FLINT ENERGY



SUSTAINABILITY & ENERGY STATEMENT

30 West Street, Horsham, RH12 1PB

DOCUMENT CONTROL

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1.1	Lee Smith	Dion Mellows	Lee Smith

VERSION	DATE	PROJECT STAGE	STATUS	DESCRIPTION
1.0	15/06/2026	Strategic Design	The issue for Planning Submission	Initial report as per the proposed layout drawings
1.1	22/06/2026	Strategic Design	The issue for Planning Submission	Removal of existing dwelling information

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1. EXECUTIVE SUMMARY

Flint Energy Ltd has been commissioned to prepare an energy and sustainability statement for a full planning application proposal in the jurisdiction of the Horsham, Surrey. The site is located at 30 West Street, Horsham, RH12 1PB. The applicant wishes to add a further storey to the existing to contain a further 2no flats.

This 'Sustainability and Energy Statement' demonstrates that the development will incorporate sustainable design and construction measures throughout all stages of the development. It sets out how the development will comply with relevant National, Regional and Local Policies. This energy statement provides an assessment of the energy demand and Carbon Dioxide (CO2) emissions for the proposed residential development. The proposed residential development will be compared with the notional dwelling set under the Building Regulations Approved Document Part L Volume 1, 2021 edition. The predicted energy consumption and demand has been based upon preliminary proposed drawings received from 'KJC Architects'.

The energy strategy seeks to address the following main objectives for the proposed building:

1. Comply with 2021 Building Regulations, Approved Document Part L Volume 1, 2021 Edition
2. Achieve 35% CO2 emissions reductions. To satisfy the planning conditions:
    a. An Energy Statement and Water Efficiency statement to satisfy the planning condition as described below:
    b. The development hereby approved shall not be first occupied unless and until an Energy and Water Efficiency Statement has been submitted to and approved in writing by the Local Planning Authority. The Statement shall detail how the development will:
        - Ensure that the potential water consumption by occupants of each new dwelling does not exceed 110 litres per person per day
        - Achieve 35% carbon emission reduction
    c. SAP calculations and Water Efficiency calculations to submit to Building Control in line with achieving 35% CO2 emissions

Energy Efficiency Measures for Proposed Case

The following energy efficiency measures are proposed for proposed development:

- Improved u-values for the building fabric
- Direct electric for space and water heating
- Natural ventilation
- Programmer and room thermostat as the heating control system
- Window size, orientation, opening and solar shading - windows have been designed to benefit from passive solar gain. This will reduce space heating demand. Glazing with an optimal 'g' value has been specified to maximise solar gains and benefits whilst not causing an overheating risk, in conjunction with the use of openable windows
- Low Energy Lighting
- A 4.08kWp solar photovoltaic renewable technology per dwelling is proposed at his stage
- Use low water use fittings- This reduces the amount of hot water consumed and hence the energy used to produce hot water, 105 litres/person/day using the Code for Sustainable Homes WAT 01 calculation procedure, this equates to 110 litres/person/day using the Building Regulations Approved Document Part G calculation procedure and is the enhanced standard target.

Low and Zero Carbon & Renewable Technology

The site is not suitable for an on-site Combined Heat and Power (CHP) system due to the size of the development. The 8.16kWp solar photovoltaic renewable technology is proposed at this stage for this development as a low and zero-carbon technology.

CO2 Savings

It is highlighted that this energy strategy has been developed at a very early stage in the design process and much of the information that has been used as the basis for the thermal modelling is at a preliminary stage and hence subject to change. Actual energy demands for the proposed design may, therefore, vary from the consumption figures used for modelling purposes at this stage and hence the results of this energy strategy must be considered as indicative only. The stated energy reduction targets will be adhered to as part of the developed design process.

Table 1: Carbon Dioxide Emissions for New Dwelling

SAP 10.2 CO2 PERFORMANCE	Carbon Dioxide Emissions for Domestic Buildings (Tonnes CO2 per annum)		
	Regulated	Unregulated	Total
Baseline: Part L 2021 of the Building Regulations Complaint Development (A)	1.4	-	1.4
After energy demand reduction (B)	1.0	-	1.0
After heat network / CHP (C)	1.0	-	1.0
After renewable energy (D)	0.1	-	0.1

Table 2: Regulated Residential Carbon Dioxide Savings

SAP 10.2 CO2 PERFORMANCE	Regulated domestic carbon dioxide savings		
		Tonnes CO2 per annum	%
Be Lean: Savings from energy demand reduction	A-B	0.4	30%
Be Clean: Savings from heat network / CHP	B-C	0.0	0%
Be Green: Savings from renewable energy	C-D	0.9	61%
Cumulative on site savings (E)	A-D	1.3	91%
Carbon Shortfall (F)	A-E	0.1	-
	(Tonnes CO2)		
Cumulative Savings for offset Payment (G)	4		
Cash-in-Lieu Contribution (£)	365		

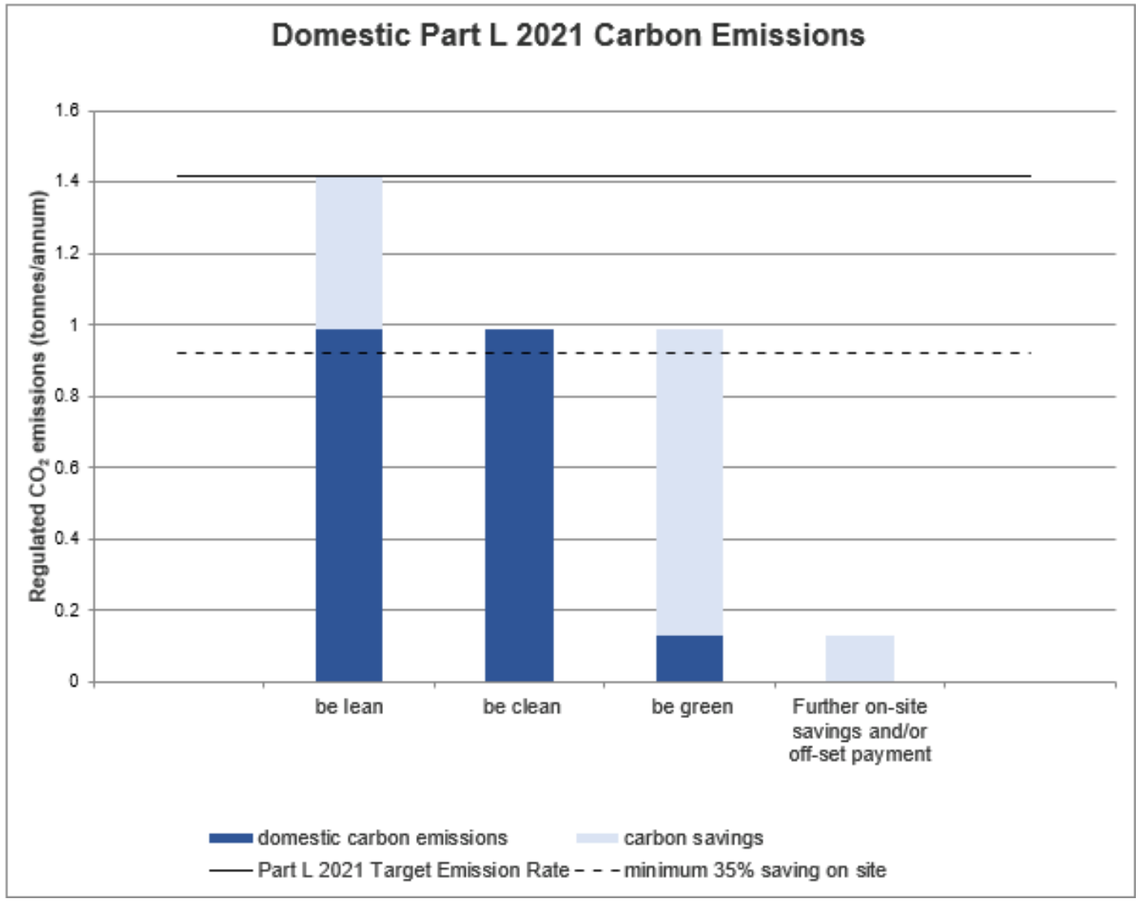


Figure 1: Domestic Part L 2021 Carbon Emissions

The proposed development achieves a cumulative saving of 1.3 tonnes of CO_2 per annum which is a 91% improvement over a baseline Part L 2021 of the building regulation-compliant development.

2. INTRODUCTION & SITE CONTEXT

Flint Energy Ltd has been commissioned to prepare an energy and sustainability statement for a full planning application proposal in the jurisdiction of the Horsham, Surrey. The site is located at 30 West Street, Horsham, RH12 1PB. The applicant wishes to add a further storey to the existing to contain a further 2no flats.

The purpose of this document is to highlight the sustainable and energy-efficient features of the proposed development. It also addresses the current planning framework identifying the design measures that meet these policies. This report details the energy strategy that has been completed for the development site. As part of this, detailed SAP calculations have been undertaken to ensure that even at this early stage, potential energy wastage as part of the operation of the development has been designed out.



Figure 2: Aerial Image of Existing Site

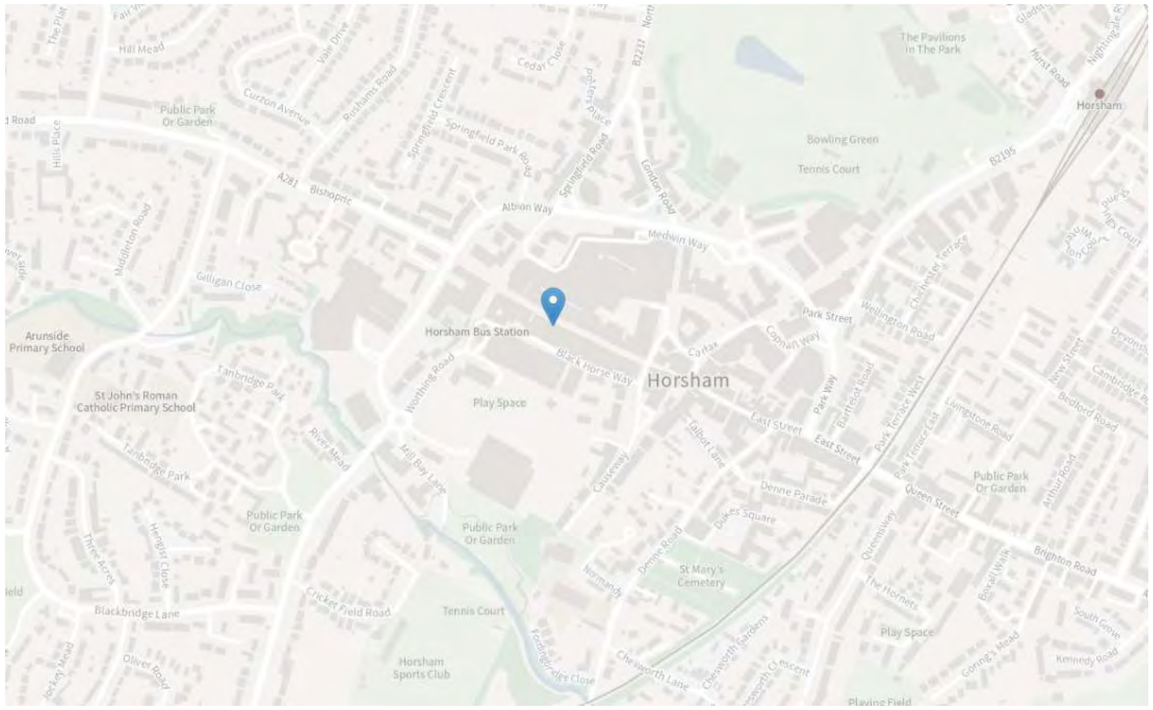


Figure 3: OS Map of Site

The site is in a busy area of Horsham, surrounded by various residential developments, schools and businesses. The applicant wishes to construct The applicant wishes to add a further storey to contain a further 2no flats.

3. ROAD TO SUSTAINABILITY

Developing sustainable projects is part of today's business reality. Costs for sustainable initiatives and strategies are reduced through improvements in technology, supply, design techniques and construction methods. Utility prices are rising and continue to do so. Individuals and organisations are starting to value the more intangible benefits associated with sustainability. Tenants, the Government and the general public are becoming increasingly more educated about the need for sustainable environments and are starting to demand these are provided where they live, work and play.

Organisations that embrace sustainability as an integral part of business planning seek to retain or grow the value of their assets over the medium to long term.

Adaptation

Even if we were to immediately curb our impact on the environment, the time lag in realising the benefits of these changes would be measured in decades. For a long time, the focus of climate change has been on mitigation – making sure we minimise our impact on the environment. Adaptation strategies are those that consider climate change and ensure that the building can deal with a future change in the climate. Given the time lag associated with climate change, even if we change the way we live, there is likely to be a noticeable change in the climate during the life of the building.

To ensure that buildings maintain their relevance, adaptation strategies must be addressed during the design phase. Adoption of these strategies will mean that, even as we undergo climate change, the buildings can still function as required.

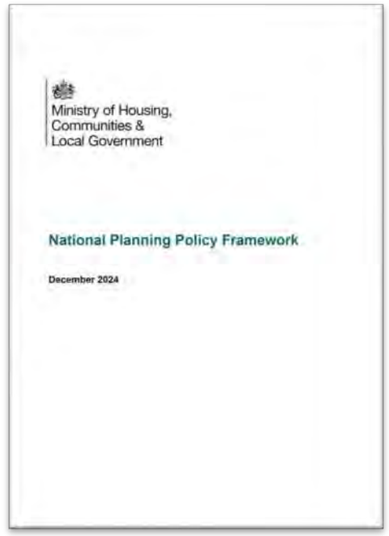
Sustainability in the Design Process

Sustainable development is a core principle throughout this project. It is important to understand the issues and drivers related to the site and the local area. Starting with a review of national, regional and local planning policies, key policies and regulations have been highlighted and used to guide the direction of the design.

A series of design team meetings commenced in 2025 and were used to discuss sustainability options and initiatives for the development. The aim was of these meetings was to maximise the contribution of the scheme to sustainable development within the site and local area constraints.

3.1 NATIONAL-LEVEL PLANNING POLICY

The Government has developed the National Planning Policy Framework (NPPF) (Department for Communities and Local Government, 2024) which plays a key role in delivering the Government's objectives on sustainable development. The framework encourages ownership at the local level and guides to promote of effective environmental protection, economic growth and ensuring a better quality of life for all, both now and in future generations.



Some of the main objectives of the Government's planning framework concerning sustainability are:

Build prosperous communities with opportunities for employment and economic growth across all areas of society;

Reduce the need for car dependency and provide easy access to public transport;

Maintain, and enhance or restore biodiversity and geological interests;

Help reduce carbon emissions through the adoption of passive design, and low and zero-carbon renewable technologies (LZCs);

Protect the condition of the land, its use, and its development from potential hazards;

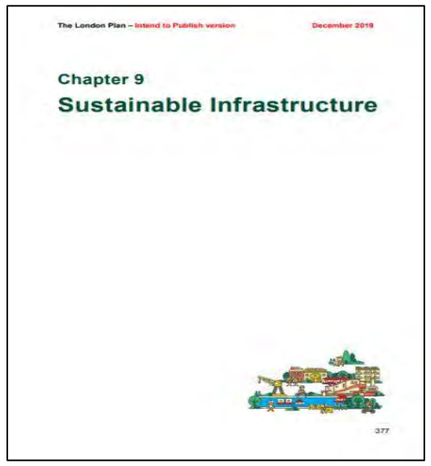
Ensure that all new developments contribute to the Government's targets of carbon emission reductions.

Supporting the building of zero-carbon homes and business premises that are low energy and produce lower carbon emissions Supporting integrated development.

3.2 REGIONAL-LEVEL PLANNING POLICY

The London Plan 2021 is the Spatial Development Strategy for Greater London. It sets out a framework for how London will develop over the next 20-25 years and the Mayor's vision for Good Growth. The Plan is part of the statutory development plan for London, meaning that the policies in the Plan should inform decisions on planning applications across the capital. Borough's Local Plans must be in 'general conformity with the London Plan, ensuring that the planning system for London operates in a joined-up way and reflects the overall strategy for how London can develop sustainably, which the London Plan sets out.





Policy SI 3 Energy infrastructure

A) Boroughs and developers should engage at an early stage with relevant energy companies and bodies to establish the future energy and infrastructure requirements arising from large-scale development proposals such as Opportunity Areas, Town Centres, other growth areas or clusters of significant new development.

B) Energy master plans should be developed for large-scale development locations (such as those outlined in Part A and other opportunities) which establish the most effective energy supply options. Energy master plans should identify:

1) Major heat loads (including anchor heat loads, with particular reference to sites such as universities, hospitals and social housing)
2) Heat loads from existing buildings that can be connected to future phases of a heat network
3) major heat supply plant including opportunities to utilise heat from energy from waste plants
4) Secondary heat sources, including both environmental and waste heat
5) Opportunities for low and ambient temperature heat networks
6) Possible land for energy centres and/or energy storage
7) Possible heating and cooling network routes
8) Opportunities for future-proofing utility infrastructure networks to minimise the impact of road works
9) Infrastructure and land requirements for electricity and gas supplies
10) Implementation options for delivering feasible projects, considering issues of procurement, funding and risk, and the role of the public sector
11) Opportunities to maximise renewable electricity generation and incorporate demand-side response measures.

C) Development Plans should:

1) Identify the need for, and suitable sites for, any necessary energy infrastructure requirements including energy centres, energy storage and upgrades to existing infrastructure
2) Identify existing heating and cooling networks, identify proposed locations for future heating and cooling networks and identify opportunities for expanding and interconnecting existing networks as well as establishing new networks.

D) Major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system:

1) the heat source for the communal heating system should be selected in accordance with the following heating hierarchy:

a) connect to local existing or planned heat networks
b) use zero-emission or local secondary heat sources (in conjunction with a heat pump, if required)
c) use low-emission combined heat and power (CHP) (only where there is a case for CHP to enable the delivery of an area-wide heat network, meet the development's electricity demand and provide demand response to the local electricity network)
d) use ultra-low NOx gas boilers

2) CHP and ultra-low NOx gas boiler communal or district heating systems should be designed to ensure that they meet the requirements in Part B of Policy SI 1 Improving air quality
3) where a heat network is planned but not yet in existence the development should be designed to allow for a cost-effective connection at a later date.

E) Heat networks should achieve good practice design and specification standards for primary, secondary and tertiary systems comparable to those set out in the CIBSE/ADE Code of Practice CP1 or equivalent.

Policy SI 2 Minimising greenhouse gas emissions

A. Major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:
1) Be lean: use less energy and manage demand during operation
2) Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
3) Be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
4) Be seen: monitor, verify and report on energy performance

B. Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

C. A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:
1) through a cash-in-lieu contribution to the borough's carbon offset fund, or
2) off-site provided that an alternative proposal is identified, and delivery is certain.

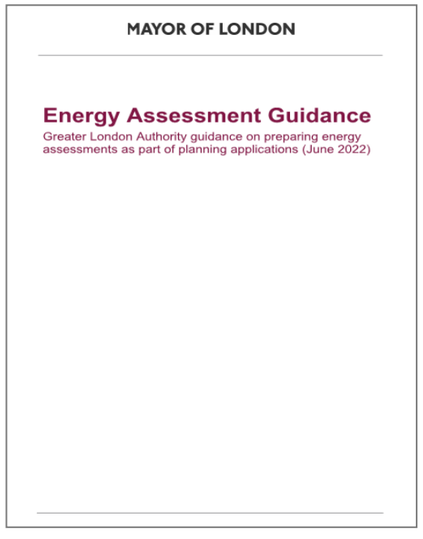
D. Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.

E. Major development proposals should calculate and minimize carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

F. Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

GLA Energy Assessment Guidance (June 2022)

London Plan requires each major development proposal to submit a detailed energy assessment based on the GLA guidance.



This guidance document explains how to prepare an energy assessment to accompany strategic planning applications referred to the Mayor as set out in London Plan Policy SI 2. It is for anyone involved, or with an interest, in developing energy assessments, including developers, energy consultants and local government officials. Although primarily aimed at strategic planning applications, London boroughs are encouraged to apply the same structure for energy assessments related to non-referable applications and adapt it for relevant scales of development. Major developments are required to achieve a minimum of 35 per cent on-site carbon reduction over Part L 2021. Residential developments are expected to be able to exceed this, and so an additional benchmark has been set that residential developments should be aiming to achieve. The benchmarks may be updated periodically to include additional building types and to reflect improvements in performance over time.

Building type	Minimum on-site improvement over Part L 2021(per cent)	Benchmark improvement over Part L 2021 (per cent)
Residential	35 per cent	50 per cent+

3.3 CONSERVE ENERGY, WATER AND OTHER RESOURCES

The impact that the built environment has on climate change and the associated feedback loop of climate change on the built environment is well documented. The development has an opportunity to demonstrate a best-practice approach to addressing these issues. The most significant source of emissions is associated with the ongoing operation of the building. A hierarchy for reducing these emissions are integer to the design process of the buildings.

Measures to be considered for the proposed development:

- Improved u-values for the building fabric
- Direct electric for space and water heating
- Natural ventilation
- Programmer and room thermostat as the heating control system
- Window size, orientation, opening and solar shading - windows have been designed to benefit from passive solar gain. This will reduce space heating demand. Glazing with an optimal 'g' value has been specified to maximise solar gains and benefits whilst not causing an overheating risk, in conjunction with the use of openable windows
- Low Energy Lighting
- A 3.15kWp solar photovoltaic renewable technology is proposed at his stage
- Use low water use fittings- This reduces the amount of hot water consumed and hence the energy used to produce hot water, 105 litres/person/day using the Code for Sustainable Homes WAT 01 calculation procedure, this equates to 110 litres/person/day using the Building Regulations Approved Document Part G calculation procedure and is the enhanced standard target.

3.4 CONSERVE & ENHANCE THE NATURAL ENVIRONMENT & BIODIVERSITY

It is important to recognise the benefits of wildlife to people and help to identify ways to better promote, and engage people in, biodiversity conservation in the area. The site is not within the conservation area.

3.5 CLIMATE CHANGE ADAPTATION AND RESILIENCE

Climate change is the rise in average global temperature due to increasing levels of greenhouse gases in the earth's atmosphere (primarily CO_2) that prevent the radiation of heat into space. The climate change projections for London are

Hotter summers

Milder winters

Increased periods without rain

Increased intensity in rainfall

More extreme weather events

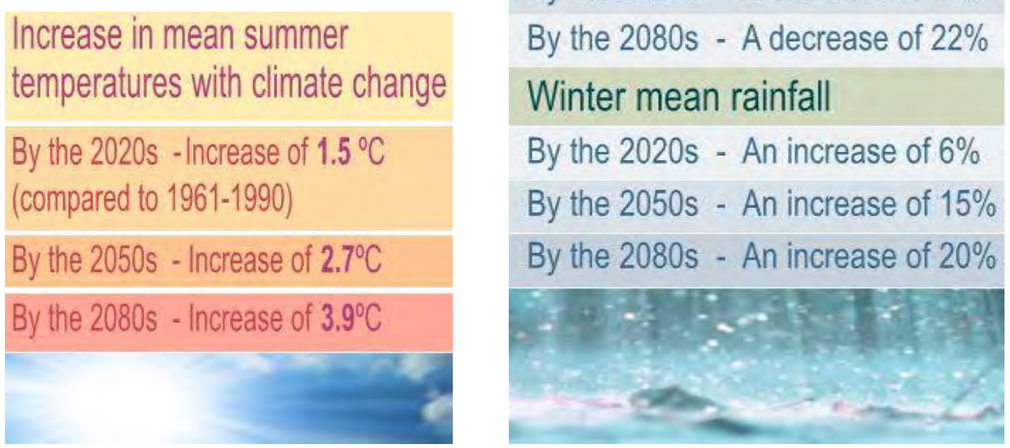
Buildings and spaces built today should respond to climate change issues and adapt to mitigation and adaptation measures. The council through its policies addresses these issues and will be required to consider how their developments will function in the future in the context of changing climate.

3.6 CLIMATE CHANGE MITIGATION & ADAPTATION MEASURES

Even if we were to immediately curb our impact on the environment, the time lag in realising the benefits of these changes would be measured in decades. For a long time, the main focus of climate change has been on mitigation – making sure we minimise our impact on the environment. Adaptation strategies are those that take into account climate change and ensure that the building is capable of dealing with present and future changes in the climate. Given the time lag associated with climate change, even if we change the way we live, there is likely to be a noticeable change in the climate during the life of the building.

To ensure that buildings maintain their relevance, adaptation strategies must be addressed during the design phase. Adoption of these strategies will mean that, even as we undergo climate change, the buildings can still function as required.

According to the latest climate projections, London will experience hotter and drier summers, warmer and wetter winters and an increase in the frequency and severity of storm events over the coming decades.



London and the southeast are classified as 'Seriously' water stressed, meaning that more water is taken from the environment than the environment can sustain in the long term. For development proposals, the early design stage is the most cost-effective time to incorporate relevant design and technological measures to adapt to climate change.

Responding to climate change must be an integral and essential part of the development process. This will be to ensure that buildings are fit for purpose in the future.

Preventative and adaptive measures will generate long-term savings, particularly for energy and water use and over time the inclusion of such measures should have positive impacts on the property value as occupiers become more aware of the impacts of climate change on their environment.

Energy-efficient dwellings/buildings will be well insulated, have low air permeability and make use of winter solar gain, however, the effects of these improved standards are an increased risk of overheating from solar gains in summer which could result in increased use of energy for cooling.

The next chapter will discuss the guiding principles and building services system selection for the proposed development.

4. GUIDING PRINCIPLES FOR BUILDING SERVICES SYSTEM SELECTION

4.1 ASSESSMENT AND ANALYSIS

The predicted energy consumption is based on concept design stage information. Actual energy demands for the proposed design may vary from the consumption figures used for modelling purposes at this stage.

The calculation methodology used to predict energy consumption and carbon dioxide emissions are the same as that approved for demonstrating compliance with Part L 2021 Volume 1 of the Building Regulations.

The Standard Assessment Procedure for the Energy Rating of Dwellings (SAP 10). Approved Document L Volume 1, 2021 explains how the Target Emission Rate (TER) and Dwelling Emission Rate (DER) are calculated.

The Building Regulations only control the certain end uses of energy (heating, hot water, cooling, fans, pumps and controls; and lighting). The approved software also calculates the major non-controlled end uses.

4.2 DWELLING ENERGY PERFORMANCE RATINGS

This building is designed to comply with the Notional Dwelling minimum standards of the building regulations. The baseline emissions are set from the 'notional dwelling', which is the same size and shape as the 'actual dwelling' built to concurrent specifications and is used to determine the carbon emission.

This building has been designed to comply with the requirements of the Building Regulations Approved Document Part L1 2021 as a minimum. In addition to this a baseline building has been created to determine the performance improvements. This is completed by using the input data from Table 3 and then the same building geometry for each residential unit to get a zero baseline from which to improve upon. The 'Be Lean' assessment then improves on the building fabric only to isolate fabric improvements to the units. Following this, further assessments then follow under the categories of 'Be Clean' and 'Be Green' to indicate improvements following the addition of LZC technologies. This is the assessment methodology under the GLAs Energy Assessment guidance.

Table 4.1 Limiting U-values for new fabric elements and air permeability in new dwellings

Element type	Maximum U-value[1] W/(m²·K)
All roof types[2]	0.16
Wall[2]	0.26
Floor	0.18
Party wall	0.20
Swimming pool basin[3]	0.25
Window[4][5]	1.6
Rooflight[4][6]	2.2
Doors (including glazed doors)	1.6
Air permeability	8.0m³/(h·m²) @ 50Pa 1.57m³/(h·m²) @ 4Pa

NOTES:

1. Area-weighted average values.
2. For dormer windows, 'roof' includes the roof parts of the windows and 'wall' includes the wall parts (cheeks).
3. The U-value of a swimming pool basin (walls and floor) calculated according to **BS EN ISO 13370**.
4. If performance requires thicker glass to be used, an equivalent window unit with standard thickness (6mm) glazing should be shown to meet the required standard.
5. Including roof windows and curtain walling.
6. U-values for rooflights or rooflight-and-kerb assemblies should be based on the developed surface area of the rooflight (U_d-values), which is often greater than the area of the roof opening. Further guidance on U_d-values is given in the Building Research Establishment's BR 443 and the National Association of Rooflight Manufacturers' Technical Document NTD02.
7. The limiting value for rooflights also applies to kerbs that are supplied as part of a single rooflight-and-kerb assembly sourced from the same supplier and for which the supplier can provide a combined U_d-value for the assembly. An upstand built on site should not exceed a U-value of 0.35W/(m²·K).

Table 3: Limiting U-Values

4.3 LONDON HEAT MAP

The London Heat Map appraises opportunities for decentralised energy projects in London. The map covers the whole of Greater London, and provides very local information to help you identify and develop DE opportunities, including data such as:

- Locations of existing and proposed district heating networks
- Locations of potential heat supply sites

The London Heat Map is used by a wide variety of people in numerous ways:

- London Boroughs can use the new map to help develop their energy master plans.
- Property developers can use the map to help them meet the decentralised energy policies in the London Plan.
- Energy consultants can use the map to gather initial data to inform feasibility studies.

4.4 DECENTRALISED ENERGY MASTER PLANNING

The Decentralised Energy Master planning programme (DEMaP), was completed in October 2010. It included a heat mapping support package for the London boroughs to enable them to carry out high resolution heat mapping for their area.

To date, heat maps have been produced for 29 London boroughs with the remaining four boroughs carrying out their own data collection. All of the data collected through this process is provided on the website.

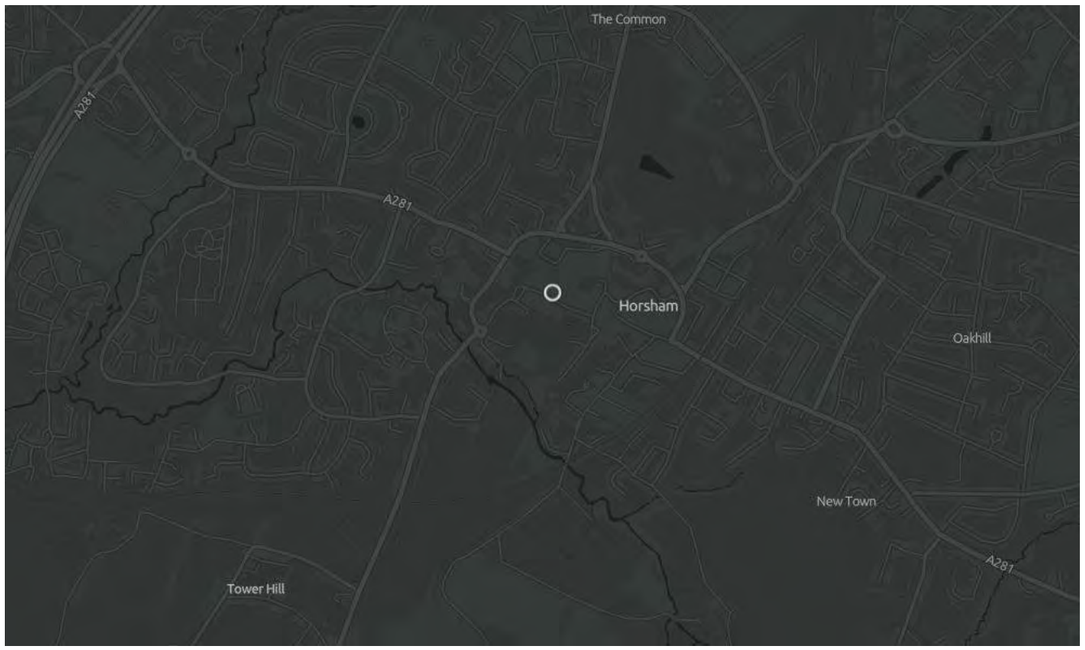


Figure 4: Heat Map of Surrounding Area

5. SAP MODEL INPUT PARAMETERS

The following Tables show the comparison of modelling input parameters for the new elements of the proposal. The baseline dwelling performance is compared with the actual proposed design dwelling performance.

Table 4: Comparison of SAP Model Input Parameters for New Builds

Elements	Part L Values	Proposed Performance
Proposed External Wall (W/m².K)	0.18	0.16
Proposed Roofs (W/m².K)	0.11	0.11
New Windows (W/m².K)	1.2	1.2
Thermal Bridging, Y value	Table K1 Defaults	Selected R.O.I Acceptable Construction Details
Air Permeability, m³.hr/m²	8.0m3/(h·m2) @ 50Pa	3m3/(h·m2) @ 50Pa
Ventilation	Natural ventilation with intermittent extract fans	Natural ventilation with intermittent extract fans
Low Energy Lighting %	Part L Values	100% Low Energy Lighting
Main Heating Fuel	Electric	Electric
Space Heating	Electric panels	Electric panel
Heating Controls	Programmer & Room Thermostat	Programmer & Room Thermostat
Hot Water Heating	Electric immersion	Electric immersion

Table 5: WWR Calculations for Proposed New Development

Window to Wall Area Ratio (WWR)	As per LETI Climate Emergency Design Guide principles in façade design, WWR<35%	<u>Flat 09</u> Wall Area = 62.38sq.m Window Area = 5.55sqm **WWR = 8.90%**
		<u>Flat 10</u> Wall Area = 57.79sq.m Window Area = 6.79sqm **WWR = 11.75%**

The next chapter discusses the summary of SAP modelling results with various design options and their comparisons.

6. SUMMARY OF MODELLING RESULTS

6.1 BUILDING REGULATIONS PART L 2021

Table 6: Carbon Dioxide Emissions for Residential Buildings

SAP 10.2 CO2 PERFORMANCE	Carbon Dioxide Emissions for Domestic Buildings (Tonnes CO2 per annum)		
	Regulated	Unregulated	Total
Baseline: Part L 2021 of the Building Regulations Complaint Development (A)	1.4	-	1.4
After energy demand reduction (B)	1.0	-	1.0
After heat network / CHP (C)	1.0	-	1.0
After renewable energy (D)	0.1	-	0.1

Table 7: Regulated Residential Carbon Dioxide Savings

SAP 10.2 CO2 PERFORMANCE	Regulated domestic carbon dioxide savings		
		Tonnes CO2 per annum	%
Be Lean: Savings from energy demand reduction	A-B	0.4	30%
Be Clean: Savings from heat network / CHP	B-C	0.0	0%
Be Green: Savings from renewable energy	C-D	0.9	61%
Cumulative on site savings (E)	A-D	1.3	91%
Carbon Shortfall (F)	A-E	0.1	-
	(Tonnes CO2)		
Cumulative Savings for offset Payment (G)	4		
Cash-in-Lieu Contribution (£)	365		

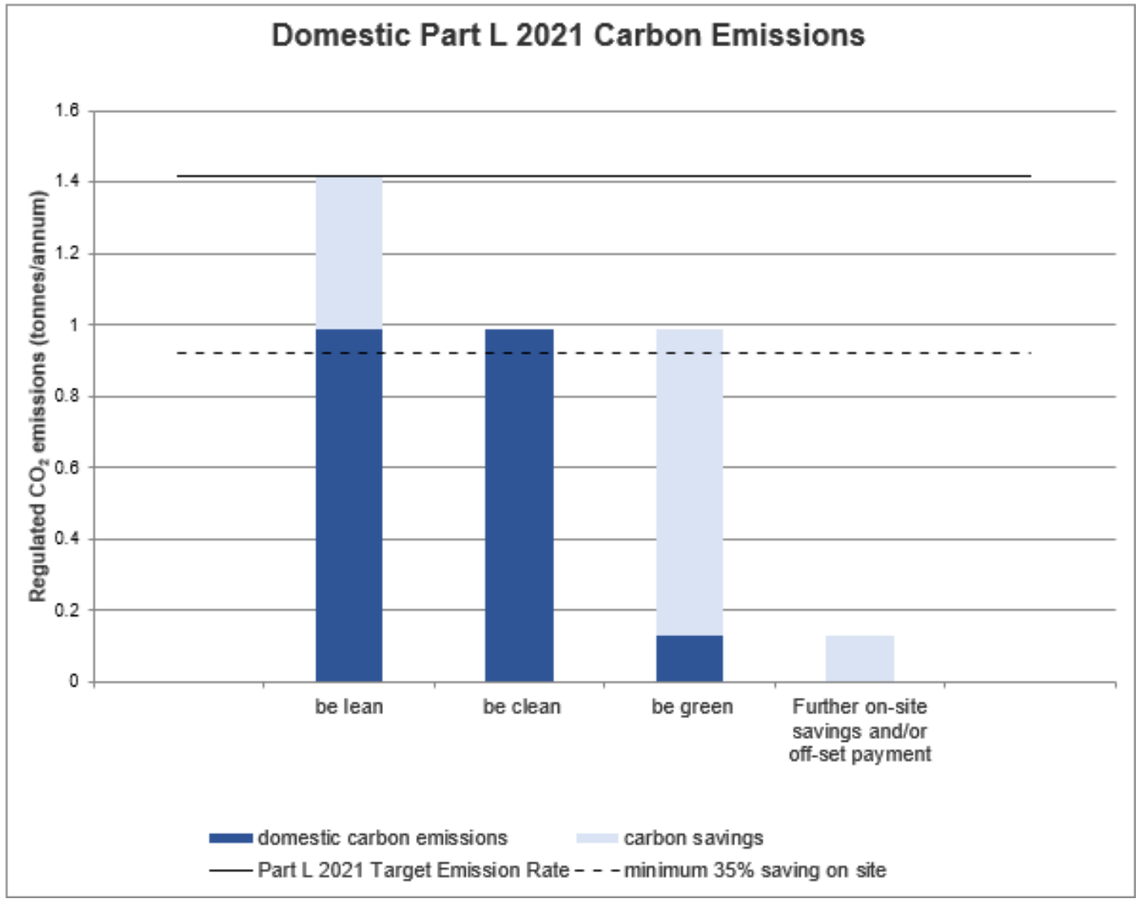


Figure 5: Domestic Part L 2021 Carbon Emissions

The proposed development achieves a cumulative saving of 1.3 tonnes of CO_2 per annum which is a 91% improvement over a baseline Part L 2021 of the building regulation-compliant development.

Table 8: Residential Predicted Energy Use Intensity and Space Heating Demand

Residential predicted energy use												
Site	TFA	# of units	Total area represented by model (m2)	EUI & space heating demand (kWh/year)			Has the following energy use been included?		Results		Table 4 of the guidance comparison	
				Space heating demand (kWh/year)	Annual Electricity Use	Annual Gas Use	Regulated	Unregulated	EUI (kWh/m2/year) (excluding renewable energy)	Space heating demand (kWh/m2/year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m2/year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance (kWh/m2/year) (excluding renewable energy)
Flat 9	58.61	1	58.61	1533.39	238.78	0	Yes	No	-0.10	22.07	35	15
Flat 10	58.22	1	58.22	1044.9	-250.19	0	Yes	No				

Table 9: Baseline DPER and Proposed DPER

URN	Baseline DPER (MWh/year)	Proposed DPER (MWh/year)	Improvement %
Flat 9	146.85	33.5	77.19%
Flat 10	167.71	45.86	72.66%

7. CONCLUSION

Flint Energy Ltd has been commissioned to prepare an energy and sustainability statement for a full planning application proposal in the jurisdiction of the Horsham, Surrey. The site is located at 30 West Street, Horsham, RH12 1PB. The applicant wishes to add a further storey to the existing to contain a further 2no flats.

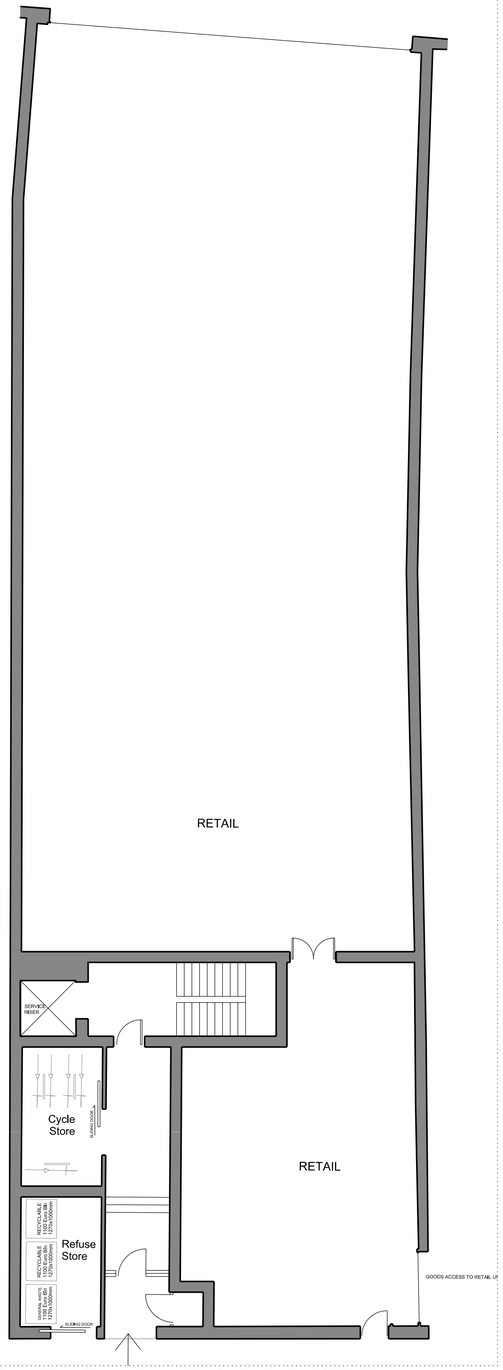
The residential units will be compared with the notional dwelling set under the Building Regulations Approved Document Part L 2021 edition. The site is not suitable for an on-site Combined Heat and Power (CHP) system due to the size of the development.

SAP10.2 CO2 emission results

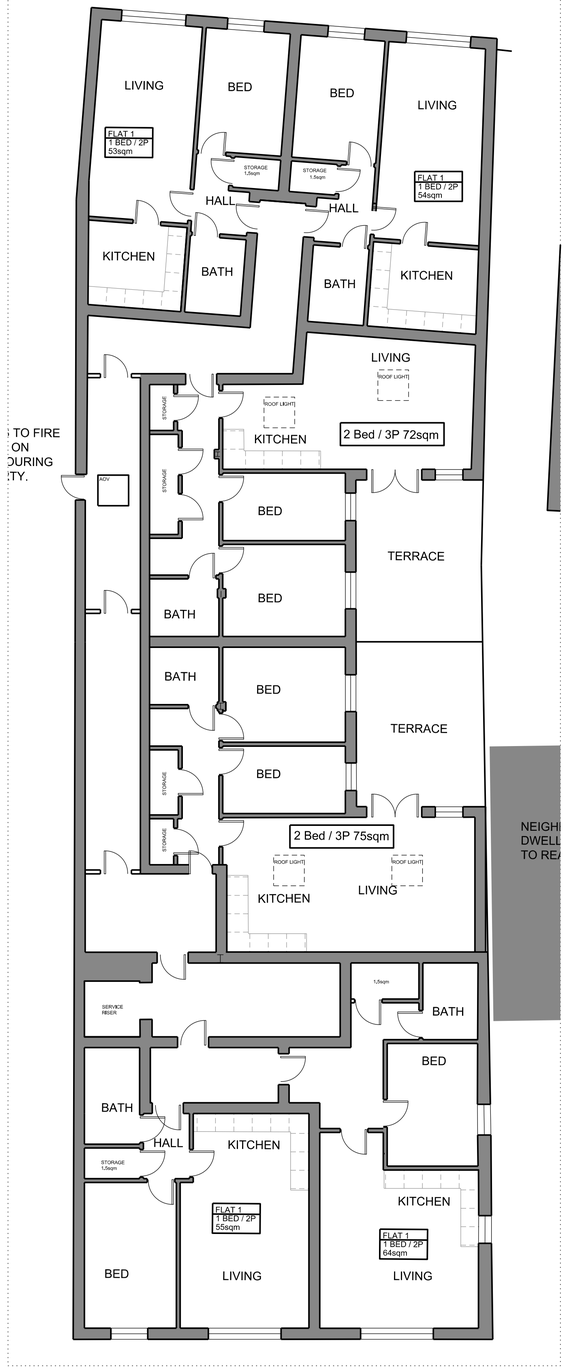
The proposed development achieves a cumulative saving of 5.1 tonnes of CO_2 per annum which is a 58% improvement over a baseline Part L 2021 of the building regulation-compliant development.

It is highlighted that this energy strategy has been developed at a very early stage in the design process and much of the information that has been used as the basis for the thermal modelling is at a preliminary stage and hence subject to change. Actual energy demands for the proposed design may, therefore, vary from the consumption figures used for modelling purposes at this stage and hence the results of this energy strategy must be considered as indicative only.

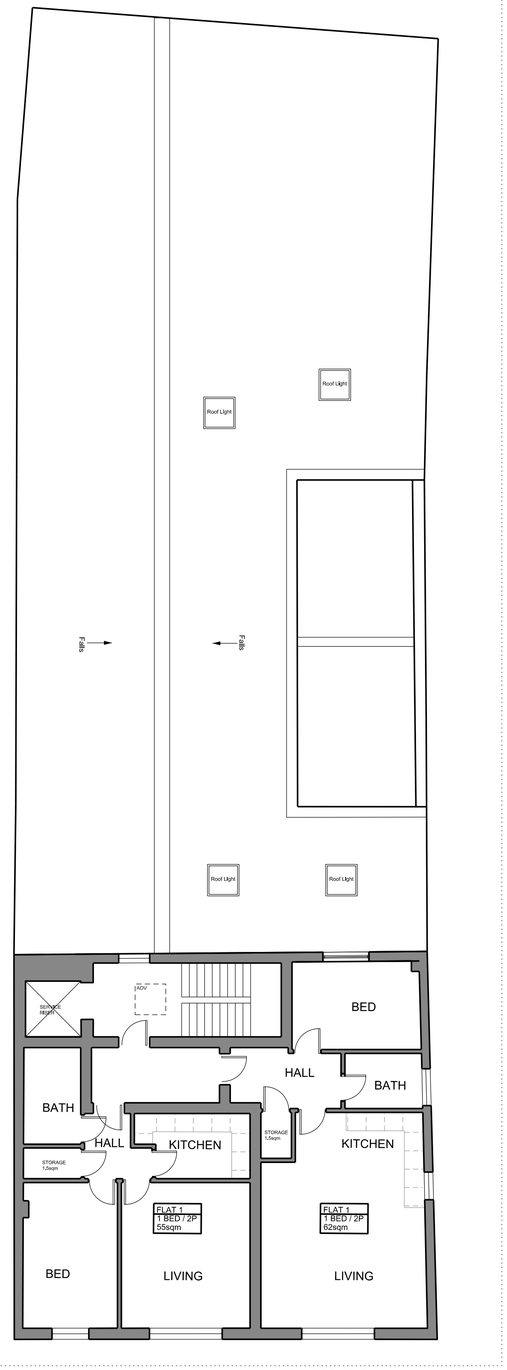
8. APPENDIX A DRAWINGS PACKAGE



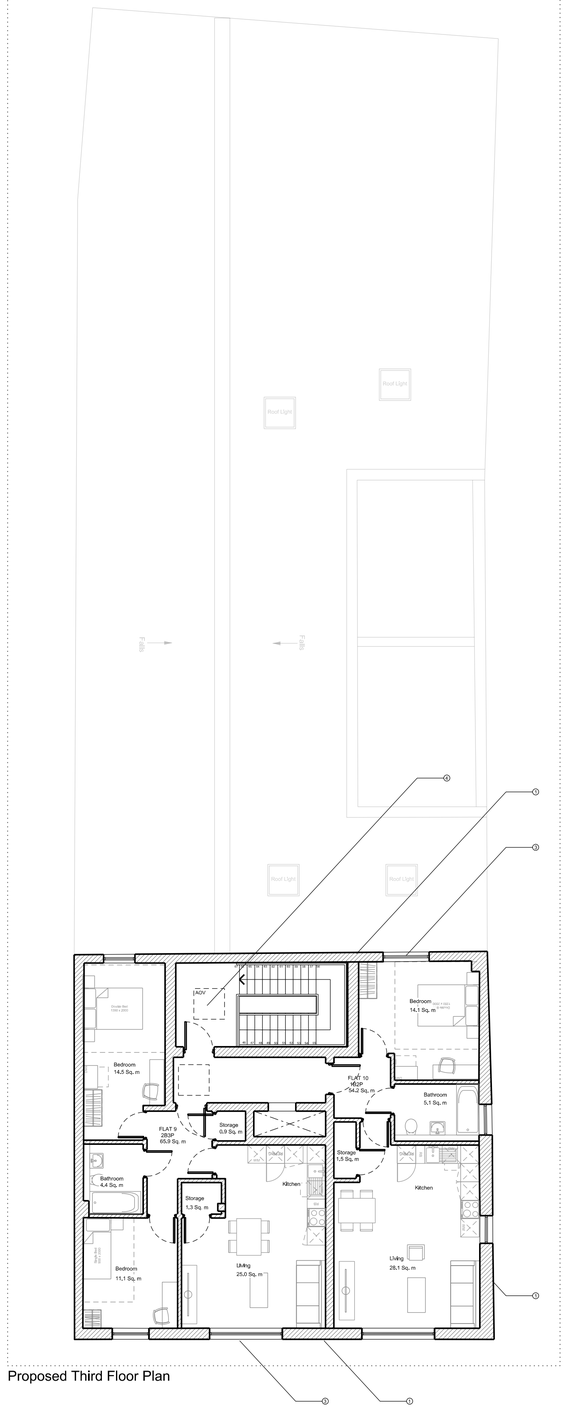
Existing Ground Floor Plan as Approved by the Application DC260146



Existing First Floor Plan as Approved by the Application DC260146



Existing Second Floor Plan as Approved by the Application DC260146



Proposed Third Floor Plan

KJC architects
2 Grove Cottage
Carshalton, SM5 3BD
+44 (0) 20 3745 4405

30 West Street
Horsham, RH12 1PB

Proposed Plans - General Arrangement
Ground, First, Second and Third Floor

INFORMATION 1:100@A1 or 1:200@A3

Project No	Type	Blg	Number	Zone/Lvl	Rev
2605	P	01	0210	ZXX	5

0 1 2 3 4 5m
Scalebar

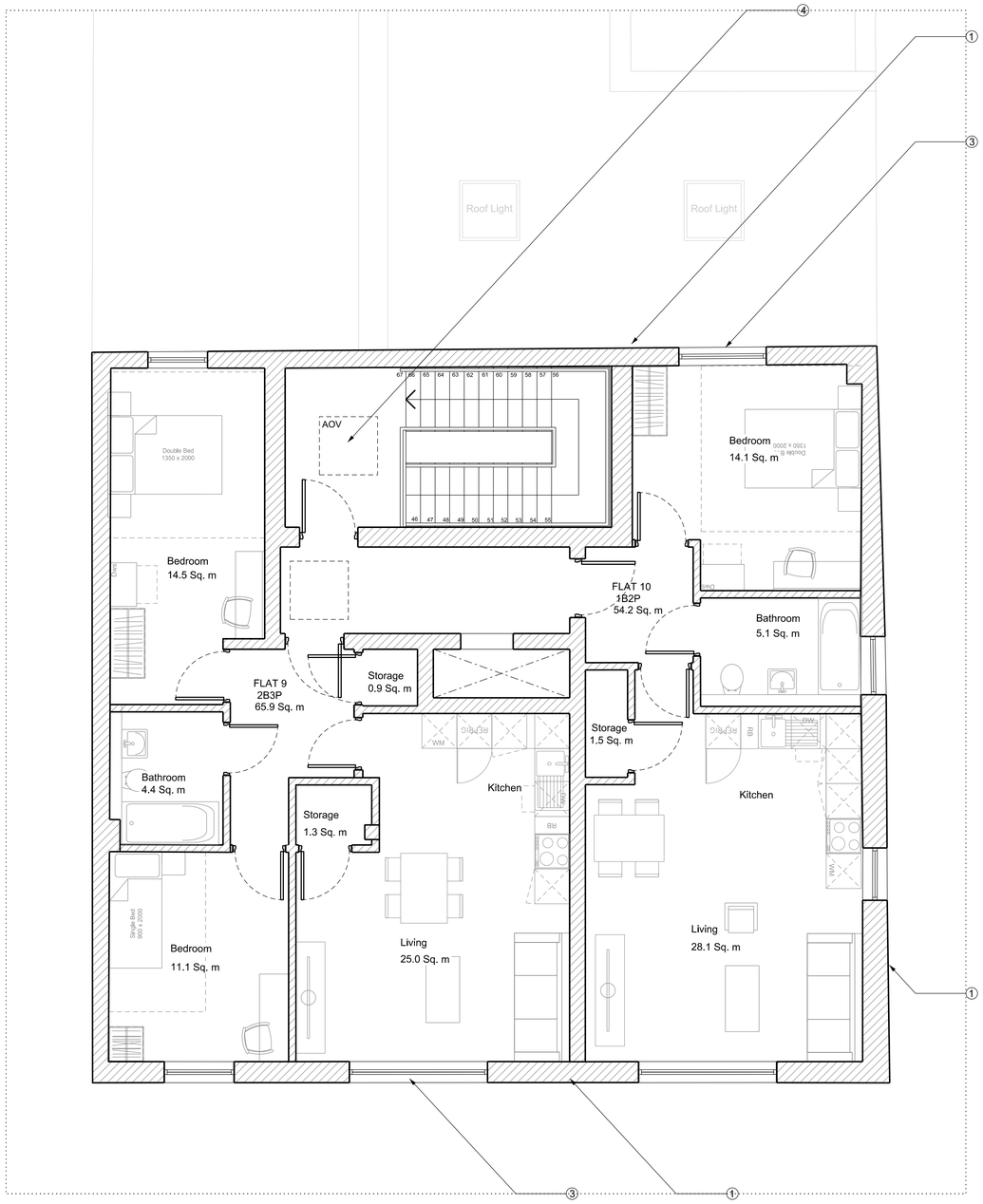
North

Notes:
1. Do not scale
2. Contractor to Check all dimensions and report omissions and errors to the Architect

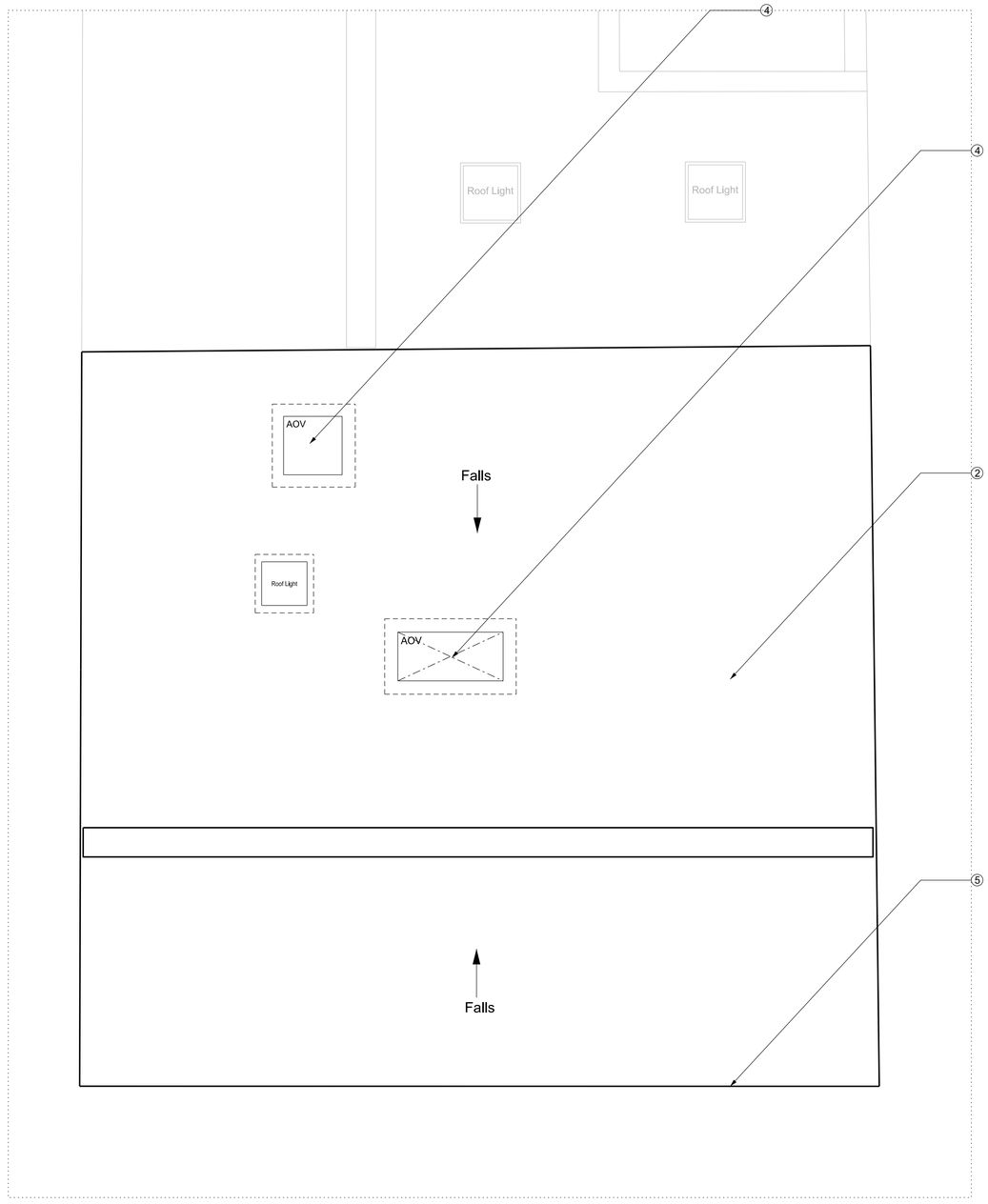
No	Revision	Date	Initial	Chkd
16				
15				
14				
13				
12				
11				
10				
09				
08				
07				
06				
05	Issued to Consultant	16.06.26	CS	KJC
04	Issued to Consultant	15.06.26	CS	KJC
03	Issued to Consultant	15.06.26	CS	KJC
02	Issued to Consultant	18.05.26	CS	KJC
01	Issued to Client	27.04.26	CS	KJC

Material Legend / Notes

1. Render to match existing
2. Flat UPVC roof to match existing
3. All new propsed windows to match existing UPVC windows
4. Proposed alluminium roof light/AOV to match existing
5. Concrete coping stone



Proposed Third Floor Plan



KJC
architects
2 Grove Cottage
Old Watercress Walk
Carshalton SM5 3BD
+44 (0) 20 3745 4405

30 West Street
Horsham, RH12 1PB

Proposed Third Floor Plan and Roof Plan

INFORMATION 1:50@A1 or 1:100@A3

Project No	Type	Bldg	Number	Zone/Lvl	Rev
2605	P	01	0211	Z03	04

0 1 2 3 4 5m

Site Boundary
New Proposed

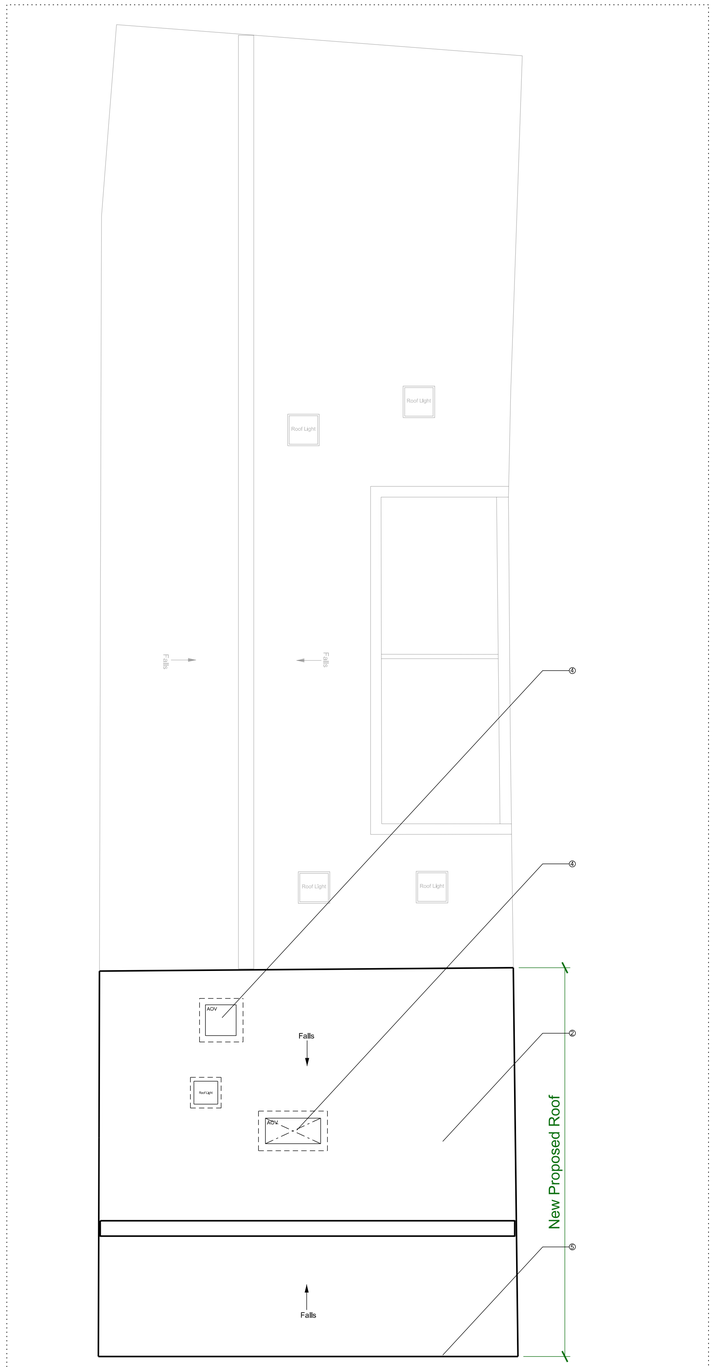
North

Notes:
1. Do not scale
2. Contractor to Check all dimensions and report omissions and errors to the Architect

No	Revision	Date	Initial	Chkd
04	Issued for Consultants	16.06.26	CS	KJC
03	Issued for Consultants	15.06.26	CS	KJC
02	Issued for DAS	12.06.26	CS	KJC
01	Issued to Client	14.05.26	CS	KJC

Material Legend / Notes

1. Render to match existing
2. Flat UPVC roof to match existing
3. All new propsed windows to match existing UPVC windows
4. Proposed alluminium roof light/AOV to match existing
5. Concrete coping stone



Proposed Roof Plan

KJC
architects
2 Grove Cottage
Carshalton, SM5 3BD
+44 (0) 20 3745 4405

30 West Street
Horsham, RH12 1PB

Proposed Plans - General Arrangement
(Roof)

INFORMATION 1:100@A1 or 1:200@A3

Project No	Type	Blg	Number	Zone/Lvl	Rev
2605	P	01	0212	Z04	3

0 1 2 3 4 5m

Scalebar

North

Notes:
1. Do not scale
2. Contractor to Check all dimensions and report omissions and errors to the Architect

No	Revision	Date	Initial	Chkd
16				
15				
14				
13				
12				
11				
10				
09				
08				
07				
06				
05				
04				
03	Issued to Consultant	16.06.26	CS	KJC
02	Issued to Consultant	18.05.26	CS	KJC
01	Issued to Client	27.04.26	CS	KJC

Material Legend / Notes

1. Render to match existing
2. Flat UPVC roof to match existing
3. All new propsed windows to match existing UPVC windows
4. Proposed alluminium roof light/AOV to match existing
5. Concrete coping stone



Proposed Front Elevation

KJC
architects

2 Grove Cottage
Old Watercress Walk
Carshalton SM5 3BD
+44 (0) 20 3745 4405

30 West Street
Horsham, RH12 1PB

Proposed Front Elevation

INFORMATION 1:50@A1 or 1:100@A3

Project No	Type	Blg	Number	Zone/Lvl	Rev
2605	P	01	0220	ZNO	05

0 1 2 3 4 5m

North

Notes:
1. Do not scale
2. Contractor to Check all dimensions and report omissions and errors to the Architect

No	Revision	Date	Initial	Chkd
05	Issued to Consultants	16.06.26	CS	KJC
04	Issued to Consultants	15.06.26	CS	KJC
03	Issued for DAS	12.06.26	CS	KJC
02	Issued to Consultant	18.05.26	CS	KJC
01	Issued to Client	27.04.26	CS	KJC

Material Legend / Notes

1. Render to match existing
2. Flat UPVC roof to match existing
3. All new propsed windows to match existing UPVC windows
4. Proposed alluminium roof light/AOV to match existing
5. Concrete coping stone



Proposed Rear Elevation

KJC
architects

2 Grove Cottage
Old Watercress Walk
Carshalton SM5 3BD
+44 (0) 20 3745 4405

30 West Street
Horsham, RH12 1PB

Proposed Rear Elevation

INFORMATION 1:50@A1 or 1:100@A3

Project No	Type	Blg	Number	Zone/Lvl	Rev
2605	P	01	0221	ZNO	05

0 1 2 3 4 5m

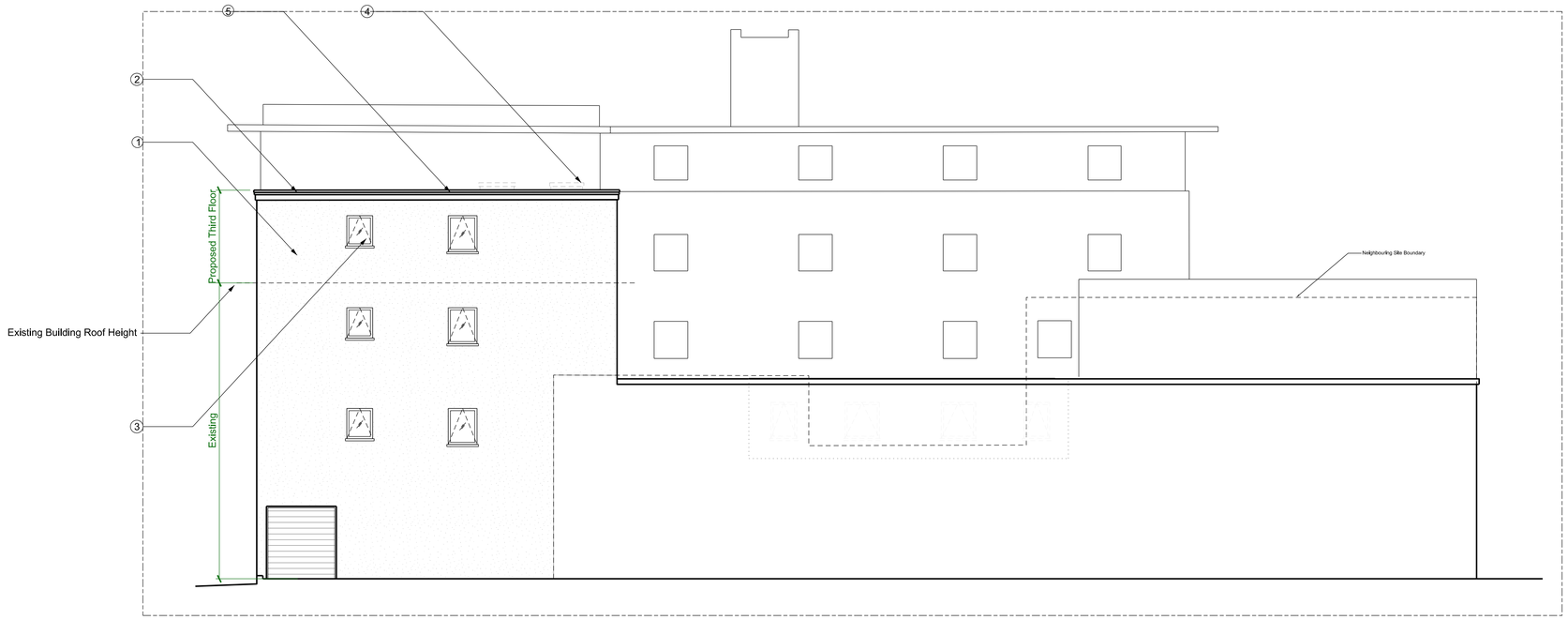
North

Notes:
1. Do not scale
2. Contractor to Check all dimensions and report omissions and errors to the Architect

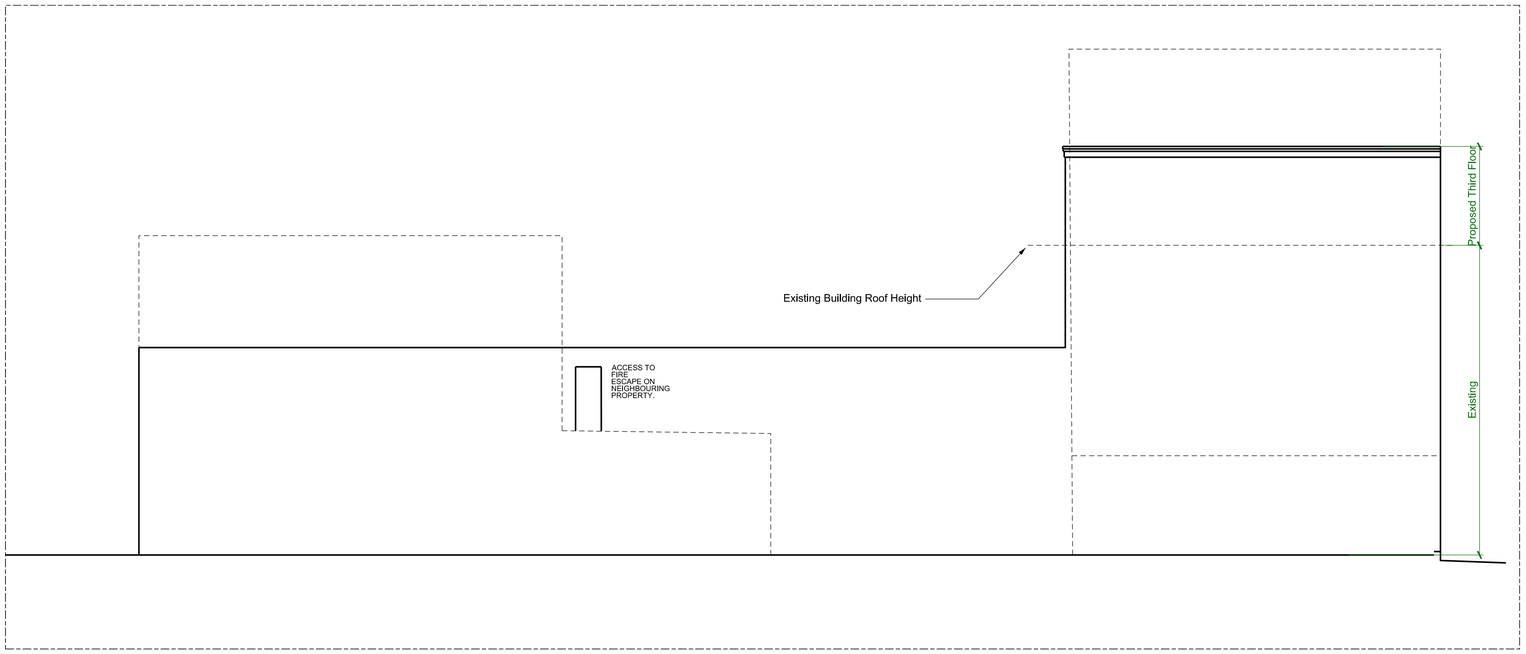
No	Revision	Date	Initial	Chkd
05	Issued to Consultants	16.06.26	CS	KJC
04	Issued to Consultants	15.06.26	CS	KJC
03	Issued for DAS	12.06.26	CS	KJC
02	Issued to Consultant	18.05.26	CS	KJC
01	Issued to Client	27.04.26	CS	KJC

Material Legend / Notes

1. Render to match existing
2. Flat UPVC roof to match existing
3. All new propsed windows to match existing UPVC windows
4. Proposed alluminium roof light/AOV to match existing
5. Concrete coping stone



Proposed Side Elevation (East)



Proposed Side Elevation (West)

KJC
architects
2 Grove Cottage
Old Watercress Walk
Carshalton SM5 3BD
+44 (0) 20 3745 4405

30 West Street
Horsham, RH12 1PB

Propsed Side Elevations

INFORMATION 1:50@A1 or 1:100@A3

Project No	Type	Blg	Number	Zone/Lvl	Rev
2605	P	01	0222	ZNO	04

0 1 2 3 4 5m

North

Notes:
1. Do not scale
2. Contractor to Check all dimensions and report omissions and errors to the Architect

No	Revision	Date	Initial	Chkd
04	Re-issued for Consultant	16.06.26	CS	KJC
03	Re-issued for Consultant	15.06.26	CS	KJC
02	Issued for Consultant	18.05.26	CS	KJC
01	Issued for Planning	27.04.26	CS	KJC

Material Legend / Notes

1. Render to match existing
2. Flat UPVC roof to match existing
3. All new propsed windows to match existing UPVC windows
4. Proposed alluminium roof light/AOV to match existing
5. Concrete coping stone

9. APPENDIX B GLA SPREADSHEET

Residential

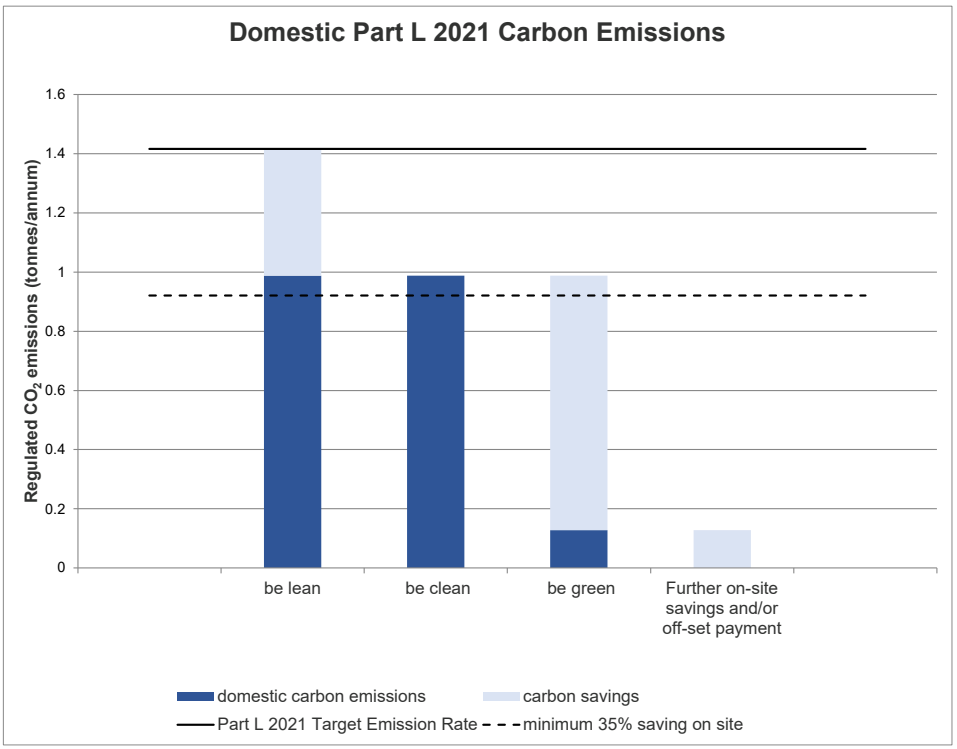
Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for residential buildings

	Carbon Dioxide Emissions for residential buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	1.4	
After energy demand reduction (be lean)	1.0	
After heat network connection (be clean)	1.0	
After renewable energy (be green)	0.1	

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for residential buildings

	Regulated residential carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	0.4	30%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	0.9	61%
Cumulative on site savings	**1.3**	**91%**
Annual savings from off-set payment	0.1	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**4**	-
Cash in-lieu contribution (£)	**365**	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab



10. APPENDIX C SAP OUTPUT SHEETS_BASELINE CASE

Summary for Input Data

elmhurst energy

Plot Reference	Flat 1	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	50 E	**DER**	15.12	**TER**	
Environmental	90 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.67	**DFEE**	59.48	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	157.74	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	254.27	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	7.40 m	50.01 m²	2.50 m

8.0 Living Area	23.40	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	18.50	11.07	0.00	None	7.43	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	17.70	0.00	None
Party Wall to Adj Flat	Filled Cavity with Edge Sealing	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	36.20	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall	Plasterboard on timber frame	9.00	91.70

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Timber I-joists, carpeted	20.00	50.01

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Suspended timber, insulation between joists	0.25	None	0.00	20.00	50.01

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Opening	Windows	External Wall 1	South West	7.43	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	3	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
LED Downlight	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	
Flue Gas Heat Recovery System	No	

Summary for Input Data

Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 1	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	50 E	**DER**	15.12	**TER**	
Environmental	90 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.67	**DFEE**	59.48	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	157.74	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b)	x 2.5000	(2b) =	125.0250	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	125.0250	(5)

---

2. Ventilation rate

---

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9900	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0729	1.0518	1.0308	0.9256	0.9046	0.7994	0.7994	0.7783	0.8415	0.9046	0.9466	0.9887	(22b)
Effective ac	1.0729	1.0518	1.0308	0.9284	0.9091	0.8195	0.8195	0.8029	0.8540	0.9091	0.9481	0.9888	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.2500	12.5025	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.3000	3.3210	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.0051			(33)
Main dwelling								
Party Wall to Adj Property			17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat			36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1			50.0100			20.0000	1000.2000	(32b)
Internal Wall			91.7000			9.0000	825.3000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12715.8900	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		254.2669	(35)
Thermal bridges (Default value 0.200 * total exposed area)		13.7020	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	38.7071	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	43.3964	42.5285	38.3030	37.5088	33.8115	33.8115	33.1268	35.2357	37.5088	39.1155	40.7953	(38)

Heat transfer coeff

	82.9714	82.1035	81.2355	77.0101	76.2159	72.5186	72.5186	71.8339	73.9427	76.2159	77.8226	79.5023 (39)
Average = Sum(39)m / 12 =												76.9909

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6591	1.6417	1.6244	1.5399	1.5240	1.4501	1.4501	1.4364	1.4786	1.5240	1.5561	1.5897	(40)
HLP (average)												1.5395	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.6904	(42)
Hot water usage for mixer showers													
	72.2726	71.1864	69.6038	66.5756	64.3409	61.8487	60.4322	62.0029	63.7247	66.4005	69.4937	71.9956	(42a)
Hot water usage for baths													
	22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497	(42b)
Hot water usage for other uses													
	31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413	(42c)
Average daily hot water use (litres/day)												116.7415	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	126.9404	124.3553	121.1358	116.0698	112.0173	107.6360	105.8265	109.0307	112.4278	117.0437	122.1929	126.5867	(44)
Energy conte	201.0426	177.0803	186.1812	158.8937	150.7968	132.3511	127.9880	135.0027	138.6348	158.8273	174.0862	198.2042	(45)
Energy content (annual)										Total = Sum(45)m =		1939.0889	
Distribution loss (46)m = 0.15 x (45)m													
	30.1564	26.5620	27.9272	23.8341	22.6195	19.8527	19.1982	20.2504	20.7952	23.8241	26.1129	29.7306	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
										Total per year (kWh/year) = Sum(64)m =		2210.6489	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month													
	85.2979	75.5448	80.3565	70.6882	68.5912	61.8627	61.0072	63.3396	63.9521	71.2613	75.7397	84.3541	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.2944	16.2489	13.2145	10.0042	7.4783	6.3135	6.8219	8.8674	11.9018	15.1121	17.6380	18.8028	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)													
	114.6477	112.4179	108.0060	98.1780	92.1924	85.9205	81.9989	85.1339	88.8223	95.7813	105.1940	113.3792	(72)
Total internal gains													
	433.3736	431.3791	418.1854	392.9116	368.9549	347.0019	333.8911	336.7908	349.2610	371.6658	399.0496	422.9158	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	36.7938	0.4600	0.7000	0.7700	61.0032	(79)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	61.0032	103.9111	142.1757	176.1626	197.3168	195.8899	188.8587	173.0768	153.9462	114.8439	73.0678	52.2061	(83)
Total gains	494.3769	535.2902	560.3611	569.0742	566.2717	542.8918	522.7498	509.8675	503.2072	486.5097	472.1174	475.1219	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	42.5712	43.0212	43.4809	45.8666	46.3446	48.7074	48.7074	49.1717	47.7693	46.3446	45.3878	44.4288	
alpha	3.8381	3.8681	3.8987	4.0578	4.0896	4.2472	4.2472	4.2781	4.1846	4.0896	4.0259	3.9619	
util living area													
	0.9876	0.9817	0.9703	0.9426	0.8821	0.7412	0.5788	0.6084	0.8127	0.9428	0.9797	0.9892	(86)
MIT	19.2612	19.4525	19.7640	20.2185	20.5852	20.8762	20.9669	20.9593	20.7978	20.3381	19.7795	19.3033	(87)
Th 2	19.5703	19.5829	19.5955	19.6577	19.6695	19.7251	19.7251	19.7355	19.7036	19.6695	19.6457	19.6209	(88)
util rest of house													
	0.9834	0.9755	0.9594	0.9198	0.8306	0.6346	0.4264	0.4599	0.7218	0.9154	0.9715	0.9855	(89)

MIT 2	17.6288	17.8789	18.2796	18.8841	19.3210	19.6552	19.7155	19.7223	19.5726	19.0443	18.3364	17.7150	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.3926	18.6152	18.9741	19.5085	19.9126	20.2265	20.3010	20.3011	20.1459	19.6497	19.0116	18.4582	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3926	18.6152	18.9741	19.5085	19.9126	20.2265	20.3010	20.3011	20.1459	19.6497	19.0116	18.4582	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9785	0.9696	0.9530	0.9167	0.8416	0.6801	0.4982	0.5296	0.7566	0.9149	0.9664	0.9812	(94)
Useful gains	483.7288	519.0368	534.0452	521.6440	476.5539	369.2135	260.4575	270.0493	380.7394	445.1133	456.2661	466.1982	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1169.2812	1126.0654	1013.3441	816.9601	625.9277	408.0247	268.3938	280.2328	447.0482	689.7283	926.9915	1133.5588	(97)
Space heating kWh	510.0510	407.9232	356.5984	212.6276	111.1341	0.0000	0.0000	0.0000	0.0000	181.9936	338.9222	496.5163	(98a)
Space heating requirement - total per year (kWh/year)												2615.7665	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	510.0510	407.9232	356.5984	212.6276	111.1341	0.0000	0.0000	0.0000	0.0000	181.9936	338.9222	496.5163	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2615.7665	
Space heating per m2											(98c) / (4) =	52.3049	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	510.0510	407.9232	356.5984	212.6276	111.1341	0.0000	0.0000	0.0000	0.0000	181.9936	338.9222	496.5163	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	510.0510	407.9232	356.5984	212.6276	111.1341	0.0000	0.0000	0.0000	0.0000	181.9936	338.9222	496.5163	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.0130	12.8462	11.5666	8.4742	6.5457	5.3479	5.9712	7.7616	10.0815	13.2275	14.9404	16.4580	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2615.7665	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2210.6489	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	129.2337	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4955.6490	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2615.7665	16.4900	431.3399	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	2210.6489	16.4900	364.5360	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	129.2337	16.4900	21.3106	(250)
Additional standing charges			0.0000	(251)
Total energy cost			817.1865	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.0964	(257)
SAP value		49.8077	
SAP rating (Section 12)		50	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2615.7665	0.1548	404.9016	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2210.6489	0.1412	312.2016	(264)
Space and water heating			717.1031	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	129.2337	0.1443	18.6524	(268)
Total CO2, kg/year			735.7556	(272)
CO2 emissions per m2			14.7100	(273)
EI value			89.6231	
EI rating			90	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b)	x 2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		125.0250	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9900	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0729	0.9887	0.9677	0.9046	0.9046	0.8415	0.8415	0.8204	0.8415	0.9466	0.9256	0.9887	(22b)
Effective ac	1.0729	0.9888	0.9682	0.9091	0.9091	0.8540	0.8540	0.8365	0.8540	0.9481	0.9284	0.9888	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.2500	12.5025	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.3000	3.3210	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.0051			(33)
Main dwelling								

Party Wall to Adj Property	17.7000	0.0000	0.0000	180.0000	3186.0000 (32)
Party Wall to Adj Flat	36.2000	0.0000	0.0000	180.0000	6516.0000 (32)
Party Ceiling 1	50.0100			20.0000	1000.2000 (32b)
Internal Wall	91.7000			9.0000	825.3000 (32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 12715.8900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 254.2669 (35)
Thermal bridges (Default value 0.200 * total exposed area) 13.7020 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 38.7071 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	40.7953	39.9463	37.5088	37.5088	35.2357	35.2357	34.5145	35.2357	39.1155	38.3030	40.7953	(38)
Heat transfer coeff	82.9714	79.5023	78.6533	76.2159	76.2159	73.9427	73.9427	73.2215	73.9427	77.8226	77.0101	79.5023	(39)
Average = Sum(39)m / 12 =												76.9119	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6591	1.5897	1.5728	1.5240	1.5240	1.4786	1.4786	1.4641	1.4786	1.5561	1.5399	1.5897	(40)
HLP (average)												1.5379	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.6904 (42)
Hot water usage for mixer showers

72.2726	71.1864	69.6038	66.5756	64.3409	61.8487	60.4322	62.0029	63.7247	66.4005	69.4937	71.9956	(42a)

Hot water usage for baths

22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497	(42b)

Hot water usage for other uses

31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413	(42c)

Average daily hot water use (litres/day) 116.7415 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	126.9404	124.3553	121.1358	116.0698	112.0173	107.6360	105.8265	109.0307	112.4278	117.0437	122.1929	126.5867	(44)
Energy conte	201.0426	177.0803	186.1812	158.8937	150.7968	132.3511	127.9880	135.0027	138.6348	158.8273	174.0862	198.2042	(45)
Energy content (annual)										Total = Sum(45)m =		1939.0889	
Distribution loss (46)m = 0.15 x (45)m	30.1564	26.5620	27.9272	23.8341	22.6195	19.8527	19.1982	20.2504	20.7952	23.8241	26.1129	29.7306	(46)

Water storage loss (or HIU loss):
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.2400 (48)
Temperature factor from Table 2b 0.6000 (49)
Enter (49) or (54) in (55) 0.7440 (55)
Total storage loss

23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)

If cylinder contains dedicated solar storage

23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
								Total per year (kWh/year) = Sum(64)m =			2210.6489	(64)
Electric shower(s)													
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
85.2979	75.5448	80.3565	70.6882	68.5912	61.8627	61.0072	63.3396	63.9521	71.2613	75.7397	84.3541	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	18.2944	16.2489	13.2145	10.0042	7.4783	6.3135	6.8219	8.8674	11.9018	15.1121	17.6380	18.8028	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)	114.6477	112.4179	108.0060	98.1780	92.1924	85.9205	81.9989	85.1339	88.8223	95.7813	105.1940	113.3792	(72)
Total internal gains	433.3736	431.3791	418.1854	392.9116	368.9549	347.0019	333.8911	336.7908	349.2610	371.6658	399.0496	422.9158	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	46.3896	0.4600	0.7000	0.7700	76.9128	(79)

Solar gains 76.9128	111.8951	152.4928	193.4785	208.3854	224.6334	211.0798	196.4229	175.3780	130.8100	91.2565	62.8726	(83)
Total gains 510.2864	543.2742	570.6782	586.3902	577.3403	571.6354	544.9709	533.2137	524.6390	502.4758	490.3061	485.7884	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	42.5712	44.4288	44.9084	46.3446	46.3446	47.7693	47.7693	48.2398	47.7693	45.3878	45.8666	44.4288	
alpha	3.8381	3.9619	3.9939	4.0896	4.0896	4.1846	4.1846	4.2160	4.1846	4.0259	4.0578	3.9619	
util living area													
	0.9828	0.9769	0.9612	0.9247	0.8427	0.6606	0.4876	0.4933	0.7342	0.9138	0.9680	0.9847	(86)
MIT	19.4637	19.6560	19.9602	20.3527	20.6954	20.9272	20.9843	20.9842	20.8832	20.4938	20.0202	19.5222	(87)
Th 2	19.5703	19.6209	19.6334	19.6695	19.6695	19.7036	19.7036	19.7145	19.7036	19.6457	19.6577	19.6209	(88)
util rest of house													
	0.9766	0.9687	0.9468	0.8948	0.7748	0.5343	0.3241	0.3294	0.6175	0.8706	0.9544	0.9791	(89)
MIT 2	17.8860	18.1609	18.5494	19.0521	19.4369	19.6709	19.7008	19.7116	19.6426	19.2078	18.6458	17.9936	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.6242	18.8605	19.2095	19.6607	20.0258	20.2587	20.3014	20.3070	20.2231	19.8095	19.2889	18.7089	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6242	18.8605	19.2095	19.6607	20.0258	20.2587	20.3014	20.3070	20.2231	19.8095	19.2889	18.7089	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9710	0.9627	0.9410	0.8945	0.7954	0.5917	0.4016	0.4071	0.6684	0.8769	0.9496	0.9741	(94)
Useful gains	495.4667	523.0255	537.0317	524.5326	459.2427	338.2629	218.8351	217.0449	350.6694	440.6292	465.5960	473.2025	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1097.2333	1046.2891	936.7225	766.7839	565.9634	359.2669	221.9295	220.1807	386.2103	623.3216	838.5551	1050.1349	(97)
Space heating kWh													
	447.7143	351.6331	297.3700	174.4209	79.4001	0.0000	0.0000	0.0000	0.0000	135.9231	268.5306	429.2377	(98a)
Space heating requirement - total per year (kWh/year)												2184.2299	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	447.7143	351.6331	297.3700	174.4209	79.4001	0.0000	0.0000	0.0000	0.0000	135.9231	268.5306	429.2377	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2184.2299	
Space heating per m2											(98c) / (4) =	43.6759	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	447.7143	351.6331	297.3700	174.4209	79.4001	0.0000	0.0000	0.0000	0.0000	135.9231	268.5306	429.2377	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	447.7143	351.6331	297.3700	174.4209	79.4001	0.0000	0.0000	0.0000	0.0000	135.9231	268.5306	429.2377	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.0130	12.8462	11.5666	8.4742	6.5457	5.3479	5.9712	7.7616	10.0815	13.2275	14.9404	16.4580	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2184.2299	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2210.6489	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												129.2337	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)

Appendix Q - special features

Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4524.1125	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2184.2299	27.6700	604.3764	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2210.6489	27.6700	611.6865	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	129.2337	27.6700	35.7590	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1251.8219	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2184.2299	0.1553	339.1588	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2210.6489	0.1412	312.2016	(264)
Space and water heating			651.3603	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	129.2337	0.1443	18.6524	(268)
Total CO2, kg/year			670.0127	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2184.2299	1.5749	3439.8943	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2210.6489	1.5222	3365.0931	(278)
Space and water heating			6804.9875	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	129.2337	1.5338	198.2230	(282)
Total Primary energy kWh/year			7003.2105	(286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating: E 50
Current environmental impact rating: B 90

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings		Energy efficiency	Environmental impact
Recommended measures				
(none)				
Total Savings	£0	0.00 kg/m²		

Potential energy efficiency rating: E 50
Potential environmental impact rating: B 90

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1252	£1252	£0
Space heating	£604	£604	£0
Water heating	£612	£612	£0
Lighting	£36	£36	£0
Total cost of fuels	£1252	£1252	£0
Total cost of uses	£1252	£1252	£0
Delivered energy	90 kWh/m²	90 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m²	13 kg/m²	13 kg/m²	0 kg/m²
Primary energy	140 kWh/m²	140 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b)	x 2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		125.0250	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	3 * 10 =	30.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.9900 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0729	1.0518	1.0308	0.9256	0.9046	0.7994	0.7994	0.7783	0.8415	0.9046	0.9466	0.9887	(22b)
Effective ac	1.0729	1.0518	1.0308	0.9284	0.9091	0.8195	0.8195	0.8029	0.8540	0.9091	0.9481	0.9888	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.2500	12.5025	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.3000	3.3210	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.0051			(33)
Main dwelling								
Party Wall to Adj Property			17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat			36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1			50.0100			20.0000	1000.2000	(32b)
Internal Wall			91.7000			9.0000	825.3000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12715.8900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		254.2669 (35)
Thermal bridges (Default value 0.200 * total exposed area)		13.7020 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	38.7071 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	43.3964	42.5285	38.3030	37.5088	33.8115	33.8115	33.1268	35.2357	37.5088	39.1155	40.7953	(38)
Heat transfer coeff	82.9714	82.1035	81.2355	77.0101	76.2159	72.5186	72.5186	71.8339	73.9427	76.2159	77.8226	79.5023	(39)
Average = Sum(39)m / 12 =												76.9909	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6591	1.6417	1.6244	1.5399	1.5240	1.4501	1.4501	1.4364	1.4786	1.5240	1.5561	1.5897	(40)
HLP (average)												1.5395	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.6904 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
72.2726	71.1864	69.6038	66.5756	64.3409	61.8487	60.4322	62.0029	63.7247	66.4005	69.4937	71.9956	(42a)

Hot water usage for baths

22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497	(42b)

Hot water usage for other uses

31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413	(42c)

Average daily hot water use (litres/day)	116.7415 (43)

Daily hot water use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
126.9404	124.3553	121.1358	116.0698	112.0173	107.6360	105.8265	109.0307	112.4278	117.0437	122.1929	126.5867	(44)
Energy conte 201.0426	177.0803	186.1812	158.8937	150.7968	132.3511	127.9880	135.0027	138.6348	158.8273	174.0862	198.2042	(45)

Energy content (annual)	Total = Sum(45)m = 1939.0889

Distribution loss (46)m = 0.15 x (45)m

30.1564	26.5620	27.9272	23.8341	22.6195	19.8527	19.1982	20.2504	20.7952	23.8241	26.1129	29.7306	(46)

Water storage loss (or HIU loss):	
Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2400 (48)

Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
									Total per year (kWh/year) = Sum(64)m =			2210.6489	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
	85.2979	75.5448	80.3565	70.6882	68.5912	61.8627	61.0072	63.3396	63.9521	71.2613	75.7397	84.3541	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.2944	16.2489	13.2145	10.0042	7.4783	6.3135	6.8219	8.8674	11.9018	15.1121	17.6380	18.8028	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)													
	114.6477	112.4179	108.0060	98.1780	92.1924	85.9205	81.9989	85.1339	88.8223	95.7813	105.1940	113.3792	(72)
Total internal gains													
	433.3736	431.3791	418.1854	392.9116	368.9549	347.0019	333.8911	336.7908	349.2610	371.6658	399.0496	422.9158	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	36.7938	0.4600	0.7000	0.7700	61.0032	(79)

Solar gains	61.0032	103.9111	142.1757	176.1626	197.3168	195.8899	188.8587	173.0768	153.9462	114.8439	73.0678	52.2061	(83)
Total gains	494.3769	535.2902	560.3611	569.0742	566.2717	542.8918	522.7498	509.8675	503.2072	486.5097	472.1174	475.1219	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	42.5712	43.0212	43.4809	45.8666	46.3446	48.7074	48.7074	49.1717	47.7693	46.3446	45.3878	44.4288	
alpha	3.8381	3.8681	3.8987	4.0578	4.0896	4.2472	4.2472	4.2781	4.1846	4.0896	4.0259	3.9619	
util living area													
	0.9876	0.9817	0.9703	0.9426	0.8821	0.7412	0.5788	0.6084	0.8127	0.9428	0.9797	0.9892	(86)
MIT	19.2612	19.4525	19.7640	20.2185	20.5852	20.8762	20.9669	20.9593	20.7978	20.3381	19.7795	19.3033	(87)
Th 2	19.5703	19.5829	19.5955	19.6577	19.6695	19.7251	19.7251	19.7355	19.7036	19.6695	19.6457	19.6209	(88)
util rest of house													
	0.9834	0.9755	0.9594	0.9198	0.8306	0.6346	0.4264	0.4599	0.7218	0.9154	0.9715	0.9855	(89)
MIT 2	17.6288	17.8789	18.2796	18.8841	19.3210	19.6552	19.7155	19.7223	19.5726	19.0443	18.3364	17.7150	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.3926	18.6152	18.9741	19.5085	19.9126	20.2265	20.3010	20.3011	20.1459	19.6497	19.0116	18.4582	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3926	18.6152	18.9741	19.5085	19.9126	20.2265	20.3010	20.3011	20.1459	19.6497	19.0116	18.4582	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9785	0.9696	0.9530	0.9167	0.8416	0.6801	0.4982	0.5296	0.7566	0.9149	0.9664	0.9812	(94)
Useful gains	483.7288	519.0368	534.0452	521.6440	476.5539	369.2135	260.4575	270.0493	380.7394	445.1133	456.2661	466.1982	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1169.2812	1126.0654	1013.3441	816.9601	625.9277	408.0247	268.3938	280.2328	447.0482	689.7283	926.9915	1133.5588	(97)
Space heating kWh													
	510.0510	407.9232	356.5984	212.6276	111.1341	0.0000	0.0000	0.0000	0.0000	181.9936	338.9222	496.5163	(98a)
Space heating requirement - total per year (kWh/year)												2615.7665	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	510.0510	407.9232	356.5984	212.6276	111.1341	0.0000	0.0000	0.0000	0.0000	181.9936	338.9222	496.5163	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2615.7665	
Space heating per m2											(98c) / (4) =	52.3049	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	510.0510	407.9232	356.5984	212.6276	111.1341	0.0000	0.0000	0.0000	0.0000	181.9936	338.9222	496.5163	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	510.0510	407.9232	356.5984	212.6276	111.1341	0.0000	0.0000	0.0000	0.0000	181.9936	338.9222	496.5163	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.0130	12.8462	11.5666	8.4742	6.5457	5.3479	5.9712	7.7616	10.0815	13.2275	14.9404	16.4580	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2615.7665	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2210.6489	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												129.2337	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												4955.6490	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2615.7665	16.4900	431.3399	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2210.6489	16.4900	364.5360	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	129.2337	16.4900	21.3106	(250)
Additional standing charges			0.0000	(251)
Total energy cost			817.1865	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.0964	(257)
SAP value		49.8077	
SAP rating (Section 12)		50	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2615.7665	0.1548	404.9016	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2210.6489	0.1412	312.2016	(264)
Space and water heating			717.1031	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	129.2337	0.1443	18.6524	(268)
Total CO2, kg/year			735.7556	(272)
CO2 emissions per m2			14.7100	(273)

EI value 89.6231
EI rating 90 (274)
EI band B

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b) x	2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		125.0250	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	3 * 10 =	30.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.9900 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0729	0.9887	0.9677	0.9046	0.9046	0.8415	0.8415	0.8204	0.8415	0.9466	0.9256	0.9887	(22b)
Effective ac	1.0729	0.9888	0.9682	0.9091	0.9091	0.8540	0.8540	0.8365	0.8540	0.9481	0.9284	0.9888	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.2500	12.5025	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.3000	3.3210	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.0051			(33)
Main dwelling								
Party Wall to Adj Property			17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat			36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1			50.0100			20.0000	1000.2000	(32b)
Internal Wall			91.7000			9.0000	825.3000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12715.8900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		254.2669 (35)
Thermal bridges (Default value 0.200 * total exposed area)		13.7020 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	38.7071 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	40.7953	39.9463	37.5088	37.5088	35.2357	35.2357	34.5145	35.2357	39.1155	38.3030	40.7953	(38)
Heat transfer coeff	82.9714	79.5023	78.6533	76.2159	76.2159	73.9427	73.9427	73.2215	73.9427	77.8226	77.0101	79.5023	(39)
Average = Sum(39)m / 12 =												76.9119	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6591	1.5897	1.5728	1.5240	1.5240	1.4786	1.4786	1.4641	1.4786	1.5561	1.5399	1.5897	(40)
HLP (average)												1.5379	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy											1.6904	(42)
Hot water usage for mixer showers												
	72.2726	71.1864	69.6038	66.5756	64.3409	61.8487	60.4322	62.0029	63.7247	66.4005	69.4937	71.9956	(42a)
Hot water usage for baths												
	22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497	(42b)

Hot water usage for other uses													
	31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413	(42c)
Average daily hot water use (litres/day)												116.7415	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	126.9404	124.3553	121.1358	116.0698	112.0173	107.6360	105.8265	109.0307	112.4278	117.0437	122.1929	126.5867	(44)
Energy conte	201.0426	177.0803	186.1812	158.8937	150.7968	132.3511	127.9880	135.0027	138.6348	158.8273	174.0862	198.2042	(45)
Energy content (annual)										Total = Sum(45)m =		1939.0889	
Distribution loss (46)m = 0.15 x (45)m													
	30.1564	26.5620	27.9272	23.8341	22.6195	19.8527	19.1982	20.2504	20.7952	23.8241	26.1129	29.7306	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
										Total per year (kWh/year) = Sum(64)m =		2210.6489	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	85.2979	75.5448	80.3565	70.6882	68.5912	61.8627	61.0072	63.3396	63.9521	71.2613	75.7397	84.3541	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.2944	16.2489	13.2145	10.0042	7.4783	6.3135	6.8219	8.8674	11.9018	15.1121	17.6380	18.8028	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)													
	114.6477	112.4179	108.0060	98.1780	92.1924	85.9205	81.9989	85.1339	88.8223	95.7813	105.1940	113.3792	(72)
Total internal gains													
	433.3736	431.3791	418.1854	392.9116	368.9549	347.0019	333.8911	336.7908	349.2610	371.6658	399.0496	422.9158	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	46.3896	0.4600	0.7000	0.7700	76.9128	(79)

Solar gains	76.9128	111.8951	152.4928	193.4785	208.3854	224.6334	211.0798	196.4229	175.3780	130.8100	91.2565	62.8726	(83)
Total gains	510.2864	543.2742	570.6782	586.3902	577.3403	571.6354	544.9709	533.2137	524.6390	502.4758	490.3061	485.7884	(84)

7. Mean internal temperature (heating season)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	42.5712	44.4288	44.9084	46.3446	46.3446	47.7693	47.7693	48.2398	47.7693	45.3878	45.8666	44.4288	
alpha	3.8381	3.9619	3.9939	4.0896	4.0896	4.1846	4.1846	4.2160	4.1846	4.0259	4.0578	3.9619	
util living area	0.9828	0.9769	0.9612	0.9247	0.8427	0.6606	0.4876	0.4933	0.7342	0.9138	0.9680	0.9847	(86)
MIT	19.4637	19.6560	19.9602	20.3527	20.6954	20.9272	20.9843	20.9842	20.8832	20.4938	20.0202	19.5222	(87)
Th 2	19.5703	19.6209	19.6334	19.6695	19.6695	19.7036	19.7036	19.7145	19.7036	19.6457	19.6577	19.6209	(88)
util rest of house	0.9766	0.9687	0.9468	0.8948	0.7748	0.5343	0.3241	0.3294	0.6175	0.8706	0.9544	0.9791	(89)
MIT 2	17.8860	18.1609	18.5494	19.0521	19.4369	19.6709	19.7008	19.7116	19.6426	19.2078	18.6458	17.9936	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.6242	18.8605	19.2095	19.6607	20.0258	20.2587	20.3014	20.3070	20.2231	19.8095	19.2889	18.7089	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6242	18.8605	19.2095	19.6607	20.0258	20.2587	20.3014	20.3070	20.2231	19.8095	19.2889	18.7089	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9710	0.9627	0.9410	0.8945	0.7954	0.5917	0.4016	0.4071	0.6684	0.8769	0.9496	0.9741	(94)
Useful gains	495.4667	523.0255	537.0317	524.5326	459.2427	338.2629	218.8351	217.0449	350.6694	440.6292	465.5960	473.2025	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1097.2333	1046.2891	936.7225	766.7839	565.9634	359.2669	221.9295	220.1807	386.2103	623.3216	838.5551	1050.1349	(97)
Space heating kWh													
	447.7143	351.6331	297.3700	174.4209	79.4001	0.0000	0.0000	0.0000	0.0000	135.9231	268.5306	429.2377	(98a)

Space heating requirement - total per year (kWh/year) 2184.2299

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

447.7143	351.6331	297.3700	174.4209	79.4001	0.0000	0.0000	0.0000	0.0000	135.9231	268.5306	429.2377	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 2184.2299

Space heating per m2 (98c) / (4) = 43.6759 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	447.7143	351.6331	297.3700	174.4209	79.4001	0.0000	0.0000	0.0000	0.0000	135.9231	268.5306	429.2377	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	447.7143	351.6331	297.3700	174.4209	79.4001	0.0000	0.0000	0.0000	0.0000	135.9231	268.5306	429.2377	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.0130	12.8462	11.5666	8.4742	6.5457	5.3479	5.9712	7.7616	10.0815	13.2275	14.9404	16.4580	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 2184.2299 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2210.6489 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 129.2337 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N) 0.0000 (235a)

Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated -0.0000 (236)

Energy used 0.0000 (237)

Total delivered energy for all uses 4524.1125 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2184.2299	27.6700	604.3764	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2210.6489	27.6700	611.6865	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	129.2337	27.6700	35.7590	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1251.8219	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2184.2299	0.1553	339.1588	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2210.6489	0.1412	312.2016	(264)
Space and water heating			651.3603	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	129.2337	0.1443	18.6524	(268)
Total CO2, kg/year			670.0127	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2184.2299	1.5749	3439.8943	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2210.6489	1.5222	3365.0931	(278)
Space and water heating			6804.9875	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	129.2337	1.5338	198.2230	(282)
Total Primary energy kWh/year			7003.2105	(286)

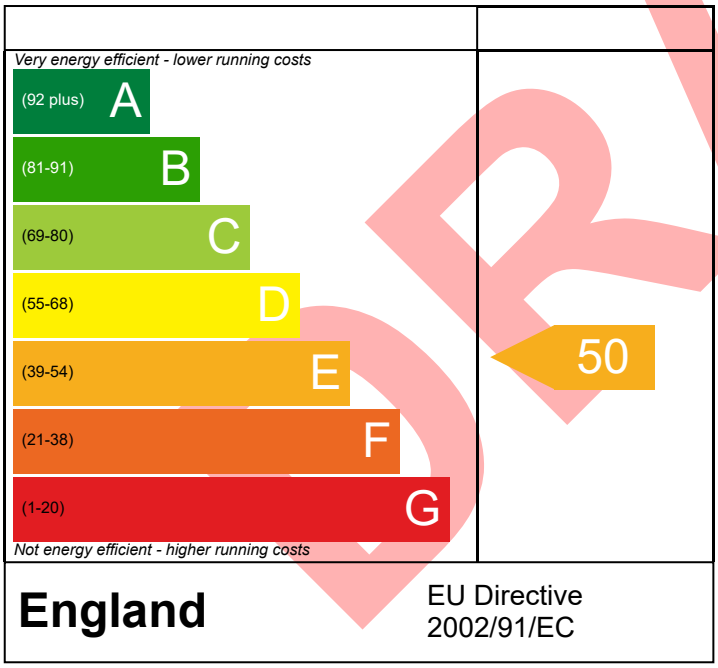
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	50.01 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

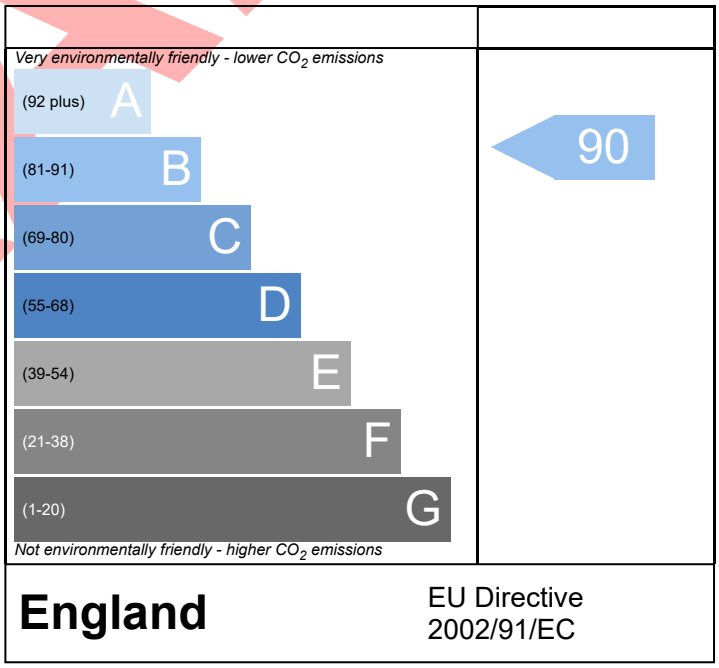
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

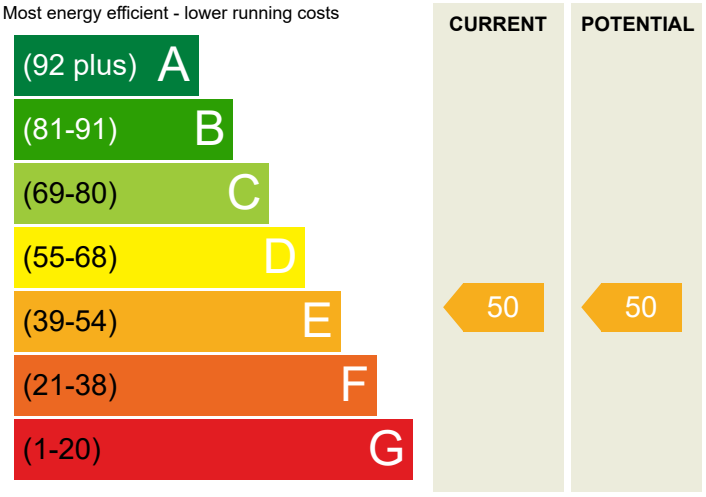
Energy Report

Dwelling Address	
Reference	Flat 1-Baseline
SAP Version	10.2
Assessment Date	29/04/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	50

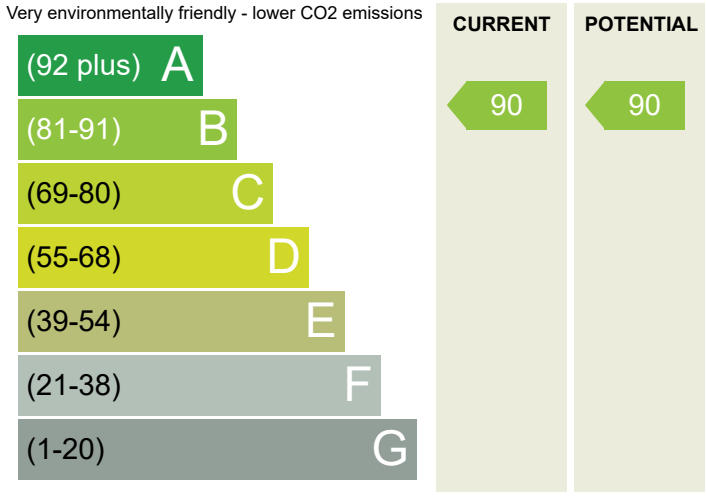
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£36	£36	You could save £0
Heating	£604	£604	
Hot Water	£612	£612	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1252	£1252	

Estimated energy use and potential savings

Space Heating
2184
kWh per year

Water Heating
2211
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 2	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	44 E	**DER**	15.87	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.82	**DFEE**	70.68	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	165.08	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	299.39	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	17.16 m	58.22 m²	2.50 m

8.0 Living Area	29.09	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.30	190.00	42.90	34.90	0.00	None	8.00	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	42.88	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	83.56

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Timber I-joists, carpeted	20.00	58.22

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.25	None	0.00	20.00	58.22

12.0 Opening Types

Summary for Input Data

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	5.81	
SE Windows	Windows	External Wall 1	South East	2.19	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation		
Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	

Summary for Input Data

Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower Over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 2	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	44 E	**DER**	15.87	**TER**	
Environmental	88 B	**% DER < TER**			N/A
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Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	165.08	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	145.5500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9617	0.9429	0.9240	0.8297	0.8109	0.7166	0.7166	0.6977	0.7543	0.8109	0.8486	0.8863	(22b)
Effective ac	0.9625	0.9445	0.9269	0.8442	0.8288	0.7567	0.7567	0.7434	0.7845	0.8288	0.8600	0.8928	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.2500	14.5550	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.3000	10.4700	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		34.9109			(33)
Main dwelling								
Party Wall 1			42.8800	0.0000	0.0000	180.0000	7718.4000	(32)
Party Ceiling 1			58.2200			20.0000	1164.4000	(32b)
Internal Wall 1			83.5600			9.0000	752.0400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	17430.2400	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		299.3858	(35)
Thermal bridges (Default value 0.200 * total exposed area)		20.2240	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	55.1349	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	45.3660	44.5205	40.5494	39.8064	36.3476	36.3476	35.7071	37.6799	39.8064	41.3094	42.8808	(38)
Heat transfer coeff													

	101.3635	100.5009	99.6554	95.6843	94.9413	91.4826	91.4826	90.8421	92.8148	94.9413	96.4444	98.0157 (39)
Average = Sum(39)m / 12 =												95.6807

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7410	1.7262	1.7117	1.6435	1.6307	1.5713	1.5713	1.5603	1.5942	1.6307	1.6566	1.6835	(40)
HLP (average)												1.6434	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309 (42)
Hot water usage for mixer showers												
	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188 (42a)
Hot water usage for baths												
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)
Hot water usage for other uses												
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)
Average daily hot water use (litres/day)												125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	21.3233	18.9391	15.4023	11.6606	8.7164	7.3588	7.9514	10.3355	13.8723	17.6141	20.5583	21.9159	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)												
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)												
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains												
	481.3974	479.2208	464.3596	436.0406	408.9853	384.2706	369.5486	372.6996	386.7819	412.0117	442.7571	469.5318	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	5.8100	36.7938	0.4600	0.7000	0.7700	47.7024	(79)

Solar gains	65.6832	111.8827	153.0828	189.6771	212.4541	210.9178	203.3472	186.3545	165.7563	123.6543	78.6733	56.2111	(83)
Total gains	547.0805	591.1036	617.4425	625.7177	621.4394	595.1884	572.8958	559.0542	552.5382	535.6660	521.4304	525.7429	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	47.7661	48.1760	48.5847	50.6011	50.9971	52.9252	52.9252	53.2984	52.1655	50.9971	50.2023	49.3975	
alpha	4.1844	4.2117	4.2390	4.3734	4.3998	4.5283	4.5283	4.5532	4.4777	4.3998	4.3468	4.2932	
util living area													
	0.9940	0.9908	0.9842	0.9677	0.9257	0.8123	0.6534	0.6849	0.8722	0.9678	0.9899	0.9949	(86)
MIT	19.3261	19.4927	19.7750	20.1839	20.5445	20.8477	20.9579	20.9477	20.7641	20.3057	19.7841	19.3494	(87)
Th 2	19.5116	19.5221	19.5325	19.5816	19.5909	19.6344	19.6344	19.6426	19.6176	19.5909	19.5721	19.5527	(88)
util rest of house													
	0.9915	0.9870	0.9771	0.9511	0.8821	0.7015	0.4750	0.5130	0.7851	0.9478	0.9849	0.9929	(89)

MIT 2	17.6431	17.8620	18.2268	18.7721	19.2091	19.5519	19.6239	19.6277	19.4680	18.9338	18.2676	17.7000	(90)
Living area fraction									fLA = Living area / (4) =			0.4997	(91)
MIT	18.4840	18.6768	19.0004	19.4775	19.8763	20.1994	20.2904	20.2872	20.1156	19.6193	19.0253	18.5241	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4840	18.6768	19.0004	19.4775	19.8763	20.1994	20.2904	20.2872	20.1156	19.6193	19.0253	18.5241	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9891	0.9839	0.9736	0.9496	0.8928	0.7528	0.5660	0.6005	0.8217	0.9484	0.9822	0.9907	(94)
Useful gains	541.0951	581.5939	601.1382	594.1760	554.8252	448.0739	324.2461	335.7062	454.0113	508.0077	512.1426	520.8676	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1437.7406	1384.5791	1245.7293	1012.1026	776.2713	512.2434	337.6105	353.1224	558.3374	856.3037	1150.1283	1403.9876	(97)
Space heating kWh	667.1042	539.6061	479.5758	300.9071	164.7559	0.0000	0.0000	0.0000	0.0000	259.1322	459.3497	657.0413	(98a)
Space heating requirement - total per year (kWh/year)												3527.4724	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	667.1042	539.6061	479.5758	300.9071	164.7559	0.0000	0.0000	0.0000	0.0000	259.1322	459.3497	657.0413	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3527.4724	
Space heating per m2											(98c) / (4) =	60.5887	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	667.1042	539.6061	479.5758	300.9071	164.7559	0.0000	0.0000	0.0000	0.0000	259.1322	459.3497	657.0413	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	667.1042	539.6061	479.5758	300.9071	164.7559	0.0000	0.0000	0.0000	0.0000	259.1322	459.3497	657.0413	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6641	14.9731	13.4816	9.8772	7.6294	6.2333	6.9598	9.0466	11.7507	15.4175	17.4141	19.1829	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3527.4724	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2359.4492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	150.6303	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6037.5518	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3527.4724	16.4900	581.6802	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	2359.4492	16.4900	389.0732	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6303	16.4900	24.8389	(250)
Additional standing charges			0.0000	(251)
Total energy cost			995.5923	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.4723	(257)
SAP value		43.7136	
SAP rating (Section 12)		44	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3527.4724	0.1545	544.9291	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			878.1976	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6303	0.1443	21.7406	(268)
Total CO2, kg/year			899.9382	(272)
CO2 emissions per m2			15.4600	(273)
EI value			88.3170	
EI rating			88	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9617	0.8863	0.8674	0.8109	0.8109	0.7543	0.7543	0.7354	0.7543	0.8486	0.8297	0.8863	(22b)
Effective ac	0.9625	0.8928	0.8762	0.8288	0.8288	0.7845	0.7845	0.7704	0.7845	0.8600	0.8442	0.8928	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.2500	14.5550	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.3000	10.4700	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		34.9109			(33)
Main dwelling								

Party Wall 1	42.8800	0.0000	0.0000	180.0000	7718.4000 (32)
Party Ceiling 1	58.2200			20.0000	1164.4000 (32b)
Internal Wall 1	83.5600			9.0000	752.0400 (32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 17430.2400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 299.3858 (35)
Thermal bridges (Default value 0.200 * total exposed area) 20.2240 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 55.1349 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	42.8808	42.0866	39.8064	39.8064	37.6799	37.6799	37.0052	37.6799	41.3094	40.5494	42.8808	(38)
Heat transfer coeff	101.3635	98.0157	97.2215	94.9413	94.9413	92.8148	92.8148	92.1402	92.8148	96.4444	95.6843	98.0157	(39)
Average = Sum(39)m / 12 =												95.6010	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7410	1.6835	1.6699	1.6307	1.6307	1.5942	1.5942	1.5826	1.5942	1.6566	1.6435	1.6835	(40)
HLP (average)												1.6421	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9309 (42)
Hot water usage for mixer showers

	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)

Hot water usage for baths

	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day) 125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
									Total per year (kWh/year) = Sum(64)m =			2359.4492	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.3233	18.9391	15.4023	11.6606	8.7164	7.3588	7.9514	10.3355	13.8723	17.6141	20.5583	21.9159	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains	481.3974	479.2208	464.3596	436.0406	408.9853	384.2706	369.5486	372.6996	386.7819	412.0117	442.7571	469.5318	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)
Southwest	5.8100	46.3896	0.4600	0.7000	0.7700	60.1431	(79)

Solar gains	82.8132	120.4793	164.1915	208.3215	224.3718	241.8664	227.2731	211.4917	188.8323	140.8452	98.2573	67.6960	(83)
Total gains	564.2106	599.7001	628.5511	644.3621	633.3571	626.1371	596.8216	584.1913	575.6142	552.8569	541.0144	537.2278	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	47.7661	49.3975	49.8010	50.9971	50.9971	52.1655	52.1655	52.5475	52.1655	50.2023	50.6011	49.3975	
alpha	4.1844	4.2932	4.3201	4.3998	4.3998	4.4777	4.4777	4.5032	4.4777	4.3468	4.3734	4.2932	
util living area	0.9913	0.9882	0.9790	0.9560	0.8951	0.7343	0.5538	0.5609	0.8037	0.9476	0.9832	0.9925	(86)
MIT	19.5111	19.6675	19.9452	20.3097	20.6586	20.9107	20.9808	20.9803	20.8597	20.4640	20.0045	19.5515	(87)
Th 2	19.5116	19.5527	19.5625	19.5909	19.5909	19.6176	19.6176	19.6261	19.6176	19.5721	19.5816	19.5527	(88)
util rest of house	0.9876	0.9831	0.9692	0.9332	0.8334	0.5942	0.3580	0.3643	0.6812	0.9130	0.9743	0.9892	(89)
MIT 2	17.8791	18.1045	18.4613	18.9313	19.3327	19.5806	19.6148	19.6233	19.5479	19.1088	18.5524	17.9580	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	18.6946	18.8854	19.2028	19.6200	19.9952	20.2452	20.2974	20.3013	20.2033	19.7860	19.2779	18.7542	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6946	18.8854	19.2028	19.6200	19.9952	20.2452	20.2974	20.3013	20.2033	19.7860	19.2779	18.7542	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9846	0.9798	0.9660	0.9338	0.8542	0.6633	0.4578	0.4646	0.7394	0.9196	0.9717	0.9866	(94)
Useful gains	555.5319	587.5937	607.1613	601.7072	541.0126	415.3036	273.2540	271.4368	425.5907	508.3836	525.7064	530.0484	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1347.5840	1292.3816	1157.2056	951.3113	702.1115	449.7036	278.1990	276.5393	482.9477	770.2030	1040.8485	1299.1168	(97)
Space heating kWh	589.2868	473.6175	409.2330	251.7149	119.8575	0.0000	0.0000	0.0000	0.0000	194.7936	370.9023	572.1869	(98a)
Space heating requirement - total per year (kWh/year)												2981.5927	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	589.2868	473.6175	409.2330	251.7149	119.8575	0.0000	0.0000	0.0000	0.0000	194.7936	370.9023	572.1869	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2981.5927	
Space heating per m2										(98c) / (4) =		51.2125	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	589.2868	473.6175	409.2330	251.7149	119.8575	0.0000	0.0000	0.0000	0.0000	194.7936	370.9023	572.1869	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	589.2868	473.6175	409.2330	251.7149	119.8575	0.0000	0.0000	0.0000	0.0000	194.7936	370.9023	572.1869	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6641	14.9731	13.4816	9.8772	7.6294	6.2333	6.9598	9.0466	11.7507	15.4175	17.4141	19.1829	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 2981.5927 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2359.4492 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 150.6303 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N) 0.0000 (235a)

Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5491.6721	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2981.5927	27.6700	825.0067	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	27.6700	652.8596	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6303	27.6700	41.6794	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1519.5457	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2981.5927	0.1550	462.0263	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			795.2948	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6303	0.1443	21.7406	(268)
Total CO2, kg/year			817.0354	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2981.5927	1.5737	4692.1628	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	1.5223	3591.7963	(278)
Space and water heating			8283.9591	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	150.6303	1.5338	231.0417	(282)
Total Primary energy kWh/year			8515.0008	(286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating: E 44
Current environmental impact rating: B 88

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 44
Potential environmental impact rating: B 88

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1520	£1520	£0
Space heating	£825	£825	£0
Water heating	£653	£653	£0
Lighting	£42	£42	£0
Total cost of fuels	£1520	£1520	£0
Total cost of uses	£1520	£1520	£0
Delivered energy	94 kWh/m²	94 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m²	14 kg/m²	14 kg/m²	0 kg/m²
Primary energy	146 kWh/m²	146 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	145.5500	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8874 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9617	0.9429	0.9240	0.8297	0.8109	0.7166	0.7166	0.6977	0.7543	0.8109	0.8486	0.8863	(22b)
Effective ac	0.9625	0.9445	0.9269	0.8442	0.8288	0.7567	0.7567	0.7434	0.7845	0.8288	0.8600	0.8928	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.2500	14.5550	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.3000	10.4700	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		34.9109			(33)
Main dwelling								
Party Wall 1			42.8800	0.0000	0.0000	180.0000	7718.4000	(32)
Party Ceiling 1			58.2200			20.0000	1164.4000	(32b)
Internal Wall 1			83.5600			9.0000	752.0400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	17430.2400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		299.3858 (35)
Thermal bridges (Default value 0.200 * total exposed area)		20.2240 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	55.1349 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	45.3660	44.5205	40.5494	39.8064	36.3476	36.3476	35.7071	37.6799	39.8064	41.3094	42.8808	(38)
Heat transfer coeff	101.3635	100.5009	99.6554	95.6843	94.9413	91.4826	91.4826	90.8421	92.8148	94.9413	96.4444	98.0157	(39)
Average = Sum(39)m / 12 =												95.6807	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7410	1.7262	1.7117	1.6435	1.6307	1.5713	1.5713	1.5603	1.5942	1.6307	1.6566	1.6835	(40)
HLP (average)												1.6434	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.9309 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)

Hot water usage for baths

24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day)	125.7000 (43)

Daily hot water use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte 216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)

Energy content (annual)	Total = Sum(45)m =	2087.8892

Distribution loss (46)m = 0.15 x (45)m

32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)

Water storage loss (or HIU loss):	
Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2400 (48)
Temperature factor from Table 2b	0.6000 (49)

Enter (49) or (54) in (55) 0.7440 (55)
Total storage loss
23.0640 20.8320 23.0640 22.3200 23.0640 22.3200 23.0640 23.0640 22.3200 23.0640 22.3200 23.0640 (56)
If cylinder contains dedicated solar storage
23.0640 20.8320 23.0640 22.3200 23.0640 22.3200 23.0640 23.0640 22.3200 23.0640 22.3200 23.0640 (57)
Primary loss 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (59)
Combi loss 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (61)
Total heat required for water heating calculated for each month
239.5344 211.5009 223.5319 193.4065 185.4322 164.8269 160.8732 168.4265 171.5935 194.0795 209.7654 236.4782 (62)
WWHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63a)
PV diverter 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63b)
Solar input 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63c)
FGHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63d)
Output from w/h
239.5344 211.5009 223.5319 193.4065 185.4322 164.8269 160.8732 168.4265 171.5935 194.0795 209.7654 236.4782 (64)
Total per year (kWh/year) = Sum(64)m = 2359.4492 (64)
Electric shower(s)
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)
Heat gains from water heating, kWh/month
90.4276 80.0630 85.1068 74.7423 72.4386 65.2395 64.2728 66.7842 67.4894 75.3139 80.1816 89.4114 (65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5
21.3233 18.9391 15.4023 11.6606 8.7164 7.3588 7.9514 10.3355 13.8723 17.6141 20.5583 21.9159 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5
251.3977 254.0064 247.4325 233.4375 215.7713 199.1675 188.0752 185.4664 192.0403 206.0354 223.7016 240.3054 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5
48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 (69)
Pumps, fans 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)
-77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 (71)
Water heating gains (Table 5)
121.5425 119.1414 114.3908 103.8087 97.3637 90.6105 86.3881 89.7638 93.7353 101.2283 111.3633 120.1767 (72)
Total internal gains
481.3974 479.2208 464.3596 436.0406 408.9853 384.2706 369.5486 372.6996 386.7819 412.0117 442.7571 469.5318 (73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	5.8100	36.7938	0.4600	0.7000	0.7700	47.7024	(79)

Solar gains 65.6832 111.8827 153.0828 189.6771 212.4541 210.9178 203.3472 186.3545 165.7563 123.6543 78.6733 56.2111 (83)
Total gains 547.0805 591.1036 617.4425 625.7177 621.4394 595.1884 572.8958 559.0542 552.5382 535.6660 521.4304 525.7429 (84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	47.7661	48.1760	48.5847	50.6011	50.9971	52.9252	52.9252	53.2984	52.1655	50.9971	50.2023	49.3975	
alpha	4.1844	4.2117	4.2390	4.3734	4.3998	4.5283	4.5283	4.5532	4.4777	4.3998	4.3468	4.2932	

util living area
0.9940 0.9908 0.9842 0.9677 0.9257 0.8123 0.6534 0.6849 0.8722 0.9678 0.9899 0.9949 (86)

MIT 19.3261 19.4927 19.7750 20.1839 20.5445 20.8477 20.9579 20.9477 20.7641 20.3057 19.7841 19.3494 (87)
Th 2 19.5116 19.5221 19.5325 19.5816 19.5909 19.6344 19.6344 19.6426 19.6176 19.5909 19.5721 19.5527 (88)
util rest of house
0.9915 0.9870 0.9771 0.9511 0.8821 0.7015 0.4750 0.5130 0.7851 0.9478 0.9849 0.9929 (89)
MIT 2 17.6431 17.8620 18.2268 18.7721 19.2091 19.5519 19.6239 19.6277 19.4680 18.9338 18.2676 17.7000 (90)
Living area fraction fLA = Living area / (4) = 0.4997 (91)
MIT 18.4840 18.6768 19.0004 19.4775 19.8763 20.1994 20.2904 20.2872 20.1156 19.6193 19.0253 18.5241 (92)
Temperature adjustment 0.0000
adjusted MIT 18.4840 18.6768 19.0004 19.4775 19.8763 20.1994 20.2904 20.2872 20.1156 19.6193 19.0253 18.5241 (93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9891	0.9839	0.9736	0.9496	0.8928	0.7528	0.5660	0.6005	0.8217	0.9484	0.9822	0.9907	(94)
Useful gains	541.0951	581.5939	601.1382	594.1760	554.8252	448.0739	324.2461	335.7062	454.0113	508.0077	512.1426	520.8676	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)

Heat loss rate W
1437.7406 1384.5791 1245.7293 1012.1026 776.2713 512.2434 337.6105 353.1224 558.3374 856.3037 1150.1283 1403.9876 (97)
Space heating kWh
667.1042 539.6061 479.5758 300.9071 164.7559 0.0000 0.0000 0.0000 0.0000 259.1322 459.3497 657.0413 (98a)
Space heating requirement - total per year (kWh/year) 3527.4724
Solar heating kWh
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (98b)
Solar heating contribution - total per year (kWh/year) 0.0000
Space heating kWh
667.1042 539.6061 479.5758 300.9071 164.7559 0.0000 0.0000 0.0000 0.0000 259.1322 459.3497 657.0413 (98c)
Space heating requirement after solar contribution - total per year (kWh/year) 3527.4724
Space heating per m2 (98c) / (4) = 60.5887 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	667.1042	539.6061	479.5758	300.9071	164.7559	0.0000	0.0000	0.0000	0.0000	259.1322	459.3497	657.0413	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	667.1042	539.6061	479.5758	300.9071	164.7559	0.0000	0.0000	0.0000	0.0000	259.1322	459.3497	657.0413	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6641	14.9731	13.4816	9.8772	7.6294	6.2333	6.9598	9.0466	11.7507	15.4175	17.4141	19.1829	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3527.4724	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2359.4492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	150.6303	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6037.5518	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3527.4724	16.4900	581.6802	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	16.4900	389.0732	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6303	16.4900	24.8389	(250)
Additional standing charges			0.0000	(251)
Total energy cost			995.5923	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.4723	(257)
SAP value		43.7136	
SAP rating (Section 12)		44	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3527.4724	0.1545	544.9291	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			878.1976	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6303	0.1443	21.7406	(268)
Total CO2, kg/year			899.9382	(272)
CO2 emissions per m2			15.4600	(273)

EI value	88.3170	
EI rating	88	(274)
EI band	B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5500	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9617	0.8863	0.8674	0.8109	0.8109	0.7543	0.7543	0.7354	0.7543	0.8486	0.8297	0.8863	(22b)
Effective ac	0.9625	0.8928	0.8762	0.8288	0.8288	0.7845	0.7845	0.7704	0.7845	0.8600	0.8442	0.8928	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.2500	14.5550	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.3000	10.4700	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		34.9109			(33)
Main dwelling								
Party Wall 1			42.8800	0.0000	0.0000	180.0000	7718.4000	(32)
Party Ceiling 1			58.2200			20.0000	1164.4000	(32b)
Internal Wall 1			83.5600			9.0000	752.0400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		17430.2400	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							299.3858	(35)
Thermal bridges (Default value 0.200 * total exposed area)							20.2240	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		55.1349	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	42.8808	42.0866	39.8064	39.8064	37.6799	37.6799	37.0052	37.6799	41.3094	40.5494	42.8808	(38)
Heat transfer coeff	101.3635	98.0157	97.2215	94.9413	94.9413	92.8148	92.8148	92.1402	92.8148	96.4444	95.6843	98.0157	(39)
Average = Sum(39)m / 12 =												95.6010	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7410	1.6835	1.6699	1.6307	1.6307	1.5942	1.5942	1.5826	1.5942	1.6566	1.6435	1.6835	(40)
HLP (average)												1.6421	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309	(42)
Hot water usage for mixer showers	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)
Hot water usage for baths	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses													

	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)
Average daily hot water use (litres/day)												125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3233	18.9391	15.4023	11.6606	8.7164	7.3588	7.9514	10.3355	13.8723	17.6141	20.5583	21.9159	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	481.3974	479.2208	464.3596	436.0406	408.9853	384.2706	369.5486	372.6996	386.7819	412.0117	442.7571	469.5318	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)
Southwest	5.8100	46.3896	0.4600	0.7000	0.7700	60.1431	(79)

Solar gains	82.8132	120.4793	164.1915	208.3215	224.3718	241.8664	227.2731	211.4917	188.8323	140.8452	98.2573	67.6960	(83)
Total gains	564.2106	599.7001	628.5511	644.3621	633.3571	626.1371	596.8216	584.1913	575.6142	552.8569	541.0144	537.2278	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	47.7661	49.3975	49.8010	50.9971	50.9971	52.1655	52.1655	52.5475	52.1655	50.2023	50.6011	49.3975	
alpha	4.1844	4.2932	4.3201	4.3998	4.3998	4.4777	4.4777	4.5032	4.4777	4.3468	4.3734	4.2932	
util living area													
	0.9913	0.9882	0.9790	0.9560	0.8951	0.7343	0.5538	0.5609	0.8037	0.9476	0.9832	0.9925	(86)
MIT	19.5111	19.6675	19.9452	20.3097	20.6586	20.9107	20.9808	20.9803	20.8597	20.4640	20.0045	19.5515	(87)
Th 2	19.5116	19.5527	19.5625	19.5909	19.5909	19.6176	19.6176	19.6261	19.6176	19.5721	19.5816	19.5527	(88)
util rest of house													
	0.9876	0.9831	0.9692	0.9332	0.8334	0.5942	0.3580	0.3643	0.6812	0.9130	0.9743	0.9892	(89)
MIT 2	17.8791	18.1045	18.4613	18.9313	19.3327	19.5806	19.6148	19.6233	19.5479	19.1088	18.5524	17.9580	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	18.6946	18.8854	19.2028	19.6200	19.9952	20.2452	20.2974	20.3013	20.2033	19.7860	19.2779	18.7542	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6946	18.8854	19.2028	19.6200	19.9952	20.2452	20.2974	20.3013	20.2033	19.7860	19.2779	18.7542	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9846	0.9798	0.9660	0.9338	0.8542	0.6633	0.4578	0.4646	0.7394	0.9196	0.9717	0.9866	(94)
Useful gains	555.5319	587.5937	607.1613	601.7072	541.0126	415.3036	273.2540	271.4368	425.5907	508.3836	525.7064	530.0484	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1347.5840	1292.3816	1157.2056	951.3113	702.1115	449.7036	278.1990	276.5393	482.9477	770.2030	1040.8485	1299.1168	(97)
Space heating kWh													
	589.2868	473.6175	409.2330	251.7149	119.8575	0.0000	0.0000	0.0000	0.0000	194.7936	370.9023	572.1869	(98a)

Space heating requirement - total per year (kWh/year)												2981.5927	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	589.2868	473.6175	409.2330	251.7149	119.8575	0.0000	0.0000	0.0000	194.7936	370.9023	572.1869	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												2981.5927	
Space heating per m2											(98c) / (4) =	51.2125	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	589.2868	473.6175	409.2330	251.7149	119.8575	0.0000	0.0000	0.0000	0.0000	194.7936	370.9023	572.1869	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	589.2868	473.6175	409.2330	251.7149	119.8575	0.0000	0.0000	0.0000	0.0000	194.7936	370.9023	572.1869	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6641	14.9731	13.4816	9.8772	7.6294	6.2333	6.9598	9.0466	11.7507	15.4175	17.4141	19.1829	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2981.5927	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2359.4492	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												150.6303	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5491.6721	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2981.5927	27.6700	825.0067	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	27.6700	652.8596	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6303	27.6700	41.6794	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1519.5457	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2981.5927	0.1550	462.0263	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			795.2948	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	150.6303	0.1443	21.7406	(268)
Total CO2, kg/year			817.0354	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2981.5927	1.5737	4692.1628	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	1.5223	3591.7963	(278)
Space and water heating			8283.9591	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	150.6303	1.5338	231.0417	(282)
Total Primary energy kWh/year			8515.0008	(286)

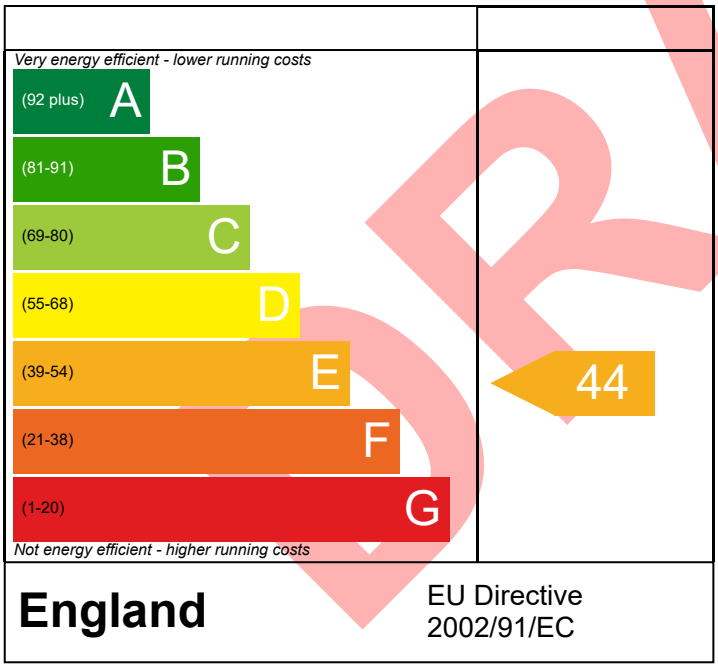
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.22 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

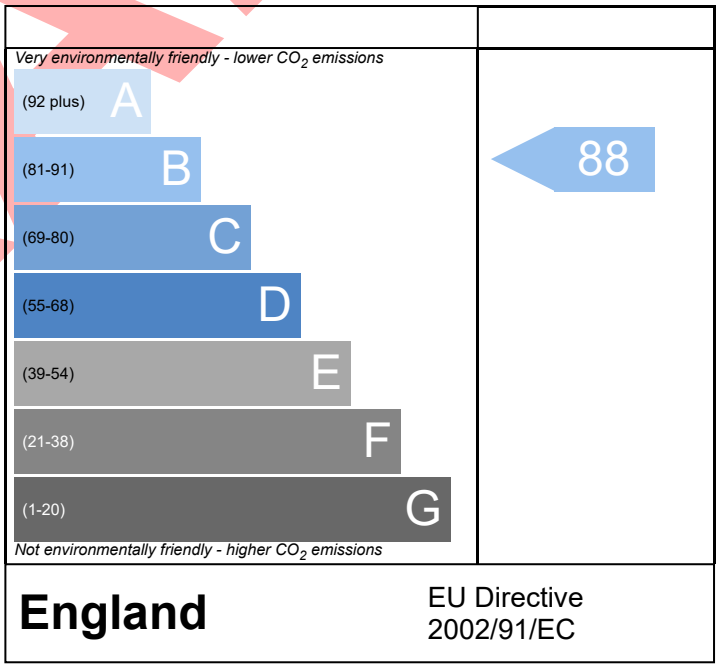
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

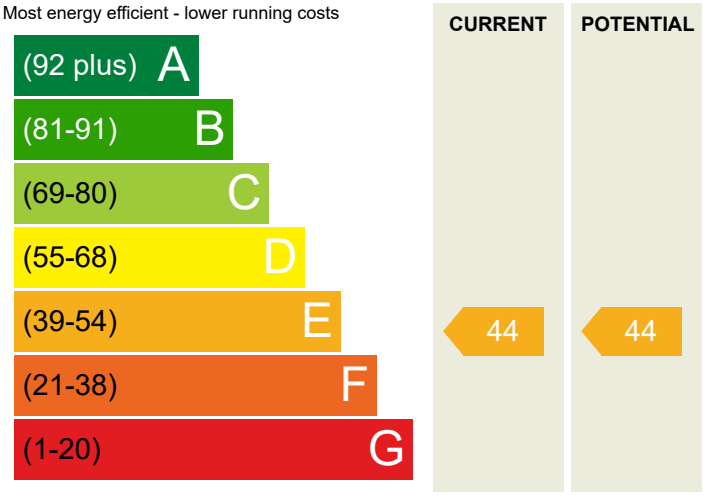
Energy Report

Dwelling Address	
Reference	Flat 2-Baseline
SAP Version	10.2
Assessment Date	29/04/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	58

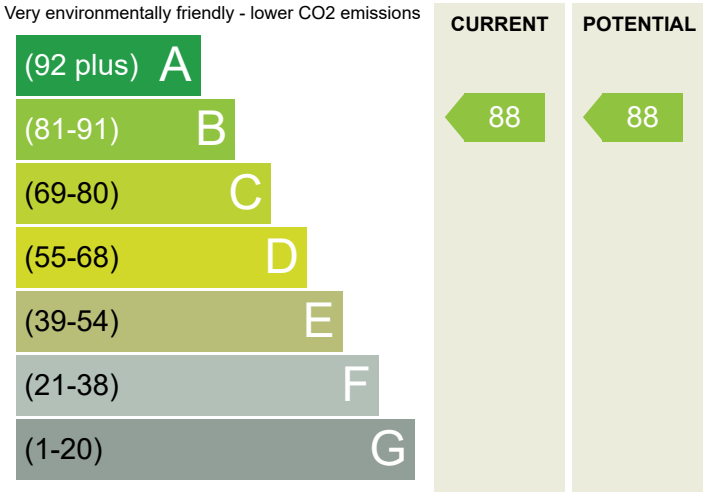
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

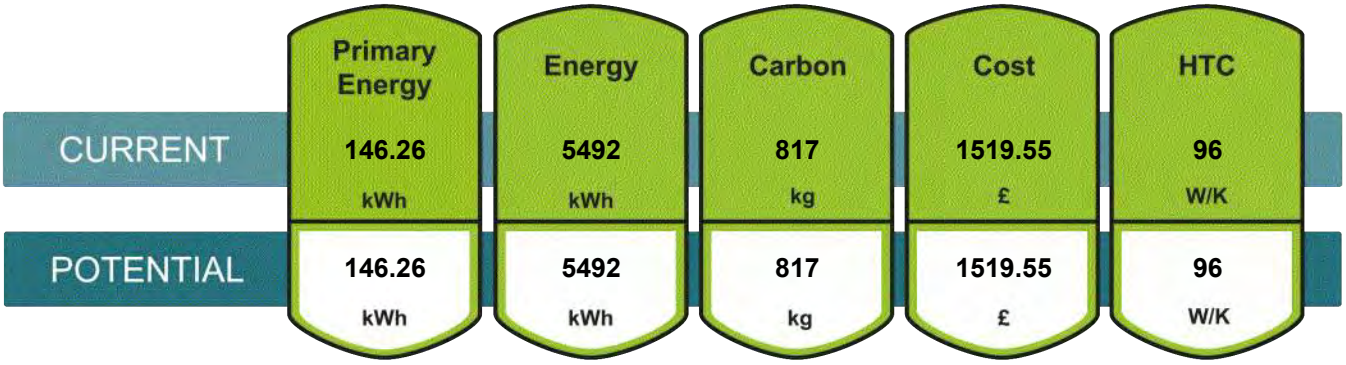


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£42	£42	You could save £0
Heating	£825	£825	
Hot Water	£653	£653	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1520	£1520	

Estimated energy use and potential savings

Space Heating
2982
kWh per year

Water Heating
2359
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 3	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	36 F	**DER**	16.05	**TER**	
Environmental	87 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.15	**DFEE**	78.82	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	166.55	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	4	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	268.49	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	14.12 m	80.13 m²	2.50 m

8.0 Living Area	35.96	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.30	190.00	35.30	28.25	0.00	None	7.05	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	70.78	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	122.36

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	80.13	78.01	None	0.00	Enter Gross Area	2.12

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.25	None	0.00	20.00	80.13

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Rooflight	Manufacturer	Roof Light	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SE Windows	Windows	External Wall 1	South East	2.63	
Roof light	Rooflight	External Roof 1	North East	2.12	0
NE Windows	Windows	External Wall 1	North East	4.42	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	

Summary for Input Data

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 3	Issued on Date	15/06/2026
Assessment Reference	Baseline	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	36 F	DER	16.05	TER	
Environmental	87 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.15	DFEE	78.82	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	166.55	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	80.1300	(1b)	x 2.5000	(2b) =	200.3250	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		200.3250	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8498 (18)
Number of sides sheltered		4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7585	0.7436	0.7287	0.6544	0.6395	0.5651	0.5651	0.5503	0.5949	0.6395	0.6692	0.6990	(22b)
Effective ac	0.7876	0.7765	0.7655	0.7141	0.7045	0.6597	0.6597	0.6514	0.6769	0.7045	0.7239	0.7443	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.2500	20.0325	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.3000	8.4750	190.0000	5367.5000	(29a)
External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900	(30)
Total net area of external elements Aum(A, m2)			195.5600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		52.3208			(33)
Main dwelling								
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000	(32)
Internal Walls			122.3600			9.0000	1101.2400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		21513.8300	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							268.4866	(35)
Thermal bridges (Default value 0.200 * total exposed area)							39.1120	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		91.4328	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	51.3307	50.6070	47.2074	46.5714	43.6105	43.6105	43.0622	44.7510	46.5714	47.8581	49.2033	(38)

Heat transfer coeff

	143.5020	142.7636	142.0398	138.6403	138.0042	135.0433	135.0433	134.4950	136.1838	138.0042	139.2909	140.6361 (39)
Average = Sum(39)m / 12 =												138.6372

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7909	1.7816	1.7726	1.7302	1.7223	1.6853	1.6853	1.6785	1.6995	1.7223	1.7383	1.7551	(40)
HLP (average)												1.7302	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4653 (42)

Hot water usage for mixer showers

	90.1382	88.7836	86.8097	83.0330	80.2458	77.1376	75.3709	77.3299	79.4773	82.8146	86.6724	89.7929 (42a)

Hot water usage for baths

	28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183 (42b)

Hot water usage for other uses

	39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774 (42c)

Average daily hot water use (litres/day) 145.6082 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	158.3296	155.1045	151.0883	144.7696	139.7149	134.2500	131.9937	135.9908	140.2285	145.9859	152.4081	157.8886	(44)
Energy conte	250.7555	220.8667	232.2171	198.1824	188.0831	165.0761	159.6349	168.3850	172.9158	198.1014	217.1333	247.2153	(45)
Energy content (annual)										Total = Sum(45)m =		2418.5665	
Distribution loss (46)m = 0.15 x (45)m													
	37.6133	33.1300	34.8326	29.7274	28.2125	24.7614	23.9452	25.2577	25.9374	29.7152	32.5700	37.0823	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
										Total per year (kWh/year) = Sum(64)m =		2690.1265	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	101.8274	90.1038	95.6634	83.7516	80.9888	72.7438	71.5298	74.4392	75.3505	84.3199	90.0528	100.6503	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	32.1264	28.5344	23.2057	17.5682	13.1324	11.0870	11.9799	15.5719	20.9005	26.5380	30.9738	33.0193	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)													
	136.8648	134.0830	128.5798	116.3217	108.8559	101.0331	96.1422	100.0527	104.6535	113.3332	125.0734	135.2827	(72)
Total internal gains													
	598.4833	595.5124	576.1054	539.9544	505.0086	473.4820	455.0150	459.1146	477.6191	510.1918	549.4119	583.3250	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	11.2829	0.4600	0.7000	0.7700	11.1284	(75)
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Northeast	2.1200	26.0000	0.4600	0.7000	1.0000	15.9738	(82)

Solar gains	48.6955	92.6100	150.1182	221.5380	277.8995	288.2653	272.8211	229.3534	174.8758	108.8830	60.1407	40.4693 (83)
Total gains	647.1788	688.1223	726.2236	761.4923	782.9082	761.7472	727.8360	688.4680	652.4950	619.0748	609.5526	623.7943 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6445	41.8599	42.0732	43.1048	43.3035	44.2529	44.2529	44.4333	43.8823	43.3035	42.9035	42.4931	
alpha	3.7763	3.7907	3.8049	3.8737	3.8869	3.9502	3.9502	3.9622	3.9255	3.8869	3.8602	3.8329	
util living area													
	0.9948	0.9927	0.9877	0.9738	0.9373	0.8450	0.7102	0.7537	0.9125	0.9780	0.9921	0.9955	(86)
MIT	19.0048	19.1585	19.4676	19.9244	20.3676	20.7447	20.9106	20.8844	20.6024	20.0452	19.4719	19.0063	(87)
Th 2	19.4764	19.4829	19.4892	19.5193	19.5249	19.5514	19.5514	19.5563	19.5412	19.5249	19.5135	19.5016	(88)

util rest of house													
	0.9928	0.9899	0.9823	0.9609	0.9006	0.7430	0.5234	0.5783	0.8443	0.9645	0.9884	0.9938	(89)
MIT 2	17.2337	17.4338	17.8316	18.4272	18.9715	19.3989	19.5252	19.5171	19.2595	18.5880	17.8543	17.2513	(90)
Living area fraction										fLA = Living area / (4) =		0.4488	(91)
MIT	18.0285	18.2078	18.5658	19.0991	19.5980	20.0028	20.1469	20.1307	19.8622	19.2419	18.5802	18.0389	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.0285	18.2078	18.5658	19.0991	19.5980	20.0028	20.1469	20.1307	19.8622	19.2419	18.5802	18.0389	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9899	0.9863	0.9777	0.9559	0.9029	0.7804	0.6088	0.6575	0.8632	0.9608	0.9849	0.9913	(94)
Useful gains	640.6547	678.7075	710.0079	727.8853	706.8655	594.4983	443.1029	452.7020	563.2433	594.8104	600.3548	618.3622	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1970.0693	1899.8696	1713.8224	1414.0082	1089.9630	729.6182	478.9919	501.7651	784.7136	1192.6253	1599.0900	1946.2428	(97)
Space heating kWh	989.0845	820.6210	746.8380	494.0085	285.0246	0.0000	0.0000	0.0000	0.0000	444.7743	719.0894	987.9432	(98a)
Space heating requirement - total per year (kWh/year)												5487.3834	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	989.0845	820.6210	746.8380	494.0085	285.0246	0.0000	0.0000	0.0000	0.0000	444.7743	719.0894	987.9432	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5487.3834	
Space heating per m2											(98c) / (4) =	68.4810	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	989.0845	820.6210	746.8380	494.0085	285.0246	0.0000	0.0000	0.0000	0.0000	444.7743	719.0894	987.9432	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	989.0845	820.6210	746.8380	494.0085	285.0246	0.0000	0.0000	0.0000	0.0000	444.7743	719.0894	987.9432	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	28.1200	22.5589	20.3118	14.8813	11.4948	9.3913	10.4859	13.6300	17.7040	23.2286	26.2366	28.9016	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												5487.3834	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2690.1265	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												226.9448	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												8404.4547	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year

Space heating - main system 1	5487.3834	16.4900	904.8695	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	16.4900	443.6019	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	226.9448	16.4900	37.4232	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1385.8946	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.9872	(257)
SAP value		36.4191	
SAP rating (Section 12)		36	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5487.3834	0.1540	845.1593	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2690.1265	0.1413	380.0853	(264)
Space and water heating			1225.2446	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	226.9448	0.1443	32.7551	(268)
Total CO2, kg/year			1257.9997	(272)
CO2 emissions per m2			15.7000	(273)
EI value			86.5283	
EI rating			87	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	80.1300	(1b) x	2.5000	(2b) =	200.3250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	200.3250	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8498	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7585	0.6990	0.6841	0.6395	0.6395	0.5949	0.5949	0.5800	0.5949	0.6692	0.6544	0.6990	(22b)
Effective ac	0.7876	0.7443	0.7340	0.7045	0.7045	0.6769	0.6769	0.6682	0.6769	0.7239	0.7141	0.7443	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.2500	20.0325	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.3000	8.4750	190.0000	5367.5000	(29a)

External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900 (30)
Total net area of external elements Aum(A, m2)			195.5600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		52.3208		(33)
Main dwelling							
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000 (32)
Internal Walls			122.3600			9.0000	1101.2400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21513.8300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		268.4866 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.1120 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	91.4328 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	49.2033	48.5234	46.5714	46.5714	44.7510	44.7510	44.1734	44.7510	47.8581	47.2074	49.2033	(38)
Heat transfer coeff	143.5020	140.6361	139.9562	138.0042	138.0042	136.1838	136.1838	135.6063	136.1838	139.2909	138.6403	140.6361	(39)
Average = Sum(39)m / 12 =												138.5690	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7909	1.7551	1.7466	1.7223	1.7223	1.6995	1.6995	1.6923	1.6995	1.7383	1.7302	1.7551	(40)
HLP (average)												1.7293	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.4653 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	90.1382	88.7836	86.8097	83.0330	80.2458	77.1376	75.3709	77.3299	79.4773	82.8146	86.6724	89.7929	(42a)
Hot water usage for baths	28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183	(42b)
Hot water usage for other uses	39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774	(42c)
Average daily hot water use (litres/day)												145.6082	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	158.3296	155.1045	151.0883	144.7696	139.7149	134.2500	131.9937	135.9908	140.2285	145.9859	152.4081	157.8886	(44)
Energy conte	250.7555	220.8667	232.2171	198.1824	188.0831	165.0761	159.6349	168.3850	172.9158	198.1014	217.1333	247.2153	(45)
Energy content (annual)										Total = Sum(45)m =		2418.5665	
Distribution loss (46)m = 0.15 x (45)m	37.6133	33.1300	34.8326	29.7274	28.2125	24.7614	23.9452	25.2577	25.9374	29.7152	32.5700	37.0823	(46)

Water storage loss (or HIU loss):		
Store volume		150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):		1.2400 (48)
Temperature factor from Table 2b		0.6000 (49)
Enter (49) or (54) in (55)		0.7440 (55)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
									Total per year (kWh/year) = Sum(64)m =			2690.1265	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	101.8274	90.1038	95.6634	83.7516	80.9888	72.7438	71.5298	74.4392	75.3505	84.3199	90.0528	100.6503	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	32.1264	28.5344	23.2057	17.5682	13.1324	11.0870	11.9799	15.5719	20.9005	26.5380	30.9738	33.0193	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)	136.8648	134.0830	128.5798	116.3217	108.8559	101.0331	96.1422	100.0527	104.6535	113.3332	125.0734	135.2827	(72)
Total internal gains	598.4833	595.5124	576.1054	539.9544	505.0086	473.4820	455.0150	459.1146	477.6191	510.1918	549.4119	583.3250	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	15.0428	0.4600	0.7000	0.7700	14.8368	(75)
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)
Northeast	2.1200	35.0000	0.4600	0.7000	1.0000	21.5032	(82)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	63.5648	103.6851	167.6921	252.0822	301.6358	338.2744	312.6335	268.8103	207.2278	129.1161	77.8743	50.3850	(83)
Total gains	662.0481	699.1975	743.7975	792.0366	806.6444	811.7564	767.6485	727.9248	684.8469	639.3079	627.2862	633.7100	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6445	42.4931	42.6995	43.3035	43.3035	43.8823	43.8823	44.0692	43.8823	42.9035	43.1048	42.4931	
alpha	3.7763	3.8329	3.8466	3.8869	3.8869	3.9255	3.9255	3.9379	3.9255	3.8602	3.8737	3.8329	
util living area	0.9929	0.9909	0.9838	0.9643	0.9105	0.7714	0.6070	0.6304	0.8607	0.9646	0.9878	0.9938	(86)
MIT	19.1999	19.3300	19.6410	20.0686	20.5112	20.8424	20.9562	20.9505	20.7371	20.2370	19.7046	19.2256	(87)
Th 2	19.4764	19.5016	19.5076	19.5249	19.5249	19.5412	19.5412	19.5463	19.5412	19.5135	19.5193	19.5016	(88)
util rest of house	0.9900	0.9871	0.9765	0.9461	0.8568	0.6338	0.3911	0.4105	0.7545	0.9407	0.9816	0.9912	(89)
MIT 2	17.4831	17.6643	18.0630	18.6091	19.1343	19.4679	19.5338	19.5377	19.3904	18.8168	18.1540	17.5318	(90)
Living area fraction										fLA = Living area / (4) =		0.4488	(91)
MIT	18.2536	18.4118	18.7711	19.2641	19.7522	20.0848	20.1721	20.1717	19.9948	19.4541	18.8499	18.2919	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2536	18.4118	18.7711	19.2641	19.7522	20.0848	20.1721	20.1717	19.9948	19.4541	18.8499	18.2919	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9865	0.9832	0.9715	0.9419	0.8670	0.6919	0.4912	0.5128	0.7943	0.9394	0.9775	0.9880	(94)
Useful gains	653.1225	687.4178	722.5934	745.9884	699.3504	561.6219	377.0313	373.2673	543.9440	600.5352	613.1521	626.1370	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1844.5139	1787.7402	1605.4585	1333.6805	987.0387	637.9887	391.1373	389.4237	680.2066	1066.1536	1448.7716	1799.0065	(97)
Space heating kWh	886.3952	739.4167	656.8516	423.1383	214.0401	0.0000	0.0000	0.0000	0.0000	346.4201	601.6460	872.6150	(98a)
Space heating requirement - total per year (kWh/year)												4740.5230	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	886.3952	739.4167	656.8516	423.1383	214.0401	0.0000	0.0000	0.0000	0.0000	346.4201	601.6460	872.6150	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4740.5230	
Space heating per m2											(98c) / (4) =	59.1604	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	886.3952	739.4167	656.8516	423.1383	214.0401	0.0000	0.0000	0.0000	0.0000	346.4201	601.6460	872.6150	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	886.3952	739.4167	656.8516	423.1383	214.0401	0.0000	0.0000	0.0000	0.0000	346.4201	601.6460	872.6150	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	28.1200	22.5589	20.3118	14.8813	11.4948	9.3913	10.4859	13.6300	17.7040	23.2286	26.2366	28.9016	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 4740.5230 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2690.1265 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 226.9448 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7657.5943	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4740.5230	27.6700	1311.7027	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	27.6700	744.3580	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	226.9448	27.6700	62.7956	(250)
Additional standing charges			0.0000	(251)
Total energy cost			2118.8564	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4740.5230	0.1545	732.2474	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2690.1265	0.1413	380.0853	(264)
Space and water heating			1112.3326	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	226.9448	0.1443	32.7551	(268)
Total CO2, kg/year			1145.0878	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4740.5230	1.5719	7451.5733	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	1.5225	4095.5963	(278)
Space and water heating			11547.1695	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	226.9448	1.5338	348.0955	(282)
Total Primary energy kWh/year			11895.2650	(286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating: F 36
Current environmental impact rating: B 87

N Solar water heating			Not applicable
U Solar photovoltaic panels			Not applicable
V2 Wind turbine			Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: F 36
Potential environmental impact rating: B 87

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£2119	£2119	£0
Space heating	£1312	£1312	£0
Water heating	£744	£744	£0
Lighting	£63	£63	£0
Total cost of fuels	£2119	£2119	£0
Total cost of uses	£2119	£2119	£0
Delivered energy	96 kWh/m²	96 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m²	14 kg/m²	14 kg/m²	0 kg/m²
Primary energy	148 kWh/m²	148 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		80.1300	(1b)	x 2.5000	(2b) =	200.3250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		200.3250	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8498 (18)
Number of sides sheltered		4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7585	0.7436	0.7287	0.6544	0.6395	0.5651	0.5651	0.5503	0.5949	0.6395	0.6692	0.6990	(22b)
Effective ac	0.7876	0.7765	0.7655	0.7141	0.7045	0.6597	0.6597	0.6514	0.6769	0.7045	0.7239	0.7443	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.2500	20.0325	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.3000	8.4750	190.0000	5367.5000	(29a)
External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900	(30)
Total net area of external elements Aum(A, m2)			195.5600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		52.3208			(33)
Main dwelling								
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000	(32)
Internal Walls			122.3600			9.0000	1101.2400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21513.8300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		268.4866 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.1120 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	91.4328 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	51.3307	50.6070	47.2074	46.5714	43.6105	43.6105	43.0622	44.7510	46.5714	47.8581	49.2033	(38)
Heat transfer coeff	143.5020	142.7636	142.0398	138.6403	138.0042	135.0433	135.0433	134.4950	136.1838	138.0042	139.2909	140.6361	(39)
Average = Sum(39)m / 12 =												138.6372	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7909	1.7816	1.7726	1.7302	1.7223	1.6853	1.6853	1.6785	1.6995	1.7223	1.7383	1.7551	(40)
HLP (average)												1.7302	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.4653 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
90.1382	88.7836	86.8097	83.0330	80.2458	77.1376	75.3709	77.3299	79.4773	82.8146	86.6724	89.7929	(42a)

Hot water usage for baths

28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183	(42b)

Hot water usage for other uses

39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774	(42c)

Average daily hot water use (litres/day)	145.6082 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	158.3296	155.1045	151.0883	144.7696	139.7149	134.2500	131.9937	135.9908	140.2285	145.9859	152.4081	157.8886	(44)
Energy conte	250.7555	220.8667	232.2171	198.1824	188.0831	165.0761	159.6349	168.3850	172.9158	198.1014	217.1333	247.2153	(45)
Energy content (annual)										Total = Sum(45)m =		2418.5665	

Distribution loss (46)m = 0.15 x (45)m

	37.6133	33.1300	34.8326	29.7274	28.2125	24.7614	23.9452	25.2577	25.9374	29.7152	32.5700	37.0823 (46)
Water storage loss (or HIU loss):												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												0.7440 (55)
Total storage loss												
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (56)
If cylinder contains dedicated solar storage												
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793 (64)
									Total per year (kWh/year) = Sum(64)m =			2690.1265 (64)
Electric shower(s)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				0.0000 (64a)
Heat gains from water heating, kWh/month												
	101.8274	90.1038	95.6634	83.7516	80.9888	72.7438	71.5298	74.4392	75.3505	84.3199	90.0528	100.6503 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	32.1264	28.5344	23.2057	17.5682	13.1324	11.0870	11.9799	15.5719	20.9005	26.5380	30.9738	33.0193	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)													
	136.8648	134.0830	128.5798	116.3217	108.8559	101.0331	96.1422	100.0527	104.6535	113.3332	125.0734	135.2827	(72)
Total internal gains													
	598.4833	595.5124	576.1054	539.9544	505.0086	473.4820	455.0150	459.1146	477.6191	510.1918	549.4119	583.3250	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	11.2829	0.4600	0.7000	0.7700	11.1284	(75)
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Northeast	2.1200	26.0000	0.4600	0.7000	1.0000	15.9738	(82)

Solar gains	48.6955	92.6100	150.1182	221.5380	277.8995	288.2653	272.8211	229.3534	174.8758	108.8830	60.1407	40.4693	(83)
Total gains	647.1788	688.1223	726.2236	761.4923	782.9082	761.7472	727.8360	688.4680	652.4950	619.0748	609.5526	623.7943	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6445	41.8599	42.0732	43.1048	43.3035	44.2529	44.2529	44.4333	43.8823	43.3035	42.9035	42.4931	
alpha	3.7763	3.7907	3.8049	3.8737	3.8869	3.9502	3.9502	3.9622	3.9255	3.8869	3.8602	3.8329	
util living area													
	0.9948	0.9927	0.9877	0.9738	0.9373	0.8450	0.7102	0.7537	0.9125	0.9780	0.9921	0.9955	(86)
MIT	19.0048	19.1585	19.4676	19.9244	20.3676	20.7447	20.9106	20.8844	20.6024	20.0452	19.4719	19.0063	(87)
Th 2	19.4764	19.4829	19.4892	19.5193	19.5249	19.5514	19.5514	19.5563	19.5412	19.5249	19.5135	19.5016	(88)
util rest of house													
	0.9928	0.9899	0.9823	0.9609	0.9006	0.7430	0.5234	0.5783	0.8443	0.9645	0.9884	0.9938	(89)
MIT 2	17.2337	17.4338	17.8316	18.4272	18.9715	19.3989	19.5252	19.5171	19.2595	18.5880	17.8543	17.2513	(90)
Living area fraction										fLA = Living area / (4) =		0.4488	(91)
MIT	18.0285	18.2078	18.5658	19.0991	19.5980	20.0028	20.1469	20.1307	19.8622	19.2419	18.5802	18.0389	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.0285	18.2078	18.5658	19.0991	19.5980	20.0028	20.1469	20.1307	19.8622	19.2419	18.5802	18.0389	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9899	0.9863	0.9777	0.9559	0.9029	0.7804	0.6088	0.6575	0.8632	0.9608	0.9849	0.9913	(94)
Useful gains	640.6547	678.7075	710.0079	727.8853	706.8655	594.4983	443.1029	452.7020	563.2433	594.8104	600.3548	618.3622	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1970.0693	1899.8696	1713.8224	1414.0082	1089.9630	729.6182	478.9919	501.7651	784.7136	1192.6253	1599.0900	1946.2428	(97)
Space heating kWh													
	989.0845	820.6210	746.8380	494.0085	285.0246	0.0000	0.0000	0.0000	0.0000	444.7743	719.0894	987.9432	(98a)
Space heating requirement - total per year (kWh/year)												5487.3834	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	989.0845	820.6210	746.8380	494.0085	285.0246	0.0000	0.0000	0.0000	0.0000	444.7743	719.0894	987.9432	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5487.3834	
Space heating per m2											(98c) / (4) =	68.4810	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	989.0845	820.6210	746.8380	494.0085	285.0246	0.0000	0.0000	0.0000	0.0000	444.7743	719.0894	987.9432	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	989.0845	820.6210	746.8380	494.0085	285.0246	0.0000	0.0000	0.0000	0.0000	444.7743	719.0894	987.9432	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	28.1200	22.5589	20.3118	14.8813	11.4948	9.3913	10.4859	13.6300	17.7040	23.2286	26.2366	28.9016	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5487.3834	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2690.1265	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	226.9448	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	8404.4547	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	5487.3834	16.4900	904.8695	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	16.4900	443.6019	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	226.9448	16.4900	37.4232	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1385.8946	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.9872	(257)
SAP value		36.4191	
SAP rating (Section 12)		36	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5487.3834	0.1540	845.1593	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2690.1265	0.1413	380.0853	(264)
Space and water heating			1225.2446	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	226.9448	0.1443	32.7551	(268)
Total CO2, kg/year			1257.9997	(272)
CO2 emissions per m2			15.7000	(273)
EI value			86.5283	
EI rating			87	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	80.1300	(1b)	x 2.5000	(2b) =	200.3250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	200.3250	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8498	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7585	0.6990	0.6841	0.6395	0.6395	0.5949	0.5949	0.5800	0.5949	0.6692	0.6544	0.6990	(22b)
Effective ac	0.7876	0.7443	0.7340	0.7045	0.7045	0.6769	0.6769	0.6682	0.6769	0.7239	0.7141	0.7443	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.2500	20.0325	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.3000	8.4750	190.0000	5367.5000	(29a)
External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900	(30)
Total net area of external elements Aum(A, m2)			195.5600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		52.3208			(33)
Main dwelling								
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000	(32)
Internal Walls			122.3600			9.0000	1101.2400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21513.8300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		268.4866 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.1120 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	91.4328 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	49.2033	48.5234	46.5714	46.5714	44.7510	44.7510	44.1734	44.7510	47.8581	47.2074	49.2033	(38)
Heat transfer coeff	143.5020	140.6361	139.9562	138.0042	138.0042	136.1838	136.1838	135.6063	136.1838	139.2909	138.6403	140.6361	(39)
Average = Sum(39)m / 12 =												138.5690	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7909	1.7551	1.7466	1.7223	1.7223	1.6995	1.6995	1.6923	1.6995	1.7383	1.7302	1.7551	(40)
HLP (average)												1.7293	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4653	(42)
Hot water usage for mixer showers													
	90.1382	88.7836	86.8097	83.0330	80.2458	77.1376	75.3709	77.3299	79.4773	82.8146	86.6724	89.7929	(42a)
Hot water usage for baths													
	28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183	(42b)
Hot water usage for other uses													
	39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774	(42c)
Average daily hot water use (litres/day)												145.6082	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	158.3296	155.1045	151.0883	144.7696	139.7149	134.2500	131.9937	135.9908	140.2285	145.9859	152.4081	157.8886	(44)
Energy conte	250.7555	220.8667	232.2171	198.1824	188.0831	165.0761	159.6349	168.3850	172.9158	198.1014	217.1333	247.2153	(45)
Energy content (annual)										Total = Sum(45)m =		2418.5665	
Distribution loss (46)m = 0.15 x (45)m													
	37.6133	33.1300	34.8326	29.7274	28.2125	24.7614	23.9452	25.2577	25.9374	29.7152	32.5700	37.0823	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
										Total per year (kWh/year) = Sum(64)m =		2690.1265	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	101.8274	90.1038	95.6634	83.7516	80.9888	72.7438	71.5298	74.4392	75.3505	84.3199	90.0528	100.6503	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	32.1264	28.5344	23.2057	17.5682	13.1324	11.0870	11.9799	15.5719	20.9005	26.5380	30.9738	33.0193	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)													
	136.8648	134.0830	128.5798	116.3217	108.8559	101.0331	96.1422	100.0527	104.6535	113.3332	125.0734	135.2827	(72)
Total internal gains													
	598.4833	595.5124	576.1054	539.9544	505.0086	473.4820	455.0150	459.1146	477.6191	510.1918	549.4119	583.3250	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	15.0428	0.4600	0.7000	0.7700	14.8368	(75)
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)
Northeast	2.1200	35.0000	0.4600	0.7000	1.0000	21.5032	(82)

Solar gains	63.5648	103.6851	167.6921	252.0822	301.6358	338.2744	312.6335	268.8103	207.2278	129.1161	77.8743	50.3850	(83)
Total gains	662.0481	699.1975	743.7975	792.0366	806.6444	811.7564	767.6485	727.9248	684.8469	639.3079	627.2862	633.7100	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6445	42.4931	42.6995	43.3035	43.3035	43.8823	43.8823	44.0692	43.8823	42.9035	43.1048	42.4931	
alpha	3.7763	3.8329	3.8466	3.8869	3.8869	3.9255	3.9255	3.9379	3.9255	3.8602	3.8737	3.8329	
util living area													
	0.9929	0.9909	0.9838	0.9643	0.9105	0.7714	0.6070	0.6304	0.8607	0.9646	0.9878	0.9938	(86)
MIT	19.1999	19.3300	19.6410	20.0686	20.5112	20.8424	20.9562	20.9505	20.7371	20.2370	19.7046	19.2256	(87)
Th 2	19.4764	19.5016	19.5076	19.5249	19.5249	19.5412	19.5412	19.5463	19.5412	19.5135	19.5193	19.5016	(88)
util rest of house													
	0.9900	0.9871	0.9765	0.9461	0.8568	0.6338	0.3911	0.4105	0.7545	0.9407	0.9816	0.9912	(89)
MIT 2	17.4831	17.6643	18.0630	18.6091	19.1343	19.4679	19.5338	19.5377	19.3904	18.8168	18.1540	17.5318	(90)
Living area fraction										fLA = Living area / (4) =		0.4488	(91)
MIT	18.2536	18.4118	18.7711	19.2641	19.7522	20.0848	20.1721	20.1717	19.9948	19.4541	18.8499	18.2919	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2536	18.4118	18.7711	19.2641	19.7522	20.0848	20.1721	20.1717	19.9948	19.4541	18.8499	18.2919	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9865	0.9832	0.9715	0.9419	0.8670	0.6919	0.4912	0.5128	0.7943	0.9394	0.9775	0.9880	(94)
Useful gains	653.1225	687.4178	722.5934	745.9884	699.3504	561.6219	377.0313	373.2673	543.9440	600.5352	613.1521	626.1370	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1844.5139	1787.7402	1605.4585	1333.6805	987.0387	637.9887	391.1373	389.4237	680.2066	1066.1536	1448.7716	1799.0065	(97)
Space heating kWh													
	886.3952	739.4167	656.8516	423.1383	214.0401	0.0000	0.0000	0.0000	0.0000	346.4201	601.6460	872.6150	(98a)
Space heating requirement - total per year (kWh/year)												4740.5230	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	886.3952	739.4167	656.8516	423.1383	214.0401	0.0000	0.0000	0.0000	0.0000	346.4201	601.6460	872.6150	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4740.5230	
Space heating per m2											(98c) / (4) =	59.1604	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	886.3952	739.4167	656.8516	423.1383	214.0401	0.0000	0.0000	0.0000	0.0000	346.4201	601.6460	872.6150	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	886.3952	739.4167	656.8516	423.1383	214.0401	0.0000	0.0000	0.0000	0.0000	346.4201	601.6460	872.6150	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	28.1200	22.5589	20.3118	14.8813	11.4948	9.3913	10.4859	13.6300	17.7040	23.2286	26.2366	28.9016	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4740.5230	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2690.1265	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	226.9448	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7657.5943	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4740.5230	27.6700	1311.7027	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	27.6700	744.3580	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	226.9448	27.6700	62.7956	(250)
Additional standing charges			0.0000	(251)
Total energy cost			2118.8564	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4740.5230	0.1545	732.2474	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2690.1265	0.1413	380.0853	(264)
Space and water heating			1112.3326	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	226.9448	0.1443	32.7551	(268)
Total CO2, kg/year			1145.0878	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4740.5230	1.5719	7451.5733	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	1.5225	4095.5963	(278)
Space and water heating			11547.1695	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	226.9448	1.5338	348.0955	(282)
Total Primary energy kWh/year			11895.2650	(286)

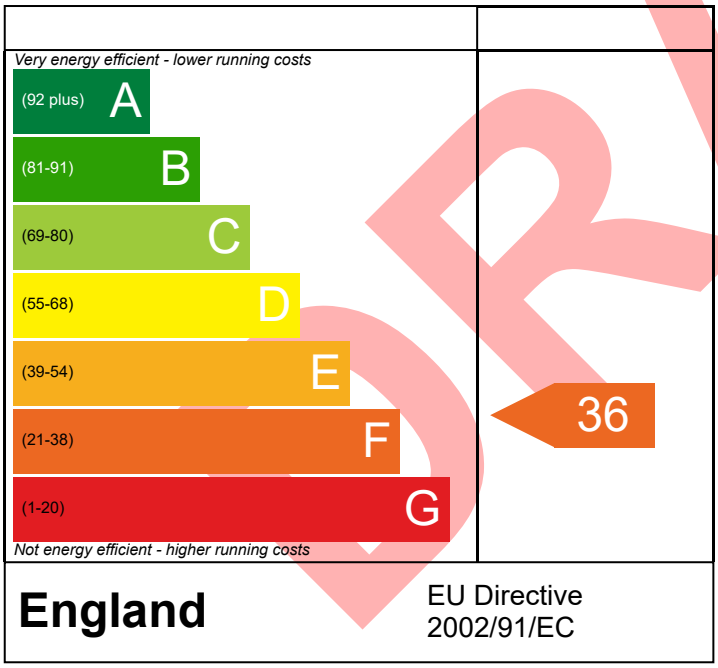
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	80.13 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

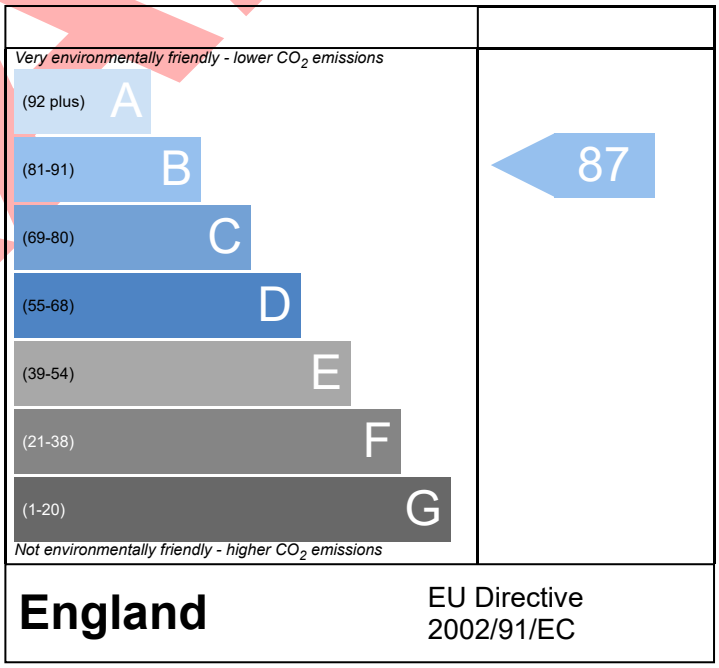
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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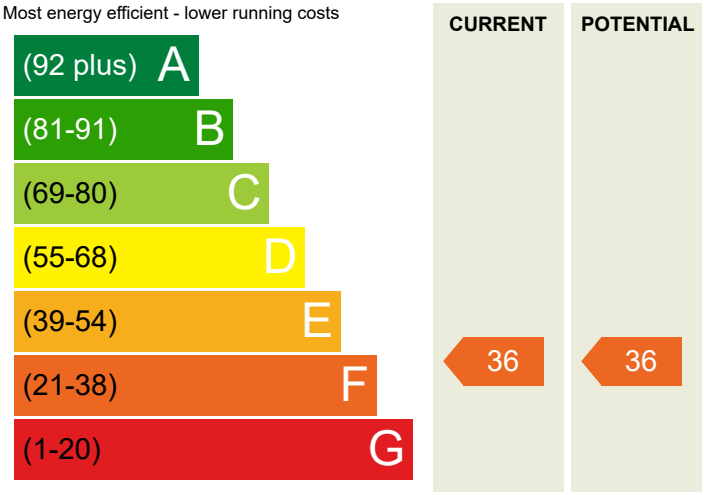
Energy Report

Dwelling Address	
Reference	Flat 3-Baseline
SAP Version	10.2
Assessment Date	29/04/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	80

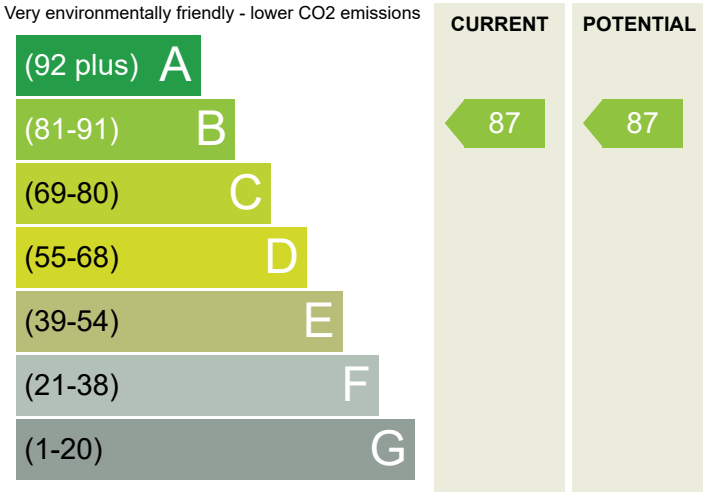
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

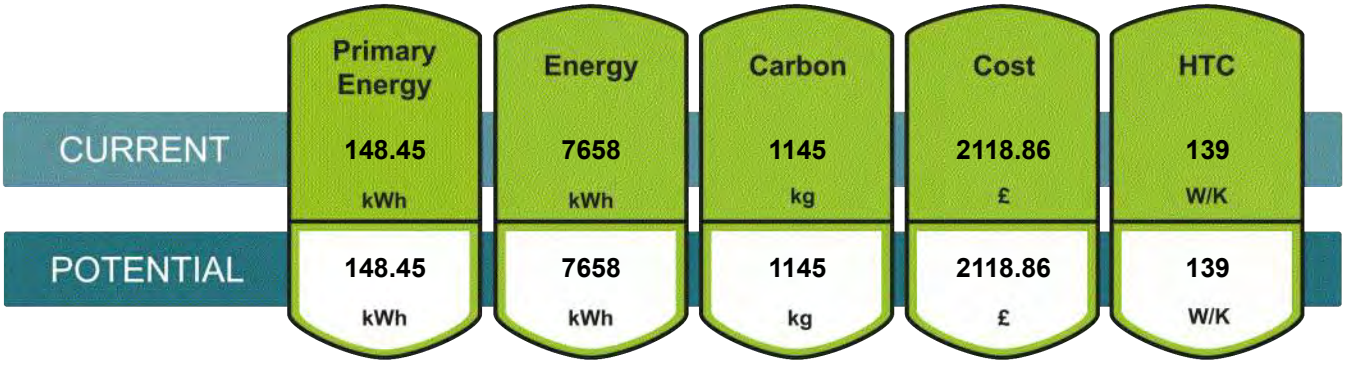


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£63	£63	
Heating	£1312	£1312	
Hot Water	£744	£744	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£2119	£2119	

Estimated energy use and potential savings

Space Heating
4741
kWh per year

Water Heating
2690
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 4	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	38 F	**DER**	15.67	**TER**	
Environmental	87 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.1	**DFEE**	76.14	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	162.64	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	4	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	255.57	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	13.60 m	79.14 m²	2.50 m

8.0 Living Area	40.57	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.30	190.00	34.00	26.95	0.00	None	7.05	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	65.33	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	118.86

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	79.14	77.02	None	0.00	Enter Gross Area	2.12

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.25	None	0.00	20.00	79.14

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Roof Light	Manufacturer	Roof Light	Double glazed			0.65		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SE Windows	Windows	External Wall 1	South East	2.63	
Rooflights	Roof Light	External Roof 1	North East	2.12	0
SW Windows	Windows	External Wall 1	South West	4.42	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	20

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	

Summary for Input Data

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 4	Issued on Date	15/06/2026
Assessment Reference	Baseline	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	38 F	DER	15.67	TER	
Environmental	87 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.1	DFEE	76.14	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	162.64	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area		Storey height		Volume	
Main dwelling		(m2)		(m)		(m3)	
Ground floor		79.1400	(1b)	x 2.5000	(2b) =	197.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	197.8500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8511	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7596	0.7447	0.7298	0.6553	0.6404	0.5660	0.5660	0.5511	0.5958	0.6404	0.6702	0.7000	(22b)
Effective ac	0.7885	0.7773	0.7663	0.7147	0.7051	0.6602	0.6602	0.6518	0.6775	0.7051	0.7246	0.7450	(25)

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3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.2500	19.7850	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.3000	8.0850	190.0000	5120.5000	(29a)
External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800	(30)
Total net area of external elements Aum(A, m2)			192.2800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		51.5249			(33)
Main dwelling								
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000	(32)
Internal Walls			118.8600			9.0000	1069.7400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	20225.6200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		255.5676	(35)
Thermal bridges (Default value 0.200 * total exposed area)		38.4560	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	89.9809	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	50.7496	50.0327	46.6653	46.0353	43.1023	43.1023	42.5592	44.2321	46.0353	47.3098	48.6423	(38)

Heat transfer coeff

	141.4620	140.7306	140.0136	136.6462	136.0162	133.0833	133.0833	132.5402	134.2130	136.0162	137.2907	138.6232 (39)
Average = Sum(39)m / 12 =												136.6432

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7875	1.7782	1.7692	1.7266	1.7187	1.6816	1.6816	1.6748	1.6959	1.7187	1.7348	1.7516	(40)
HLP (average)												1.7266	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4463 (42)
Hot water usage for mixer showers												
	89.7006	88.3526	86.3882	82.6298	79.8562	76.7631	75.0050	76.9545	79.0914	82.4125	86.2516	89.3569 (42a)
Hot water usage for baths												
	28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819 (42b)
Hot water usage for other uses												
	39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830 (42c)
Average daily hot water use (litres/day)												144.9011 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	157.5608	154.3512	150.3546	144.0666	139.0364	133.5981	131.3527	135.3304	139.5475	145.2769	151.6680	157.1218	(44)
Energy conte	249.5377	219.7941	231.0894	197.2200	187.1697	164.2745	158.8597	167.5673	172.0760	197.1394	216.0789	246.0148	(45)
Energy content (annual)										Total = Sum(45)m =		2406.8214	
Distribution loss (46)m = 0.15 x (45)m													
	37.4307	32.9691	34.6634	29.5830	28.0755	24.6412	23.8290	25.1351	25.8114	29.5709	32.4118	36.9022	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
										Total per year (kWh/year) = Sum(64)m =		2678.3814	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	101.4225	89.7471	95.2884	83.4316	80.6851	72.4773	71.2721	74.1673	75.0713	84.0000	89.7022	100.2511	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	28.5578	25.3647	20.6280	15.6167	11.6737	9.8554	10.6491	13.8421	18.5789	23.5902	27.5332	29.3515	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)													
	136.3206	133.5523	128.0758	115.8773	108.4478	100.6629	95.7958	99.6872	104.2657	112.9033	124.5864	134.7461	(72)
Total internal gains													
	590.7560	588.1654	569.4582	534.1656	499.9668	468.9103	450.5047	454.2185	472.0277	503.7593	542.2117	575.6431	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Southwest	4.4200	36.7938	0.4600	0.7000	0.7700	36.2900	(79)
Northeast	2.1200	26.0000	0.6500	0.7000	1.0000	22.5716	(82)

Solar gains	80.4549	145.4762	218.2457	297.3739	353.9081	359.4993	343.2782	300.5229	245.9089	166.2676	97.9795	67.7670	(83)
Total gains	671.2109	733.6417	787.7039	831.5396	853.8749	828.4096	793.7829	754.7414	717.9365	670.0269	640.1912	643.4101	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.7155	39.9219	40.1263	41.1151	41.3056	42.2159	42.2159	42.3889	41.8605	41.3056	40.9221	40.5288	
alpha	3.6477	3.6615	3.6751	3.7410	3.7537	3.8144	3.8144	3.8259	3.7907	3.7537	3.7281	3.7019	
util living area													
	0.9927	0.9891	0.9809	0.9605	0.9121	0.8031	0.6588	0.7011	0.8785	0.9672	0.9886	0.9938	(86)
MIT	18.9736	19.1571	19.4931	19.9687	20.4127	20.7734	20.9239	20.9020	20.6418	20.0740	19.4631	18.9698	(87)
Th 2	19.4788	19.4853	19.4916	19.5218	19.5275	19.5540	19.5540	19.5590	19.5438	19.5275	19.5160	19.5041	(88)

util rest of house													
	0.9901	0.9850	0.9733	0.9428	0.8669	0.6939	0.4775	0.5272	0.7981	0.9489	0.9836	0.9916	(89)
MIT 2	17.2057	17.4433	17.8735	18.4884	19.0245	19.4223	19.5321	19.5265	19.2985	18.6306	17.8540	17.2165	(90)
Living area fraction										fLA = Living area / (4) =		0.5126	(91)
MIT	18.1120	18.3219	18.7038	19.2473	19.7361	20.1149	20.2456	20.2317	19.9872	19.3705	18.6789	18.1153	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1120	18.3219	18.7038	19.2473	19.7361	20.1149	20.2456	20.2317	19.9872	19.3705	18.6789	18.1153	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9866	0.9806	0.9678	0.9385	0.8746	0.7418	0.5711	0.6161	0.8274	0.9463	0.9796	0.9885	(94)
Useful gains	662.2067	719.4038	762.3642	780.3990	746.8387	614.5542	453.3489	465.0335	594.0073	634.0165	627.1352	636.0051	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1953.8676	1888.8688	1708.6981	1413.9128	1093.0431	733.9461	485.1661	507.8480	790.1323	1192.9356	1589.6766	1928.9842	(97)
Space heating kWh													
	960.9957	785.8805	704.0724	456.1299	257.5761	0.0000	0.0000	0.0000	0.0000	415.8358	693.0298	961.9765	(98a)
Space heating requirement - total per year (kWh/year)												5235.4967	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	960.9957	785.8805	704.0724	456.1299	257.5761	0.0000	0.0000	0.0000	0.0000	415.8358	693.0298	961.9765	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5235.4967	
Space heating per m2											(98c) / (4) =	66.1549	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	960.9957	785.8805	704.0724	456.1299	257.5761	0.0000	0.0000	0.0000	0.0000	415.8358	693.0298	961.9765	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	960.9957	785.8805	704.0724	456.1299	257.5761	0.0000	0.0000	0.0000	0.0000	415.8358	693.0298	961.9765	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.9964	20.0531	18.0556	13.2283	10.2179	8.3481	9.3211	12.1159	15.7374	20.6483	23.3222	25.6912	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5235.4967	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2678.3814	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	201.7355	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	8115.6137	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	

Space heating - main system 1	5235.4967	16.4900	863.3334	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	16.4900	441.6651	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	201.7355	16.4900	33.2662	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1338.2647	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.8809	(257)
SAP value		37.8336	
SAP rating (Section 12)		38	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5235.4967	0.1542	807.3362	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2678.3814	0.1413	378.4224	(264)
Space and water heating			1185.7586	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	201.7355	0.1443	29.1167	(268)
Total CO2, kg/year			1214.8753	(272)
CO2 emissions per m2			15.3500	(273)
EI value			86.8863	
EI rating			87	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	79.1400	(1b) x	2.5000	(2b) =	197.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		197.8500	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8511	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7596	0.7000	0.6851	0.6404	0.6404	0.5958	0.5958	0.5809	0.5958	0.6702	0.6553	0.7000	(22b)
Effective ac	0.7885	0.7450	0.7347	0.7051	0.7051	0.6775	0.6775	0.6687	0.6775	0.7246	0.7147	0.7450	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.2500	19.7850	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.3000	8.0850	190.0000	5120.5000	(29a)

External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800 (30)
Total net area of external elements Aum(A, m2)			192.2800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		51.5249		(33)
Main dwelling							
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000 (32)
Internal Walls			118.8600			9.0000	1069.7400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 20225.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	255.5676 (35)
Thermal bridges (Default value 0.200 * total exposed area)	38.4560 (36)
Point Thermal bridges	(36a) = 0.0000
Total fabric heat loss	(33) + (36) + (36a) = 89.9809 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	48.6423	47.9688	46.0353	46.0353	44.2321	44.2321	43.6600	44.2321	47.3098	46.6653	48.6423	(38)
Heat transfer coeff	141.4620	138.6232	137.9497	136.0162	136.0162	134.2130	134.2130	133.6409	134.2130	137.2907	136.6462	138.6232	(39)
Average = Sum(39)m / 12 =												136.5756	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7875	1.7516	1.7431	1.7187	1.7187	1.6959	1.6959	1.6887	1.6959	1.7348	1.7266	1.7516	(40)
HLP (average)												1.7257	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4463	(42)
Hot water usage for mixer showers	89.7006	88.3526	86.3882	82.6298	79.8562	76.7631	75.0050	76.9545	79.0914	82.4125	86.2516	89.3569	(42a)
Hot water usage for baths	28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819	(42b)
Hot water usage for other uses	39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830	(42c)
Average daily hot water use (litres/day)												144.9011	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	157.5608	154.3512	150.3546	144.0666	139.0364	133.5981	131.3527	135.3304	139.5475	145.2769	151.6680	157.1218	(44)
Energy conte	249.5377	219.7941	231.0894	197.2200	187.1697	164.2745	158.8597	167.5673	172.0760	197.1394	216.0789	246.0148	(45)
Energy content (annual)										Total = Sum(45)m =		2406.8214	
Distribution loss (46)m = 0.15 x (45)m	37.4307	32.9691	34.6634	29.5830	28.0755	24.6412	23.8290	25.1351	25.8114	29.5709	32.4118	36.9022	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
										Total per year (kWh/year) = Sum(64)m =		2678.3814	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	101.4225	89.7471	95.2884	83.4316	80.6851	72.4773	71.2721	74.1673	75.0713	84.0000	89.7022	100.2511	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	28.5578	25.3647	20.6280	15.6167	11.6737	9.8554	10.6491	13.8421	18.5789	23.5902	27.5332	29.3515	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)	136.3206	133.5523	128.0758	115.8773	108.4478	100.6629	95.7958	99.6872	104.2657	112.9033	124.5864	134.7461	(72)
Total internal gains	590.7560	588.1654	569.4582	534.1656	499.9668	468.9103	450.5047	454.2185	472.0277	503.7593	542.2117	575.6431	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)
Southwest	4.4200	46.3896	0.4600	0.7000	0.7700	45.7543	(79)
Northeast	2.1200	35.0000	0.6500	0.7000	1.0000	30.3849	(82)

Solar gains	103.3641	159.9970	239.3210	332.9034	379.1689	417.1577	388.6708	346.9830	286.2118	193.5711	124.7874	83.0968	(83)
Total gains	694.1201	748.1625	808.7792	867.0690	879.1358	886.0680	839.1754	801.2014	758.2394	697.3304	666.9991	658.7399	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.7155	40.5288	40.7266	41.3056	41.3056	41.8605	41.8605	42.0397	41.8605	40.9221	41.1151	40.5288	
alpha	3.6477	3.7019	3.7151	3.7537	3.7537	3.7907	3.7907	3.8026	3.7907	3.7281	3.7410	3.7019	
util living area	0.9899	0.9862	0.9751	0.9469	0.8790	0.7218	0.5558	0.5753	0.8144	0.9480	0.9822	0.9913	(86)
MIT	19.1843	19.3380	19.6748	20.1186	20.5532	20.8641	20.9634	20.9593	20.7723	20.2746	19.7130	19.2027	(87)
Th 2	19.4788	19.5041	19.5101	19.5275	19.5275	19.5438	19.5438	19.5490	19.5438	19.5160	19.5218	19.5041	(88)
util rest of house	0.9860	0.9809	0.9648	0.9227	0.8161	0.5829	0.3541	0.3694	0.6979	0.9166	0.9737	0.9878	(89)
MIT 2	17.4746	17.6850	18.1142	18.6745	19.1790	19.4820	19.5376	19.5419	19.4182	18.8663	18.1744	17.5140	(90)
Living area fraction									fLA = Living area / (4) =			0.5126	(91)
MIT	18.3511	18.5324	18.9142	19.4148	19.8835	20.1905	20.2685	20.2685	20.1124	19.5882	18.9631	18.3797	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3511	18.5324	18.9142	19.4148	19.8835	20.1905	20.2685	20.2685	20.1124	19.5882	18.9631	18.3797	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9818	0.9761	0.9593	0.9204	0.8340	0.6504	0.4595	0.4773	0.7500	0.9185	0.9693	0.9841	(94)
Useful gains	681.4764	730.2983	775.8699	798.0483	733.2196	576.3134	385.6244	382.3942	568.7045	640.5171	646.4914	648.2744	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1832.0846	1778.8674	1602.1759	1334.9730	990.6724	642.9527	398.4102	396.7140	686.1458	1069.2518	1443.4145	1785.4228	(97)
Space heating kWh	856.0525	704.6384	614.7717	386.5858	191.5448	0.0000	0.0000	0.0000	0.0000	318.9786	573.7846	846.0384	(98a)
Space heating requirement - total per year (kWh/year)												4492.3949	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	856.0525	704.6384	614.7717	386.5858	191.5448	0.0000	0.0000	0.0000	0.0000	318.9786	573.7846	846.0384	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4492.3949	
Space heating per m2											(98c) / (4) =	56.7652	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	856.0525	704.6384	614.7717	386.5858	191.5448	0.0000	0.0000	0.0000	0.0000	318.9786	573.7846	846.0384	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	856.0525	704.6384	614.7717	386.5858	191.5448	0.0000	0.0000	0.0000	0.0000	318.9786	573.7846	846.0384	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.9964	20.0531	18.0556	13.2283	10.2179	8.3481	9.3211	12.1159	15.7374	20.6483	23.3222	25.6912	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 4492.3949 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2678.3814 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 201.7355 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7372.5119	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4492.3949	27.6700	1243.0457	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	27.6700	741.1081	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	201.7355	27.6700	55.8202	(250)
Additional standing charges			0.0000	(251)
Total energy cost			2039.9740	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4492.3949	0.1547	694.8313	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2678.3814	0.1413	378.4224	(264)
Space and water heating			1073.2537	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	201.7355	0.1443	29.1167	(268)
Total CO2, kg/year			1102.3704	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4492.3949	1.5726	7064.8964	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	1.5225	4077.7022	(278)
Space and water heating			11142.5986	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	201.7355	1.5338	309.4287	(282)
Total Primary energy kWh/year			11452.0273	(286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating: F 38
Current environmental impact rating: B 87

N Solar water heating	Not applicable	
U Solar photovoltaic panels	Not applicable	
V2 Wind turbine	Not applicable	

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: F 38
Potential environmental impact rating: B 87

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£2040	£2040	£0
Space heating	£1243	£1243	£0
Water heating	£741	£741	£0
Lighting	£56	£56	£0
Total cost of fuels	£2040	£2040	£0
Total cost of uses	£2040	£2040	£0
Delivered energy	93 kWh/m²	93 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m²	14 kg/m²	14 kg/m²	0 kg/m²
Primary energy	145 kWh/m²	145 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	79.1400	(1b)	x 2.5000	(2b) =	197.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		197.8500	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8511 (18)
Number of sides sheltered		4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7596	0.7447	0.7298	0.6553	0.6404	0.5660	0.5660	0.5511	0.5958	0.6404	0.6702	0.7000	(22b)
Effective ac	0.7885	0.7773	0.7663	0.7147	0.7051	0.6602	0.6602	0.6518	0.6775	0.7051	0.7246	0.7450	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.2500	19.7850	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.3000	8.0850	190.0000	5120.5000	(29a)
External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800	(30)
Total net area of external elements Aum(A, m2)			192.2800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		51.5249			(33)
Main dwelling								
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000	(32)
Internal Walls			118.8600			9.0000	1069.7400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	20225.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		255.5676 (35)
Thermal bridges (Default value 0.200 * total exposed area)		38.4560 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	89.9809 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	50.7496	50.0327	46.6653	46.0353	43.1023	43.1023	42.5592	44.2321	46.0353	47.3098	48.6423	(38)
Heat transfer coeff	141.4620	140.7306	140.0136	136.6462	136.0162	133.0833	133.0833	132.5402	134.2130	136.0162	137.2907	138.6232	(39)
Average = Sum(39)m / 12 =												136.6432	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7875	1.7782	1.7692	1.7266	1.7187	1.6816	1.6816	1.6748	1.6959	1.7187	1.7348	1.7516	(40)
HLP (average)												1.7266	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.4463 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
89.7006	88.3526	86.3882	82.6298	79.8562	76.7631	75.0050	76.9545	79.0914	82.4125	86.2516	89.3569	(42a)

Hot water usage for baths

28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819	(42b)

Hot water usage for other uses

39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830	(42c)

Average daily hot water use (litres/day)		144.9011 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	157.5608	154.3512	150.3546	144.0666	139.0364	133.5981	131.3527	135.3304	139.5475	145.2769	151.6680	157.1218	(44)
Energy conte	249.5377	219.7941	231.0894	197.2200	187.1697	164.2745	158.8597	167.5673	172.0760	197.1394	216.0789	246.0148	(45)
Energy content (annual)										Total = Sum(45)m =		2406.8214	
Distribution loss (46)m = 0.15 x (45)m													

	37.4307	32.9691	34.6634	29.5830	28.0755	24.6412	23.8290	25.1351	25.8114	29.5709	32.4118	36.9022	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
										Total per year (kWh/year) = Sum(64)m =		2678.3814	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	101.4225	89.7471	95.2884	83.4316	80.6851	72.4773	71.2721	74.1673	75.0713	84.0000	89.7022	100.2511	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	28.5578	25.3647	20.6280	15.6167	11.6737	9.8554	10.6491	13.8421	18.5789	23.5902	27.5332	29.3515	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)													
	136.3206	133.5523	128.0758	115.8773	108.4478	100.6629	95.7958	99.6872	104.2657	112.9033	124.5864	134.7461	(72)
Total internal gains													
	590.7560	588.1654	569.4582	534.1656	499.9668	468.9103	450.5047	454.2185	472.0277	503.7593	542.2117	575.6431	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Southwest	4.4200	36.7938	0.4600	0.7000	0.7700	36.2900	(79)
Northeast	2.1200	26.0000	0.6500	0.7000	1.0000	22.5716	(82)

Solar gains	80.4549	145.4762	218.2457	297.3739	353.9081	359.4993	343.2782	300.5229	245.9089	166.2676	97.9795	67.7670	(83)
Total gains	671.2109	733.6417	787.7039	831.5396	853.8749	828.4096	793.7829	754.7414	717.9365	670.0269	640.1912	643.4101	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.7155	39.9219	40.1263	41.1151	41.3056	42.2159	42.2159	42.3889	41.8605	41.3056	40.9221	40.5288	
alpha	3.6477	3.6615	3.6751	3.7410	3.7537	3.8144	3.8144	3.8259	3.7907	3.7537	3.7281	3.7019	
util living area													
	0.9927	0.9891	0.9809	0.9605	0.9121	0.8031	0.6588	0.7011	0.8785	0.9672	0.9886	0.9938	(86)
MIT	18.9736	19.1571	19.4931	19.9687	20.4127	20.7734	20.9239	20.9020	20.6418	20.0740	19.4631	18.9698	(87)
Th 2	19.4788	19.4853	19.4916	19.5218	19.5275	19.5540	19.5540	19.5590	19.5438	19.5275	19.5160	19.5041	(88)
util rest of house													
	0.9901	0.9850	0.9733	0.9428	0.8669	0.6939	0.4775	0.5272	0.7981	0.9489	0.9836	0.9916	(89)
MIT 2	17.2057	17.4433	17.8735	18.4884	19.0245	19.4223	19.5321	19.5265	19.2985	18.6306	17.8540	17.2165	(90)
Living area fraction										fLA = Living area / (4) =		0.5126	(91)
MIT	18.1120	18.3219	18.7038	19.2473	19.7361	20.1149	20.2456	20.2317	19.9872	19.3705	18.6789	18.1153	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1120	18.3219	18.7038	19.2473	19.7361	20.1149	20.2456	20.2317	19.9872	19.3705	18.6789	18.1153	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9866	0.9806	0.9678	0.9385	0.8746	0.7418	0.5711	0.6161	0.8274	0.9463	0.9796	0.9885	(94)
Useful gains	662.2067	719.4038	762.3642	780.3990	746.8387	614.5542	453.3489	465.0335	594.0073	634.0165	627.1352	636.0051	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1953.8676	1888.8688	1708.6981	1413.9128	1093.0431	733.9461	485.1661	507.8480	790.1323	1192.9356	1589.6766	1928.9842	(97)
Space heating kWh													
	960.9957	785.8805	704.0724	456.1299	257.5761	0.0000	0.0000	0.0000	0.0000	415.8358	693.0298	961.9765	(98a)
Space heating requirement - total per year (kWh/year)												5235.4967	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	960.9957	785.8805	704.0724	456.1299	257.5761	0.0000	0.0000	0.0000	0.0000	415.8358	693.0298	961.9765	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5235.4967	
Space heating per m2											(98c) / (4) =	66.1549	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	960.9957	785.8805	704.0724	456.1299	257.5761	0.0000	0.0000	0.0000	0.0000	415.8358	693.0298	961.9765	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	960.9957	785.8805	704.0724	456.1299	257.5761	0.0000	0.0000	0.0000	0.0000	415.8358	693.0298	961.9765	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.9964	20.0531	18.0556	13.2283	10.2179	8.3481	9.3211	12.1159	15.7374	20.6483	23.3222	25.6912	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												5235.4967	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2678.3814	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												201.7355	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												8115.6137	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	5235.4967	16.4900	863.3334	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	16.4900	441.6651	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	201.7355	16.4900	33.2662	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1338.2647	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.8809	(257)
SAP value		37.8336	
SAP rating (Section 12)		38	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5235.4967	0.1542	807.3362	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2678.3814	0.1413	378.4224	(264)
Space and water heating			1185.7586	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	201.7355	0.1443	29.1167	(268)
Total CO2, kg/year			1214.8753	(272)
CO2 emissions per m2			15.3500	(273)
EI value			86.8863	
EI rating			87	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	79.1400	(1b)	x 2.5000	(2b) =	197.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	197.8500	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8511	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7596	0.7000	0.6851	0.6404	0.6404	0.5958	0.5958	0.5809	0.5958	0.6702	0.6553	0.7000	(22b)
Effective ac	0.7885	0.7450	0.7347	0.7051	0.7051	0.6775	0.6775	0.6687	0.6775	0.7246	0.7147	0.7450	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.2500	19.7850	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.3000	8.0850	190.0000	5120.5000	(29a)
External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800	(30)
Total net area of external elements Aum(A, m2)			192.2800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		51.5249			(33)
Main dwelling								
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000	(32)
Internal Walls			118.8600			9.0000	1069.7400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	20225.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		255.5676 (35)
Thermal bridges (Default value 0.200 * total exposed area)		38.4560 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	89.9809 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	48.6423	47.9688	46.0353	46.0353	44.2321	44.2321	43.6600	44.2321	47.3098	46.6653	48.6423	(38)
Heat transfer coeff	141.4620	138.6232	137.9497	136.0162	136.0162	134.2130	134.2130	133.6409	134.2130	137.2907	136.6462	138.6232	(39)
Average = Sum(39)m / 12 =												136.5756	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7875	1.7516	1.7431	1.7187	1.7187	1.6959	1.6959	1.6887	1.6959	1.7348	1.7266	1.7516	(40)
HLP (average)												1.7257	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4463	(42)
Hot water usage for mixer showers													
	89.7006	88.3526	86.3882	82.6298	79.8562	76.7631	75.0050	76.9545	79.0914	82.4125	86.2516	89.3569	(42a)
Hot water usage for baths													
	28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819	(42b)
Hot water usage for other uses													
	39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830	(42c)
Average daily hot water use (litres/day)												144.9011	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	157.5608	154.3512	150.3546	144.0666	139.0364	133.5981	131.3527	135.3304	139.5475	145.2769	151.6680	157.1218	(44)
Energy conte	249.5377	219.7941	231.0894	197.2200	187.1697	164.2745	158.8597	167.5673	172.0760	197.1394	216.0789	246.0148	(45)
Energy content (annual)										Total = Sum(45)m =		2406.8214	
Distribution loss (46)m = 0.15 x (45)m													
	37.4307	32.9691	34.6634	29.5830	28.0755	24.6412	23.8290	25.1351	25.8114	29.5709	32.4118	36.9022	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
										Total per year (kWh/year) = Sum(64)m =		2678.3814	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	101.4225	89.7471	95.2884	83.4316	80.6851	72.4773	71.2721	74.1673	75.0713	84.0000	89.7022	100.2511	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	28.5578	25.3647	20.6280	15.6167	11.6737	9.8554	10.6491	13.8421	18.5789	23.5902	27.5332	29.3515	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)													
	136.3206	133.5523	128.0758	115.8773	108.4478	100.6629	95.7958	99.6872	104.2657	112.9033	124.5864	134.7461	(72)
Total internal gains													
	590.7560	588.1654	569.4582	534.1656	499.9668	468.9103	450.5047	454.2185	472.0277	503.7593	542.2117	575.6431	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)
Southwest	4.4200	46.3896	0.4600	0.7000	0.7700	45.7543	(79)
Northeast	2.1200	35.0000	0.6500	0.7000	1.0000	30.3849	(82)

Solar gains	103.3641	159.9970	239.3210	332.9034	379.1689	417.1577	388.6708	346.9830	286.2118	193.5711	124.7874	83.0968	(83)
Total gains	694.1201	748.1625	808.7792	867.0690	879.1358	886.0680	839.1754	801.2014	758.2394	697.3304	666.9991	658.7399	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.7155	40.5288	40.7266	41.3056	41.3056	41.8605	41.8605	42.0397	41.8605	40.9221	41.1151	40.5288	
alpha	3.6477	3.7019	3.7151	3.7537	3.7537	3.7907	3.7907	3.8026	3.7907	3.7281	3.7410	3.7019	
util living area													
	0.9899	0.9862	0.9751	0.9469	0.8790	0.7218	0.5558	0.5753	0.8144	0.9480	0.9822	0.9913	(86)
MIT	19.1843	19.3380	19.6748	20.1186	20.5532	20.8641	20.9634	20.9593	20.7723	20.2746	19.7130	19.2027	(87)
Th 2	19.4788	19.5041	19.5101	19.5275	19.5275	19.5438	19.5438	19.5490	19.5438	19.5160	19.5218	19.5041	(88)
util rest of house													
	0.9860	0.9809	0.9648	0.9227	0.8161	0.5829	0.3541	0.3694	0.6979	0.9166	0.9737	0.9878	(89)
MIT 2	17.4746	17.6850	18.1142	18.6745	19.1790	19.4820	19.5376	19.5419	19.4182	18.8663	18.1744	17.5140	(90)
Living area fraction										fLA = Living area / (4) =		0.5126	(91)
MIT	18.3511	18.5324	18.9142	19.4148	19.8835	20.1905	20.2685	20.2685	20.1124	19.5882	18.9631	18.3797	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3511	18.5324	18.9142	19.4148	19.8835	20.1905	20.2685	20.2685	20.1124	19.5882	18.9631	18.3797	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9818	0.9761	0.9593	0.9204	0.8340	0.6504	0.4595	0.4773	0.7500	0.9185	0.9693	0.9841	(94)
Useful gains	681.4764	730.2983	775.8699	798.0483	733.2196	576.3134	385.6244	382.3942	568.7045	640.5171	646.4914	648.2744	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1832.0846	1778.8674	1602.1759	1334.9730	990.6724	642.9527	398.4102	396.7140	686.1458	1069.2518	1443.4145	1785.4228	(97)
Space heating kWh													
	856.0525	704.6384	614.7717	386.5858	191.5448	0.0000	0.0000	0.0000	0.0000	318.9786	573.7846	846.0384	(98a)
Space heating requirement - total per year (kWh/year)												4492.3949	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	856.0525	704.6384	614.7717	386.5858	191.5448	0.0000	0.0000	0.0000	0.0000	318.9786	573.7846	846.0384	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4492.3949	
Space heating per m2											(98c) / (4) =	56.7652	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	856.0525	704.6384	614.7717	386.5858	191.5448	0.0000	0.0000	0.0000	0.0000	318.9786	573.7846	846.0384	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	856.0525	704.6384	614.7717	386.5858	191.5448	0.0000	0.0000	0.0000	0.0000	318.9786	573.7846	846.0384	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.9964	20.0531	18.0556	13.2283	10.2179	8.3481	9.3211	12.1159	15.7374	20.6483	23.3222	25.6912	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4492.3949	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2678.3814	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	201.7355	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7372.5119	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4492.3949	27.6700	1243.0457	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	27.6700	741.1081	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	201.7355	27.6700	55.8202	(250)
Additional standing charges			0.0000	(251)
Total energy cost			2039.9740	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4492.3949	0.1547	694.8313	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2678.3814	0.1413	378.4224	(264)
Space and water heating			1073.2537	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	201.7355	0.1443	29.1167	(268)
Total CO2, kg/year			1102.3704	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4492.3949	1.5726	7064.8964	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	1.5225	4077.7022	(278)
Space and water heating			11142.5986	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	201.7355	1.5338	309.4287	(282)
Total Primary energy kWh/year			11452.0273	(286)

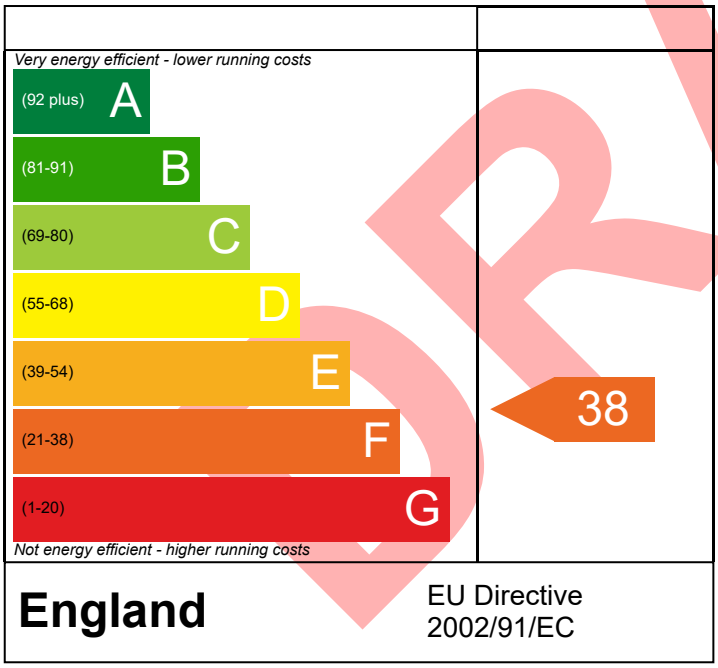
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	79.14 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

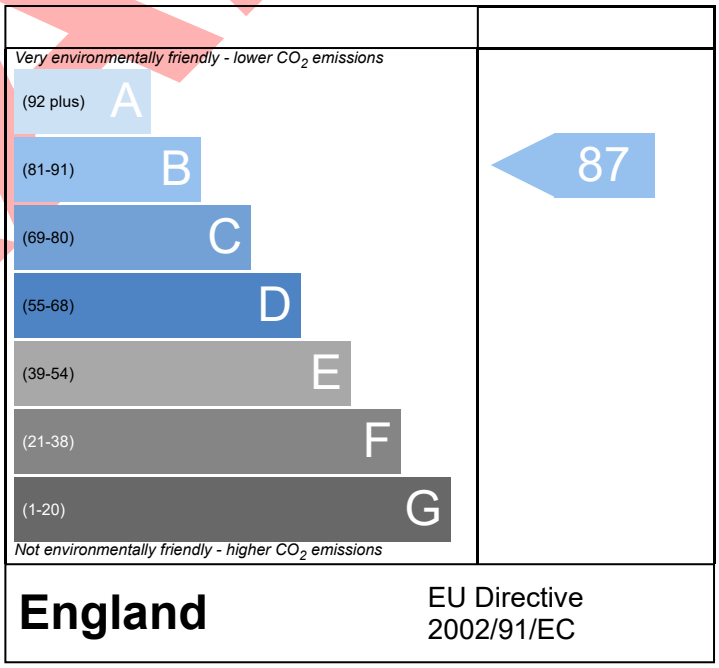
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

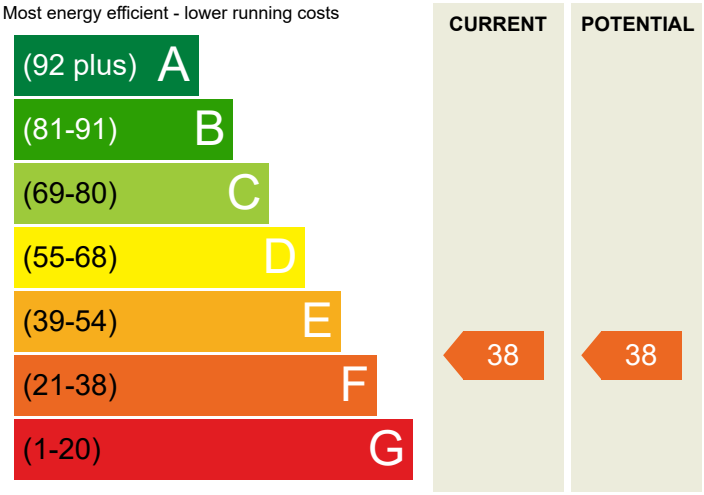
Energy Report

Dwelling Address	
Reference	Flat 4-Baseline
SAP Version	10.2
Assessment Date	29/04/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	79

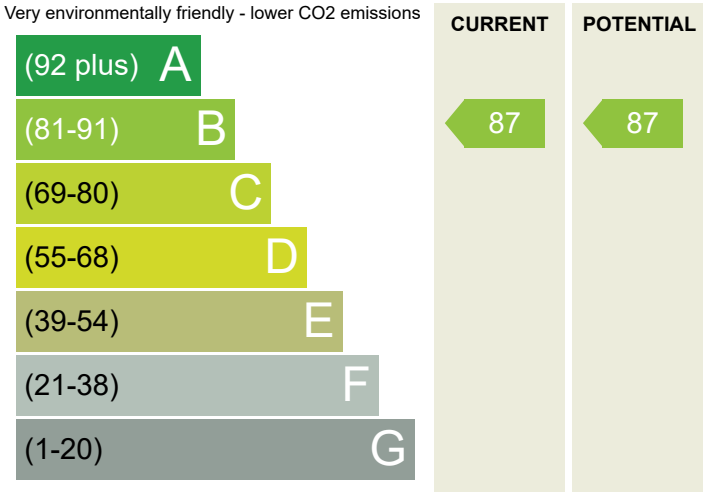
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

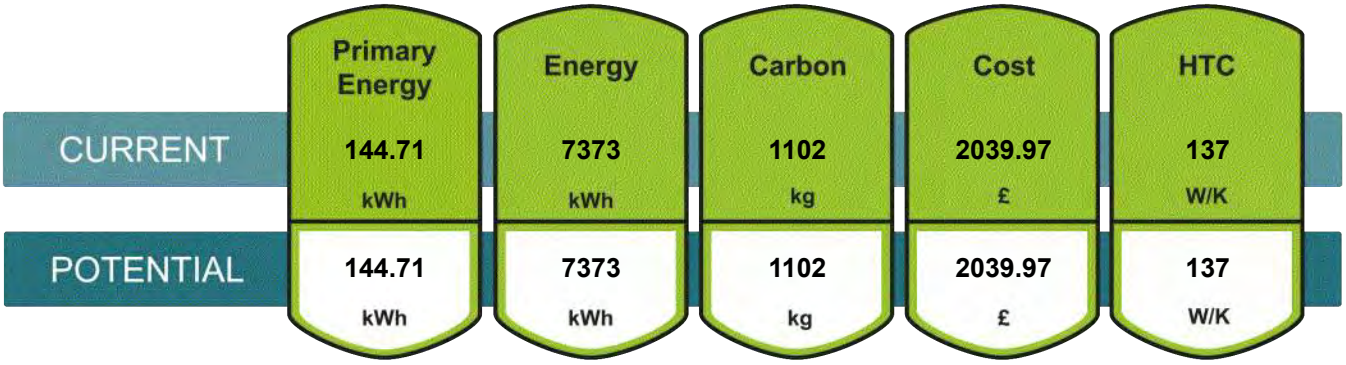
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home


Primary Energy
Energy
Carbon
Cost
HTC
CURRENT
144.71
kWh
7373
kWh
1102
kg
2039.97
£
137
W/K
POTENTIAL
144.71
kWh
7373
kWh
1102
kg
2039.97
£
137
W/K

Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£56	£56	
Heating	£1243	£1243	
Hot Water	£741	£741	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£2040	£2040	

Estimated energy use and potential savings

Space Heating
4492
kWh per year

Water Heating
2678
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 5	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	42 E	**DER**	16.71	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.81	**DFEE**	75.07	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	174.07	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	245.46	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	6.21 m	53.92 m²	2.50 m

8.0 Living Area	24.65	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.30	190.00	15.53	11.43	0.00	None	4.10	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Single plasterboard on both sides, dense cellular blocks, cavity	0.00	70.00	23.48	0.00	None
Party Wall to Adj Flat	Filled Cavity with Edge Sealing	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	38.80	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	98.00

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	53.92	52.86	None	0.00	Enter Gross Area	1.06

11.0 Heat Loss Floors

Summary for Input Data

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.25	None	0.00	20.00	53.92

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Roof light	Manufacturer	Roof Light	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
NE Windows	Windows	External Wall 1	North East	4.10	
Rooflights	Roof light	External Roof 1	North East	1.06	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	

22.0 Lighting

No Fixed Lighting	No

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Independent

Summary for Input Data

SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 5	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	42 E	**DER**	16.71	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.81	**DFEE**	75.07	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	174.07	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.9200 (1b)	x	2.5000 (2b)	=	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	134.8000	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8984	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8877	0.8703	0.8529	0.7659	0.7485	0.6614	0.6614	0.6440	0.6962	0.7485	0.7833	0.8181	(22b)
Effective ac	0.8940	0.8787	0.8637	0.7933	0.7801	0.7187	0.7187	0.7074	0.7424	0.7801	0.8068	0.8346	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.2500	13.4800	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.3000	3.4290	190.0000	2171.7000	(29a)
External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400	(30)
Total net area of external elements Aum(A, m2)			123.3700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		31.7430			(33)
Main dwelling								
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000	(32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000	(32)
Internal Walls			98.0000			9.0000	882.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	56.4170 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

(38)m	39.7689	39.0883	38.4212	35.2878	34.7016	31.9725	31.9725	31.4671	33.0237	34.7016	35.8875	37.1274	(38)
Heat transfer coeff													
	96.1860	95.5054	94.8383	91.7048	91.1186	88.3895	88.3895	87.8841	89.4407	91.1186	92.3046	93.5445	(39)
Average = Sum(39)m / 12 =												91.7020	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7839	1.7712	1.7589	1.7008	1.6899	1.6393	1.6393	1.6299	1.6588	1.6899	1.7119	1.7349	(40)
HLP (average)												1.7007	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8057	(42)
Hot water usage for mixer showers													
	74.9297	73.8037	72.1628	69.0233	66.7064	64.1226	62.6540	64.2825	66.0676	68.8417	72.0487	74.6426	(42a)
Hot water usage for baths													
	23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779	(42b)
Hot water usage for other uses													
	33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217	(42c)
Average daily hot water use (litres/day)												121.0349	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	131.6090	128.9286	125.5907	120.3383	116.1368	111.5943	109.7183	113.0404	116.5626	121.3483	126.6868	131.2422	(44)
Energy conte	208.4364	183.5927	193.0282	164.7371	156.3424	137.2183	132.6948	139.9677	143.7334	164.6685	180.4886	205.4936	(45)
Energy content (annual)										Total = Sum(45)m =		2010.4017	
Distribution loss (46)m = 0.15 x (45)m													
	31.2655	27.5389	28.9542	24.7106	23.4514	20.5827	19.9042	20.9952	21.5600	24.7003	27.0733	30.8240	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
									Total per year (kWh/year) = Sum(64)m =			2281.9617	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	87.7563	77.7102	82.6331	72.6311	70.4351	63.4811	62.5722	64.9905	65.6474	73.2035	77.8685	86.7778	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3292	18.9444	15.4066	11.6638	8.7188	7.3608	7.9536	10.3384	13.8762	17.6190	20.5640	21.9220	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)													
	117.9520	115.6401	111.0659	100.8765	94.6708	88.1682	84.1025	87.3528	91.1769	98.3918	108.1506	116.6369	(72)
Total internal gains													
	457.9563	455.6974	441.4423	414.4322	388.7730	365.3967	351.5584	354.7558	368.2607	392.2963	421.5086	446.8685	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	476.2659	493.2978	508.7898	522.6831	531.3254	515.9313	492.9653	469.4306	449.7172	438.2494	444.6345	461.7496	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.2229	38.4953	38.7661	40.0907	40.3486	41.5944	41.5944	41.8336	41.1056	40.3486	39.8302	39.3023	
alpha	3.5482	3.5664	3.5844	3.6727	3.6899	3.7730	3.7730	3.7889	3.7404	3.6899	3.6553	3.6202	
util living area													
	0.9905	0.9882	0.9820	0.9657	0.9250	0.8252	0.6884	0.7284	0.8931	0.9679	0.9863	0.9916	(86)
MIT	18.9516	19.0999	19.4126	19.8926	20.3472	20.7412	20.9084	20.8845	20.6027	20.0400	19.4569	18.9728	(87)
Th 2	19.4813	19.4902	19.4989	19.5403	19.5481	19.5847	19.5847	19.5915	19.5705	19.5481	19.5323	19.5159	(88)

util rest of house													
	0.9873	0.9839	0.9750	0.9504	0.8858	0.7241	0.5104	0.5602	0.8210	0.9505	0.9806	0.9887	(89)
MIT 2	17.1876	17.3820	17.7849	18.4151	18.9727	19.4256	19.5557	19.5498	19.2864	18.6096	17.8640	17.2358	(90)
Living area fraction										fLA = Living area / (4) =		0.4572	(91)
MIT	17.9940	18.1673	18.5290	19.0906	19.6011	20.0270	20.1741	20.1600	19.8882	19.2635	18.5922	18.0299	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.9940	18.1673	18.5290	19.0906	19.6011	20.0270	20.1741	20.1600	19.8882	19.2635	18.5922	18.0299	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9825	0.9786	0.9686	0.9441	0.8875	0.7608	0.5921	0.6362	0.8407	0.9459	0.9754	0.9844	(94)
Useful gains	467.9549	482.7376	492.7963	493.4883	471.5770	392.5119	291.8656	298.6575	378.0832	414.5218	433.6857	454.5610	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1317.1720	1267.1025	1140.8139	934.5230	719.9345	479.6923	315.9107	330.4434	517.6982	789.4071	1060.7809	1293.7095	(97)
Space heating kWh	631.8175	527.0932	482.1251	317.5450	184.7780	0.0000	0.0000	0.0000	0.0000	278.9146	451.5086	624.3265	(98a)
Space heating requirement - total per year (kWh/year)												3498.1085	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	631.8175	527.0932	482.1251	317.5450	184.7780	0.0000	0.0000	0.0000	0.0000	278.9146	451.5086	624.3265	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3498.1085	
Space heating per m2											(98c) / (4) =	64.8759	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	631.8175	527.0932	482.1251	317.5450	184.7780	0.0000	0.0000	0.0000	0.0000	278.9146	451.5086	624.3265	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	631.8175	527.0932	482.1251	317.5450	184.7780	0.0000	0.0000	0.0000	0.0000	278.9146	451.5086	624.3265	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6693	14.9772	13.4853	9.8799	7.6315	6.2350	6.9617	9.0491	11.7539	15.4218	17.4189	19.1882	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3498.1085	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2281.9617	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	150.6720	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5930.7422	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year

Space heating - main system 1	3498.1085	16.4900	576.8381	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	16.4900	376.2955	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6720	16.4900	24.8458	(250)
Additional standing charges			0.0000	(251)
Total energy cost			977.9794	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.5592	(257)
SAP value		42.3626	
SAP rating (Section 12)		42	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3498.1085	0.1540	538.7613	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2281.9617	0.1412	322.2979	(264)
Space and water heating			861.0593	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6720	0.1443	21.7466	(268)
Total CO2, kg/year			882.8059	(272)
CO2 emissions per m2			16.3700	(273)
EI value			88.0412	
EI rating			88	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.9200	(1b) x	2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		134.8000	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8984	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8877	0.8181	0.8007	0.7485	0.7485	0.6962	0.6962	0.6788	0.6962	0.7833	0.7659	0.8181	(22b)
Effective ac	0.8940	0.8346	0.8205	0.7801	0.7801	0.7424	0.7424	0.7304	0.7424	0.8068	0.7933	0.8346	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.2500	13.4800	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.3000	3.4290	190.0000	2171.7000	(29a)

External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400 (30)
Total net area of external elements Aum(A, m2)			123.3700				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		31.7430		(33)
Main dwelling							
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000 (32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000 (32)
Internal Walls			98.0000			9.0000	882.0000 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	56.4170 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.7689	37.1274	36.5007	34.7016	34.7016	33.0237	33.0237	32.4913	33.0237	35.8875	35.2878	37.1274	(38)
Heat transfer coeff	96.1860	93.5445	92.9178	91.1186	91.1186	89.4407	89.4407	88.9083	89.4407	92.3046	91.7048	93.5445	(39)
Average = Sum(39)m / 12 =												91.6391	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7839	1.7349	1.7233	1.6899	1.6899	1.6588	1.6588	1.6489	1.6588	1.7119	1.7008	1.7349	(40)
HLP (average)												1.6995	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8057	(42)
Hot water usage for mixer showers													
	74.9297	73.8037	72.1628	69.0233	66.7064	64.1226	62.6540	64.2825	66.0676	68.8417	72.0487	74.6426	(42a)
Hot water usage for baths													
	23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779	(42b)
Hot water usage for other uses													
	33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217	(42c)
Average daily hot water use (litres/day)												121.0349	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	131.6090	128.9286	125.5907	120.3383	116.1368	111.5943	109.7183	113.0404	116.5626	121.3483	126.6868	131.2422	(44)
Energy conte	208.4364	183.5927	193.0282	164.7371	156.3424	137.2183	132.6948	139.9677	143.7334	164.6685	180.4886	205.4936	(45)
Energy content (annual)										Total = Sum(45)m =		2010.4017	
Distribution loss (46)m = 0.15 x (45)m													
	31.2655	27.5389	28.9542	24.7106	23.4514	20.5827	19.9042	20.9952	21.5600	24.7003	27.0733	30.8240	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
										Total per year (kWh/year) = Sum(64)m =		2281.9617	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
							Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					0.0000	(64a)
Heat gains from water heating, kWh/month													
	87.7563	77.7102	82.6331	72.6311	70.4351	63.4811	62.5722	64.9905	65.6474	73.2035	77.8685	86.7778	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3292	18.9444	15.4066	11.6638	8.7188	7.3608	7.9536	10.3384	13.8762	17.6190	20.5640	21.9220	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)													
	117.9520	115.6401	111.0659	100.8765	94.6708	88.1682	84.1025	87.3528	91.1769	98.3918	108.1506	116.6369	(72)
Total internal gains													
	457.9563	455.6974	441.4423	414.4322	388.7730	365.3967	351.5584	354.7558	368.2607	392.2963	421.5086	446.8685	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	15.0428	0.4600	0.7000	0.7700	13.7627	(75)
Northeast	1.0600	35.0000	0.4600	0.7000	1.0000	10.7516	(82)

Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	482.4706	498.8479	518.2886	539.5508	545.2429	543.6873	515.2434	491.0094	466.6476	448.0973	452.2223	465.8688	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.2229	39.3023	39.5674	40.3486	40.3486	41.1056	41.1056	41.3517	41.1056	39.8302	40.0907	39.3023	
alpha	3.5482	3.6202	3.6378	3.6899	3.6899	3.7404	3.7404	3.7568	3.7404	3.6553	3.6727	3.6202	
util living area	0.9878	0.9855	0.9771	0.9551	0.8967	0.7555	0.5923	0.6123	0.8404	0.9519	0.9803	0.9888	(86)
MIT	19.1513	19.2897	19.6019	20.0400	20.4929	20.8339	20.9525	20.9477	20.7336	20.2277	19.6963	19.1992	(87)
Th 2	19.4813	19.5159	19.5242	19.5481	19.5481	19.5705	19.5705	19.5777	19.5705	19.5323	19.5403	19.5159	(88)
util rest of house	0.9833	0.9802	0.9678	0.9346	0.8413	0.6229	0.3867	0.4036	0.7340	0.9233	0.9714	0.9846	(89)
MIT 2	17.4425	17.6393	18.0399	18.6015	19.1376	19.4892	19.5615	19.5674	19.4137	18.8289	18.1724	17.5250	(90)
Living area fraction										fLA = Living area / (4) =		0.4572	(91)
MIT	18.2237	18.3938	18.7540	19.2591	19.7572	20.1039	20.1974	20.1984	20.0171	19.4684	18.8690	18.2904	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2237	18.3938	18.7540	19.2591	19.7572	20.1039	20.1974	20.1984	20.0171	19.4684	18.8690	18.2904	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9779	0.9744	0.9612	0.9293	0.8510	0.6785	0.4831	0.5016	0.7733	0.9217	0.9657	0.9797	(94)
Useful gains	471.8129	486.0897	498.1674	501.3848	463.9868	368.8782	248.8984	246.2954	360.8749	413.0045	436.6958	456.3914	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1233.4608	1187.4340	1064.2825	880.1269	652.1539	420.7243	259.1452	257.6932	448.7347	707.8277	960.0611	1196.4680	(97)
Space heating kWh	566.6660	471.3034	421.1896	272.6944	139.9963	0.0000	0.0000	0.0000	0.0000	219.3484	376.8230	550.6170	(98a)
Space heating requirement - total per year (kWh/year)												3018.6382	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	566.6660	471.3034	421.1896	272.6944	139.9963	0.0000	0.0000	0.0000	0.0000	219.3484	376.8230	550.6170	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3018.6382	
Space heating per m2											(98c) / (4) =	55.9836	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	566.6660	471.3034	421.1896	272.6944	139.9963	0.0000	0.0000	0.0000	0.0000	219.3484	376.8230	550.6170	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	566.6660	471.3034	421.1896	272.6944	139.9963	0.0000	0.0000	0.0000	0.0000	219.3484	376.8230	550.6170	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6693	14.9772	13.4853	9.8799	7.6315	6.2350	6.9617	9.0491	11.7539	15.4218	17.4189	19.1882	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 3018.6382 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2281.9617 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 150.6720 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5451.2718	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3018.6382	27.6700	835.2572	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	27.6700	631.4188	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6720	27.6700	41.6909	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1508.3669	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3018.6382	0.1544	466.1742	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2281.9617	0.1412	322.2979	(264)
Space and water heating			788.4721	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6720	0.1443	21.7466	(268)
Total CO2, kg/year			810.2187	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3018.6382	1.5718	4744.5875	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	1.5223	3473.7410	(278)
Space and water heating			8218.3285	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	150.6720	1.5338	231.1057	(282)
Total Primary energy kWh/year			8449.4342	(286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating: E 42
Current environmental impact rating: B 88

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 42
Potential environmental impact rating: B 88

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1508	£1508	£0
Space heating	£835	£835	£0
Water heating	£631	£631	£0
Lighting	£42	£42	£0
Total cost of fuels	£1508	£1508	£0
Total cost of uses	£1508	£1508	£0
Delivered energy	101 kWh/m²	101 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m²	15 kg/m²	15 kg/m²	0 kg/m²
Primary energy	157 kWh/m²	157 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.9200	(1b)	x 2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	134.8000	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8984 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8877	0.8703	0.8529	0.7659	0.7485	0.6614	0.6614	0.6440	0.6962	0.7485	0.7833	0.8181	(22b)
Effective ac	0.8940	0.8787	0.8637	0.7933	0.7801	0.7187	0.7187	0.7074	0.7424	0.7801	0.8068	0.8346	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.2500	13.4800	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.3000	3.4290	190.0000	2171.7000	(29a)
External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400	(30)
Total net area of external elements Aum(A, m2)			123.3700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		31.7430			(33)
Main dwelling								
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000	(32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000	(32)
Internal Walls			98.0000			9.0000	882.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	56.4170 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.7689	39.0883	38.4212	35.2878	34.7016	31.9725	31.9725	31.4671	33.0237	34.7016	35.8875	37.1274	(38)
Heat transfer coeff	96.1860	95.5054	94.8383	91.7048	91.1186	88.3895	88.3895	87.8841	89.4407	91.1186	92.3046	93.5445	(39)
Average = Sum(39)m / 12 =												91.7020	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7839	1.7712	1.7589	1.7008	1.6899	1.6393	1.6393	1.6299	1.6588	1.6899	1.7119	1.7349	(40)
HLP (average)												1.7007	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.8057 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
74.9297	73.8037	72.1628	69.0233	66.7064	64.1226	62.6540	64.2825	66.0676	68.8417	72.0487	74.6426	(42a)

Hot water usage for baths

23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779	(42b)

Hot water usage for other uses

33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217	(42c)

Average daily hot water use (litres/day)		121.0349 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	131.6090	128.9286	125.5907	120.3383	116.1368	111.5943	109.7183	113.0404	116.5626	121.3483	126.6868	131.2422	(44)
Energy conte	208.4364	183.5927	193.0282	164.7371	156.3424	137.2183	132.6948	139.9677	143.7334	164.6685	180.4886	205.4936	(45)
Energy content (annual)										Total = Sum(45)m =		2010.4017	

Distribution loss (46)m = 0.15 x (45)m

	31.2655	27.5389	28.9542	24.7106	23.4514	20.5827	19.9042	20.9952	21.5600	24.7003	27.0733	30.8240 (46)

Water storage loss (or HIU loss):

Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												0.7440 (55)
Total storage loss												
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (56)
If cylinder contains dedicated solar storage												
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576 (64)
Total per year (kWh/year) = Sum(64)m =												2281.9617 (64)
Electric shower(s)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
	87.7563	77.7102	82.6331	72.6311	70.4351	63.4811	62.5722	64.9905	65.6474	73.2035	77.8685	86.7778 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3292	18.9444	15.4066	11.6638	8.7188	7.3608	7.9536	10.3384	13.8762	17.6190	20.5640	21.9220	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)													
	117.9520	115.6401	111.0659	100.8765	94.6708	88.1682	84.1025	87.3528	91.1769	98.3918	108.1506	116.6369	(72)
Total internal gains													
	457.9563	455.6974	441.4423	414.4322	388.7730	365.3967	351.5584	354.7558	368.2607	392.2963	421.5086	446.8685	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	476.2659	493.2978	508.7898	522.6831	531.3254	515.9313	492.9653	469.4306	449.7172	438.2494	444.6345	461.7496	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.2229	38.4953	38.7661	40.0907	40.3486	41.5944	41.5944	41.8336	41.1056	40.3486	39.8302	39.3023	
alpha	3.5482	3.5664	3.5844	3.6727	3.6899	3.7730	3.7730	3.7889	3.7404	3.6899	3.6553	3.6202	
util living area													
	0.9905	0.9882	0.9820	0.9657	0.9250	0.8252	0.6884	0.7284	0.8931	0.9679	0.9863	0.9916	(86)
MIT	18.9516	19.0999	19.4126	19.8926	20.3472	20.7412	20.9084	20.8845	20.6027	20.0400	19.4569	18.9728	(87)
Th 2	19.4813	19.4902	19.4989	19.5403	19.5481	19.5847	19.5847	19.5915	19.5705	19.5481	19.5323	19.5159	(88)
util rest of house													
	0.9873	0.9839	0.9750	0.9504	0.8858	0.7241	0.5104	0.5602	0.8210	0.9505	0.9806	0.9887	(89)
MIT 2	17.1876	17.3820	17.7849	18.4151	18.9727	19.4256	19.5557	19.5498	19.2864	18.6096	17.8640	17.2358	(90)
Living area fraction									fLA = Living area / (4) =			0.4572	(91)
MIT	17.9940	18.1673	18.5290	19.0906	19.6011	20.0270	20.1741	20.1600	19.8882	19.2635	18.5922	18.0299	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.9940	18.1673	18.5290	19.0906	19.6011	20.0270	20.1741	20.1600	19.8882	19.2635	18.5922	18.0299	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9825	0.9786	0.9686	0.9441	0.8875	0.7608	0.5921	0.6362	0.8407	0.9459	0.9754	0.9844	(94)
Useful gains	467.9549	482.7376	492.7963	493.4883	471.5770	392.5119	291.8656	298.6575	378.0832	414.5218	433.6857	454.5610	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1317.1720	1267.1025	1140.8139	934.5230	719.9345	479.6923	315.9107	330.4434	517.6982	789.4071	1060.7809	1293.7095	(97)
Space heating kWh													
	631.8175	527.0932	482.1251	317.5450	184.7780	0.0000	0.0000	0.0000	0.0000	278.9146	451.5086	624.3265	(98a)
Space heating requirement - total per year (kWh/year)												3498.1085	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	631.8175	527.0932	482.1251	317.5450	184.7780	0.0000	0.0000	0.0000	0.0000	278.9146	451.5086	624.3265	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3498.1085	
Space heating per m2											(98c) / (4) =	64.8759	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	631.8175	527.0932	482.1251	317.5450	184.7780	0.0000	0.0000	0.0000	0.0000	278.9146	451.5086	624.3265	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	631.8175	527.0932	482.1251	317.5450	184.7780	0.0000	0.0000	0.0000	0.0000	278.9146	451.5086	624.3265	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6693	14.9772	13.4853	9.8799	7.6315	6.2350	6.9617	9.0491	11.7539	15.4218	17.4189	19.1882	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3498.1085	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2281.9617	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												150.6720	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5930.7422	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3498.1085	16.4900	576.8381	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	16.4900	376.2955	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6720	16.4900	24.8458	(250)
Additional standing charges			0.0000	(251)
Total energy cost			977.9794	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.5592	(257)
SAP value		42.3626	
SAP rating (Section 12)		42	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3498.1085	0.1540	538.7613	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2281.9617	0.1412	322.2979 (264)
Space and water heating			861.0593 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	150.6720	0.1443	21.7466 (268)
Total CO2, kg/year			882.8059 (272)
CO2 emissions per m2			16.3700 (273)
EI value			88.0412
EI rating			88 (274)
EI band			B

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.9200	(1b) x	2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		134.8000	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8984	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8877	0.8181	0.8007	0.7485	0.7485	0.6962	0.6962	0.6788	0.6962	0.7833	0.7659	0.8181	(22b)
Effective ac	0.8940	0.8346	0.8205	0.7801	0.7801	0.7424	0.7424	0.7304	0.7424	0.8068	0.7933	0.8346	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.2500	13.4800	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.3000	3.4290	190.0000	2171.7000	(29a)
External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400	(30)
Total net area of external elements Aum(A, m2)			123.3700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		31.7430			(33)
Main dwelling								
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000	(32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000	(32)
Internal Walls			98.0000			9.0000	882.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	56.4170 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.7689	37.1274	36.5007	34.7016	34.7016	33.0237	33.0237	32.4913	33.0237	35.8875	35.2878	37.1274	(38)
Heat transfer coeff	96.1860	93.5445	92.9178	91.1186	91.1186	89.4407	89.4407	88.9083	89.4407	92.3046	91.7048	93.5445	(39)
Average = Sum(39)m / 12 =												91.6391	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7839	1.7349	1.7233	1.6899	1.6899	1.6588	1.6588	1.6489	1.6588	1.7119	1.7008	1.7349	(40)
HLP (average)												1.6995	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8057	(42)
Hot water usage for mixer showers													
	74.9297	73.8037	72.1628	69.0233	66.7064	64.1226	62.6540	64.2825	66.0676	68.8417	72.0487	74.6426	(42a)
Hot water usage for baths													
	23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779	(42b)
Hot water usage for other uses													
	33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217	(42c)
Average daily hot water use (litres/day)												121.0349	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	131.6090	128.9286	125.5907	120.3383	116.1368	111.5943	109.7183	113.0404	116.5626	121.3483	126.6868	131.2422	(44)
Energy conte	208.4364	183.5927	193.0282	164.7371	156.3424	137.2183	132.6948	139.9677	143.7334	164.6685	180.4886	205.4936	(45)
Energy content (annual)										Total = Sum(45)m =		2010.4017	
Distribution loss (46)m = 0.15 x (45)m													
	31.2655	27.5389	28.9542	24.7106	23.4514	20.5827	19.9042	20.9952	21.5600	24.7003	27.0733	30.8240	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
										Total per year (kWh/year) = Sum(64)m =		2281.9617	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	87.7563	77.7102	82.6331	72.6311	70.4351	63.4811	62.5722	64.9905	65.6474	73.2035	77.8685	86.7778	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3292	18.9444	15.4066	11.6638	8.7188	7.3608	7.9536	10.3384	13.8762	17.6190	20.5640	21.9220	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)													
	117.9520	115.6401	111.0659	100.8765	94.6708	88.1682	84.1025	87.3528	91.1769	98.3918	108.1506	116.6369	(72)
Total internal gains													
	457.9563	455.6974	441.4423	414.4322	388.7730	365.3967	351.5584	354.7558	368.2607	392.2963	421.5086	446.8685	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	15.0428	0.4600	0.7000	0.7700	13.7627	(75)
Northeast	1.0600	35.0000	0.4600	0.7000	1.0000	10.7516	(82)

Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	482.4706	498.8479	518.2886	539.5508	545.2429	543.6873	515.2434	491.0094	466.6476	448.0973	452.2223	465.8688	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.2229	39.3023	39.5674	40.3486	40.3486	41.1056	41.1056	41.3517	41.1056	39.8302	40.0907	39.3023	
alpha	3.5482	3.6202	3.6378	3.6899	3.6899	3.7404	3.7404	3.7568	3.7404	3.6553	3.6727	3.6202	
util living area													
	0.9878	0.9855	0.9771	0.9551	0.8967	0.7555	0.5923	0.6123	0.8404	0.9519	0.9803	0.9888	(86)
MIT	19.1513	19.2897	19.6019	20.0400	20.4929	20.8339	20.9525	20.9477	20.7336	20.2277	19.6963	19.1992	(87)
Th 2	19.4813	19.5159	19.5242	19.5481	19.5481	19.5705	19.5705	19.5777	19.5705	19.5323	19.5403	19.5159	(88)
util rest of house													
	0.9833	0.9802	0.9678	0.9346	0.8413	0.6229	0.3867	0.4036	0.7340	0.9233	0.9714	0.9846	(89)
MIT 2	17.4425	17.6393	18.0399	18.6015	19.1376	19.4892	19.5615	19.5674	19.4137	18.8289	18.1724	17.5250	(90)
Living area fraction										fLA = Living area / (4) =		0.4572	(91)
MIT	18.2237	18.3938	18.7540	19.2591	19.7572	20.1039	20.1974	20.1984	20.0171	19.4684	18.8690	18.2904	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2237	18.3938	18.7540	19.2591	19.7572	20.1039	20.1974	20.1984	20.0171	19.4684	18.8690	18.2904	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9779	0.9744	0.9612	0.9293	0.8510	0.6785	0.4831	0.5016	0.7733	0.9217	0.9657	0.9797	(94)
Useful gains	471.8129	486.0897	498.1674	501.3848	463.9868	368.8782	248.8984	246.2954	360.8749	413.0045	436.6958	456.3914	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1233.4608	1187.4340	1064.2825	880.1269	652.1539	420.7243	259.1452	257.6932	448.7347	707.8277	960.0611	1196.4680	(97)
Space heating kWh													
	566.6660	471.3034	421.1896	272.6944	139.9963	0.0000	0.0000	0.0000	0.0000	219.3484	376.8230	550.6170	(98a)
Space heating requirement - total per year (kWh/year)												3018.6382	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	566.6660	471.3034	421.1896	272.6944	139.9963	0.0000	0.0000	0.0000	0.0000	219.3484	376.8230	550.6170	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3018.6382	
Space heating per m2											(98c) / (4) =	55.9836	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	566.6660	471.3034	421.1896	272.6944	139.9963	0.0000	0.0000	0.0000	0.0000	219.3484	376.8230	550.6170	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	566.6660	471.3034	421.1896	272.6944	139.9963	0.0000	0.0000	0.0000	0.0000	219.3484	376.8230	550.6170	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6693	14.9772	13.4853	9.8799	7.6315	6.2350	6.9617	9.0491	11.7539	15.4218	17.4189	19.1882	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3018.6382	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2281.9617	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	150.6720	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5451.2718	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3018.6382	27.6700	835.2572	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	27.6700	631.4188	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6720	27.6700	41.6909	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1508.3669	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3018.6382	0.1544	466.1742	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2281.9617	0.1412	322.2979	(264)
Space and water heating			788.4721	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6720	0.1443	21.7466	(268)
Total CO2, kg/year			810.2187	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3018.6382	1.5718	4744.5875	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	1.5223	3473.7410	(278)
Space and water heating			8218.3285	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	150.6720	1.5338	231.1057	(282)
Total Primary energy kWh/year			8449.4342	(286)

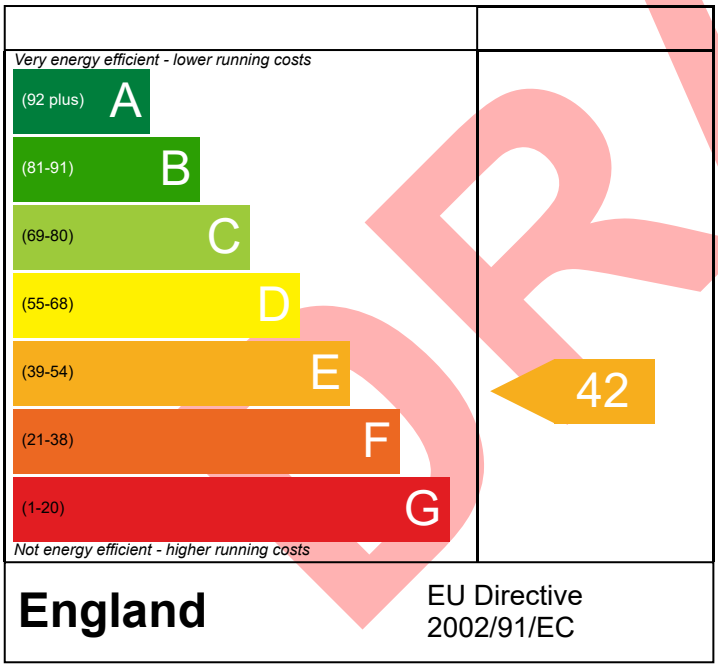
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	53.92 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

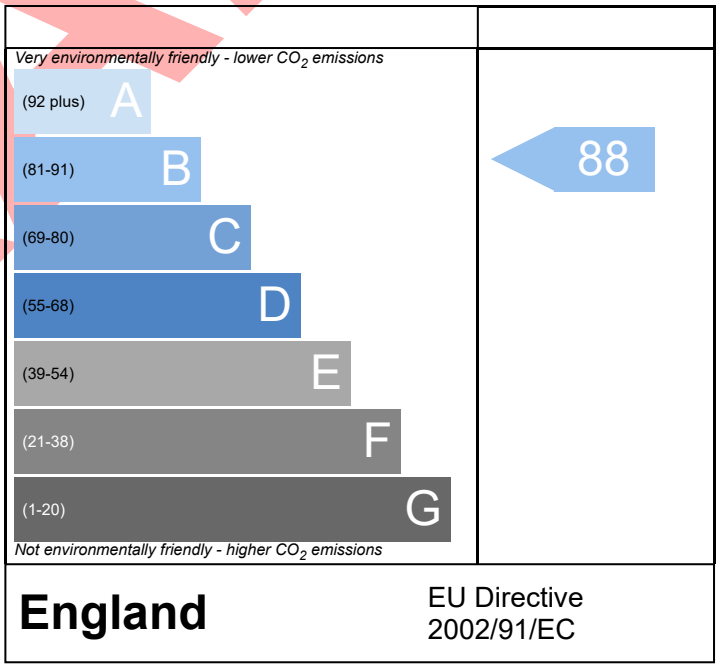
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

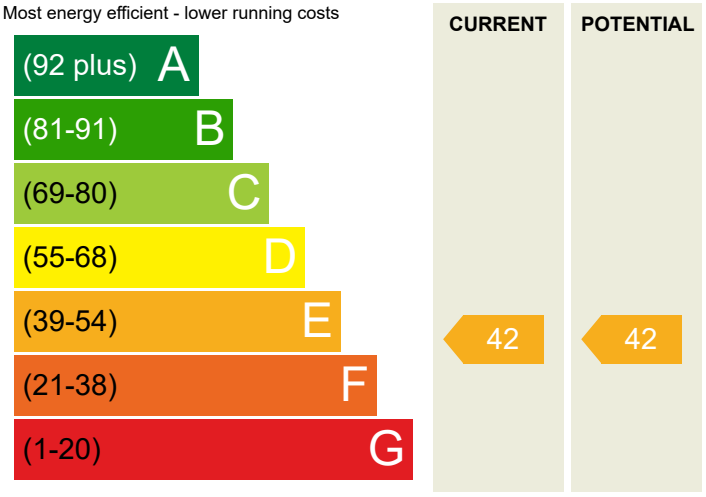
Energy Report

Dwelling Address	
Reference	Flat 5-Baseline
SAP Version	10.2
Assessment Date	29/04/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	54

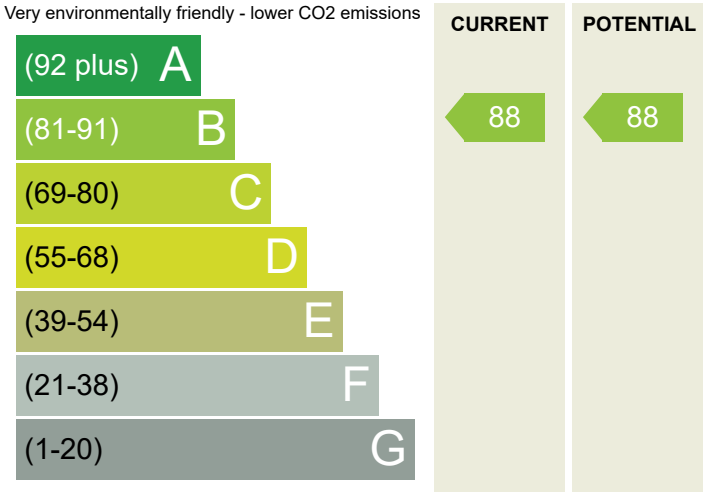
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

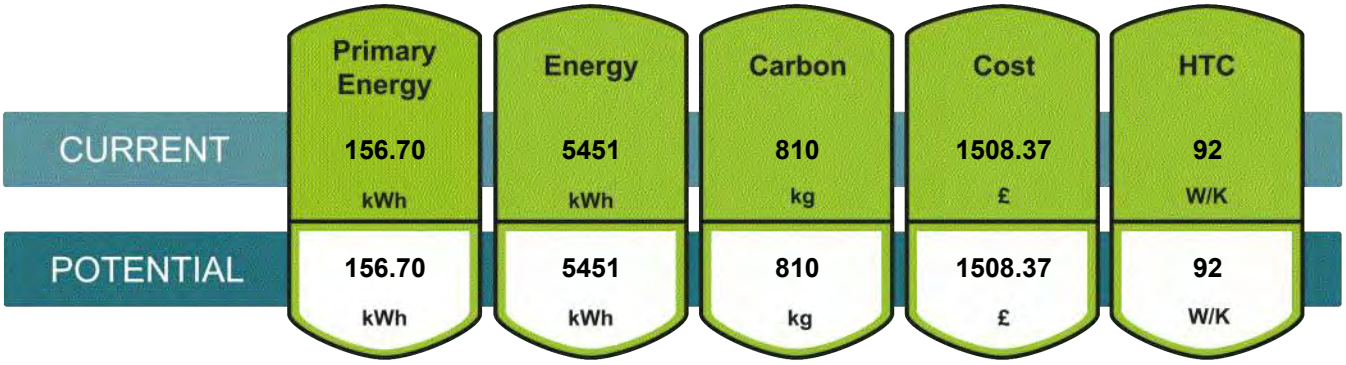


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£42	£42	
Heating	£835	£835	
Hot Water	£631	£631	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1508	£1508	

Estimated energy use and potential savings

Space Heating
3019
kWh per year

Water Heating
2282
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 6	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	34 F	**DER**	18.19	**TER**	
Environmental	86 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.06	**DFEE**	88.11	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	188.93	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	300.66	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	15.42 m	65.07 m²	2.50 m

8.0 Living Area	31.33	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.30	190.00	38.55	34.45	0.00	None	4.10	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	56.90	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	99.90

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	65.07	64.01	None	0.00	Enter Gross Area	1.06

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.25	None	0.00	20.00	65.07

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Roof Light	Manufacturer	Roof Light	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
NE Windows	Windows	External Wall 1	North East	4.10	
Rooflights	Roof Light	External Roof 1	North East	1.06	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	

Summary for Input Data

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 6	Issued on Date	15/06/2026
Assessment Reference	Baseline	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	34 F	DER	18.19	TER	
Environmental	86 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.06	DFEE	88.11	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	188.93	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700	(1b)	x 2.5000	(2b) =	162.6750	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	162.6750	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8729	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9461	0.9275	0.9090	0.8162	0.7977	0.7049	0.7049	0.6864	0.7420	0.7977	0.8348	0.8719	(22b)
Effective ac	0.9475	0.9301	0.9131	0.8331	0.8181	0.7484	0.7484	0.7355	0.7753	0.8181	0.8484	0.8801	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.2500	16.2675	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.3000	10.3350	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)
Total net area of external elements Aum(A, m2)			168.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		43.2205			(33)
Main dwelling								
Party Wall 1			56.9000	0.0000	0.0000	180.0000	10242.0000	(32)
Internal Wall 1			99.9000			9.0000	899.1000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19564.0900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		300.6622 (35)
Thermal bridges (Default value 0.200 * total exposed area)		33.7380 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	76.9585 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	49.9320	49.0176	44.7228	43.9192	40.1785	40.1785	39.4858	41.6194	43.9192	45.5448	47.2443	(38)

Heat transfer coeff

	127.8234	126.8905	125.9761	121.6813	120.8777	117.1371	117.1371	116.4443	118.5779	120.8777	122.5033	124.2028 (39)
Average = Sum(39)m / 12 =												121.6774

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9644	1.9501	1.9360	1.8700	1.8577	1.8002	1.8002	1.7895	1.8223	1.8577	1.8826	1.9088	(40)
HLP (average)												1.8699	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

---

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1208 (42)
Hot water usage for mixer showers												
	82.1947	80.9595	79.1596	75.7156	73.1741	70.3398	68.7288	70.5152	72.4733	75.5165	79.0344	81.8798 (42a)
Hot water usage for baths												
	25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424 (42b)
Hot water usage for other uses												
	36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488 (42c)
Average daily hot water use (litres/day)												132.7734 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	144.3733	141.4327	137.7707	132.0090	127.3999	122.4169	120.3592	124.0037	127.8677	133.1176	138.9738	143.9711	(44)
Energy conte	228.6520	201.3983	211.7485	180.7138	171.5048	150.5258	145.5640	153.5425	157.6737	180.6393	197.9936	225.4239	(45)
Energy content (annual)										Total = Sum(45)m =		2205.3801	
Distribution loss (46)m = 0.15 x (45)m													
	34.2978	30.2097	31.7623	27.1071	25.7257	22.5789	21.8346	23.0314	23.6511	27.0959	29.6990	33.8136	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
									Total per year (kWh/year) = Sum(64)m =			2476.9401	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
	94.4780	83.6305	88.8576	77.9433	75.4765	67.9058	66.8512	69.5041	70.2825	78.5138	83.6889	93.4046	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	27.3744	24.3137	19.7732	14.9696	11.1900	9.4470	10.2079	13.2686	17.8090	22.6127	26.3923	28.1352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)
Water heating gains (Table 5)													
	126.9866	124.4502	119.4322	108.2546	101.4470	94.3137	89.8538	93.4195	97.6146	105.5292	116.2345	125.5439	(72)
Total internal gains													
	523.5313	520.8076	504.0082	472.6117	442.5654	415.4005	399.4835	403.2364	419.2130	447.3465	481.2905	510.6314	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	541.8409	558.4080	571.3556	580.8626	585.1178	565.9350	540.8904	517.9112	500.6694	493.2996	504.4163	525.5124	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	42.5155	42.8280	43.1389	44.6615	44.9584	46.3941	46.3941	46.6701	45.8304	44.9584	44.3618	43.7548	
alpha	3.8344	3.8552	3.8759	3.9774	3.9972	4.0929	4.0929	4.1113	4.0554	3.9972	3.9575	3.9170	
util living area													
	0.9961	0.9951	0.9924	0.9849	0.9633	0.8981	0.7838	0.8177	0.9422	0.9854	0.9943	0.9966	(86)
MIT	18.9920	19.1238	19.4078	19.8515	20.2837	20.6890	20.8822	20.8553	20.5550	20.0147	19.4702	19.0170	(87)
Th 2	19.3572	19.3668	19.3763	19.4214	19.4299	19.4699	19.4699	19.4773	19.4544	19.4299	19.4127	19.3949	(88)
util rest of house													

	0.9944	0.9929	0.9886	0.9760	0.9363	0.8068	0.5847	0.6366	0.8846	0.9749	0.9912	0.9952	(89)
MIT 2	17.1184	17.2928	17.6615	18.2536	18.7961	19.2817	19.4369	19.4299	19.1379	18.4682	17.7650	17.1737	(90)
Living area fraction										fLA = Living area / (4) =		0.4815	(91)
MIT	18.0205	18.1744	18.5023	19.0230	19.5123	19.9593	20.1328	20.1162	19.8202	19.2128	18.5860	18.0612	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.0205	18.1744	18.5023	19.0230	19.5123	19.9593	20.1328	20.1162	19.8202	19.2128	18.5860	18.0612	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9923	0.9905	0.9856	0.9728	0.9382	0.8430	0.6844	0.7263	0.9026	0.9728	0.9889	0.9933	(94)
Useful gains	537.6825	553.0925	563.1062	565.0493	548.9631	477.0562	370.1692	376.1465	451.8881	479.8677	498.7990	522.0044	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1753.8008	1684.3979	1512.0090	1231.7769	944.3379	627.7689	413.8195	432.7292	678.2940	1041.0981	1407.0765	1721.6021	(97)
Space heating kWh	904.7920	760.2372	705.9836	480.0439	294.1589	0.0000	0.0000	0.0000	0.0000	417.5554	653.9598	892.5007	(98a)
Space heating requirement - total per year (kWh/year)												5109.2315	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	904.7920	760.2372	705.9836	480.0439	294.1589	0.0000	0.0000	0.0000	0.0000	417.5554	653.9598	892.5007	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5109.2315	
Space heating per m2											(98c) / (4) =	78.5190	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	904.7920	760.2372	705.9836	480.0439	294.1589	0.0000	0.0000	0.0000	0.0000	417.5554	653.9598	892.5007	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	904.7920	760.2372	705.9836	480.0439	294.1589	0.0000	0.0000	0.0000	0.0000	417.5554	653.9598	892.5007	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.9607	19.2221	17.3074	12.6801	9.7945	8.0022	8.9349	11.6139	15.0853	19.7927	22.3558	24.6266	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5109.2315	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2476.9401	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	193.3763	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7779.5478	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	5109.2315	16.4900	842.5123	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	16.4900	408.4474	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	193.3763	16.4900	31.8877	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1282.8474	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	4.1957	(257)
SAP value		33.7516	
SAP rating (Section 12)		34	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5109.2315	0.1538	785.6229	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2476.9401	0.1413	349.9027	(264)
Space and water heating			1135.5255	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	193.3763	0.1443	27.9102	(268)
Total CO2, kg/year			1163.4357	(272)
CO2 emissions per m2			17.8800	(273)
EI value			85.8363	
EI rating			86	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700	(1b) x	2.5000	(2b) =	162.6750	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	162.6750	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8729	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9461	0.8719	0.8533	0.7977	0.7977	0.7420	0.7420	0.7235	0.7420	0.8348	0.8162	0.8719	(22b)
Effective ac	0.9475	0.8801	0.8641	0.8181	0.8181	0.7753	0.7753	0.7617	0.7753	0.8484	0.8331	0.8801	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.2500	16.2675	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.3000	10.3350	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)

Total net area of external elements Aum(A, m2)						168.6900							(31)
Fabric heat loss, W/K = Sum (A x U)						(26)...(30) + (32) =				43.2205			(33)
Main dwelling													
Party Wall 1						56.9000	0.0000	0.0000	180.0000	10242.0000			(32)
Internal Wall 1						99.9000			9.0000	899.1000			(32c)
Heat capacity Cm = Sum(A x k)								(28)...(30) + (32) + (32a)...(32e) =		19564.0900			(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K										300.6622			(35)
Thermal bridges (Default value 0.200 * total exposed area)										33.7380			(36)
Point Thermal bridges									(36a) =	0.0000			
Total fabric heat loss								(33) + (36) + (36a) =		76.9585			(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	47.2443	46.3853	43.9192	43.9192	41.6194	41.6194	40.8897	41.6194	45.5448	44.7228	47.2443	(38)
Heat transfer coeff	127.8234	124.2028	123.3438	120.8777	120.8777	118.5779	118.5779	117.8482	118.5779	122.5033	121.6813	124.2028	(39)
Average = Sum(39)m / 12 =												121.5912	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9644	1.9088	1.8956	1.8577	1.8577	1.8223	1.8223	1.8111	1.8223	1.8826	1.8700	1.9088	(40)
HLP (average)												1.8686	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1208	(42)
Hot water usage for mixer showers	82.1947	80.9595	79.1596	75.7156	73.1741	70.3398	68.7288	70.5152	72.4733	75.5165	79.0344	81.8798	(42a)
Hot water usage for baths	25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424	(42b)
Hot water usage for other uses	36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488	(42c)
Average daily hot water use (litres/day)												132.7734	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	144.3733	141.4327	137.7707	132.0090	127.3999	122.4169	120.3592	124.0037	127.8677	133.1176	138.9738	143.9711	(44)
Energy conte	228.6520	201.3983	211.7485	180.7138	171.5048	150.5258	145.5640	153.5425	157.6737	180.6393	197.9936	225.4239	(45)
Energy content (annual)										Total = Sum(45)m =		2205.3801	
Distribution loss (46)m = 0.15 x (45)m	34.2978	30.2097	31.7623	27.1071	25.7257	22.5789	21.8346	23.0314	23.6511	27.0959	29.6990	33.8136	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
									Total per year (kWh/year) = Sum(64)m =			2476.9401	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	94.4780	83.6305	88.8576	77.9433	75.4765	67.9058	66.8512	69.5041	70.2825	78.5138	83.6889	93.4046	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	27.3744	24.3137	19.7732	14.9696	11.1900	9.4470	10.2079	13.2686	17.8090	22.6127	26.3923	28.1352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)
Water heating gains (Table 5)	126.9866	124.4502	119.4322	108.2546	101.4470	94.3137	89.8538	93.4195	97.6146	105.5292	116.2345	125.5439	(72)
Total internal gains	523.5313	520.8076	504.0082	472.6117	442.5654	415.4005	399.4835	403.2364	419.2130	447.3465	481.2905	510.6314	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	15.0428	0.4600	0.7000	0.7700	13.7627	(75)
Northeast	1.0600	35.0000	0.4600	0.7000	1.0000	10.7516	(82)

Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	548.0455	563.9582	580.8544	597.7303	599.0353	593.6910	563.1685	539.4900	517.5998	503.1475	512.0042	529.6317	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	42.5155	43.7548	44.0595	44.9584	44.9584	45.8304	45.8304	46.1141	45.8304	44.3618	44.6615	43.7548	
alpha	3.8344	3.9170	3.9373	3.9972	3.9972	4.0554	4.0554	4.0743	4.0554	3.9575	3.9774	3.9170	
util living area	0.9949	0.9940	0.9902	0.9796	0.9464	0.8444	0.6918	0.7097	0.9062	0.9768	0.9915	0.9954	(86)
MIT	19.1760	19.3001	19.5831	19.9873	20.4269	20.7910	20.9369	20.9316	20.6887	20.1907	19.6917	19.2263	(87)
Th 2	19.3572	19.3949	19.4039	19.4299	19.4299	19.4544	19.4544	19.4622	19.4544	19.4127	19.4214	19.3949	(88)
util rest of house	0.9925	0.9911	0.9850	0.9671	0.9047	0.7100	0.4434	0.4603	0.8102	0.9580	0.9865	0.9932	(89)
MIT 2	17.3537	17.5356	17.9019	18.4293	18.9648	19.3567	19.4449	19.4516	19.2751	18.6764	18.0528	17.4415	(90)
Living area fraction										fLA = Living area / (4) =		0.4815	(91)
MIT	18.2311	18.3852	18.7114	19.1794	19.6688	20.0473	20.1633	20.1642	19.9557	19.4055	18.8419	18.3008	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2311	18.3852	18.7114	19.1794	19.6688	20.0473	20.1633	20.1642	19.9557	19.4055	18.8419	18.3008	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9900	0.9884	0.9818	0.9643	0.9130	0.7712	0.5695	0.5875	0.8496	0.9579	0.9838	0.9910	(94)
Useful gains	542.5629	557.4431	570.2614	576.3757	546.8953	457.8748	320.7488	316.9303	439.7320	481.9414	503.6866	524.8452	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1640.1172	1575.5329	1407.5228	1157.9394	854.4569	551.0677	339.5227	337.5370	587.6355	931.6990	1270.5843	1589.9012	(97)
Space heating kWh	816.5804	684.1564	622.9225	418.7258	228.8259	0.0000	0.0000	0.0000	0.0000	334.6197	552.1663	792.4017	(98a)
Space heating requirement - total per year (kWh/year)												4450.3986	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	816.5804	684.1564	622.9225	418.7258	228.8259	0.0000	0.0000	0.0000	0.0000	334.6197	552.1663	792.4017	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4450.3986	
Space heating per m2											(98c) / (4) =	68.3940	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	816.5804	684.1564	622.9225	418.7258	228.8259	0.0000	0.0000	0.0000	0.0000	334.6197	552.1663	792.4017	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	816.5804	684.1564	622.9225	418.7258	228.8259	0.0000	0.0000	0.0000	0.0000	334.6197	552.1663	792.4017	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.9607	19.2221	17.3074	12.6801	9.7945	8.0022	8.9349	11.6139	15.0853	19.7927	22.3558	24.6266	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 4450.3986 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2476.9401 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 193.3763 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7120.7149	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4450.3986	27.6700	1231.4253	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	27.6700	685.3693	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	193.3763	27.6700	53.5072	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1970.3018	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4450.3986	0.1541	686.0044	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2476.9401	0.1413	349.9027	(264)
Space and water heating			1035.9071	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	193.3763	0.1443	27.9102	(268)
Total CO2, kg/year			1063.8173	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4450.3986	1.5707	6990.2354	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	1.5224	3770.7983	(278)
Space and water heating			10761.0337	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	193.3763	1.5338	296.6069	(282)
Total Primary energy kWh/year			11057.6406	(286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating: F 34
Current environmental impact rating: B 86

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: F 34
Potential environmental impact rating: B 86

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1970	£1970	£0
Space heating	£1231	£1231	£0
Water heating	£685	£685	£0
Lighting	£54	£54	£0
Total cost of fuels	£1970	£1970	£0
Total cost of uses	£1970	£1970	£0
Delivered energy	109 kWh/m²	109 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m²	16 kg/m²	16 kg/m²	0 kg/m²
Primary energy	170 kWh/m²	170 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700	(1b)	x 2.5000	(2b) =	162.6750	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		162.6750	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8729 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9461	0.9275	0.9090	0.8162	0.7977	0.7049	0.7049	0.6864	0.7420	0.7977	0.8348	0.8719	(22b)
Effective ac	0.9475	0.9301	0.9131	0.8331	0.8181	0.7484	0.7484	0.7355	0.7753	0.8181	0.8484	0.8801	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.2500	16.2675	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.3000	10.3350	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)
Total net area of external elements Aum(A, m2)			168.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		43.2205			(33)
Main dwelling								
Party Wall 1			56.9000	0.0000	0.0000	180.0000	10242.0000	(32)
Internal Wall 1			99.9000			9.0000	899.1000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19564.0900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		300.6622 (35)
Thermal bridges (Default value 0.200 * total exposed area)		33.7380 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	76.9585 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	49.9320	49.0176	44.7228	43.9192	40.1785	40.1785	39.4858	41.6194	43.9192	45.5448	47.2443	(38)
Heat transfer coeff	127.8234	126.8905	125.9761	121.6813	120.8777	117.1371	117.1371	116.4443	118.5779	120.8777	122.5033	124.2028	(39)
Average = Sum(39)m / 12 =												121.6774	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9644	1.9501	1.9360	1.8700	1.8577	1.8002	1.8002	1.7895	1.8223	1.8577	1.8826	1.9088	(40)
HLP (average)												1.8699	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.1208 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
82.1947	80.9595	79.1596	75.7156	73.1741	70.3398	68.7288	70.5152	72.4733	75.5165	79.0344	81.8798	(42a)

Hot water usage for baths

25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424	(42b)

Hot water usage for other uses

36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488	(42c)
Average daily hot water use (litres/day)												132.7734	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	144.3733	141.4327	137.7707	132.0090	127.3999	122.4169	120.3592	124.0037	127.8677	133.1176	138.9738	143.9711	(44)
Energy conte	228.6520	201.3983	211.7485	180.7138	171.5048	150.5258	145.5640	153.5425	157.6737	180.6393	197.9936	225.4239	(45)
Energy content (annual)										Total = Sum(45)m =		2205.3801	

Distribution loss (46)m = 0.15 x (45)m

34.2978	30.2097	31.7623	27.1071	25.7257	22.5789	21.8346	23.0314	23.6511	27.0959	29.6990	33.8136	(46)

Water storage loss (or HIU loss):

Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
									Total per year (kWh/year) = Sum(64)m =			2476.9401	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	94.4780	83.6305	88.8576	77.9433	75.4765	67.9058	66.8512	69.5041	70.2825	78.5138	83.6889	93.4046	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	27.3744	24.3137	19.7732	14.9696	11.1900	9.4470	10.2079	13.2686	17.8090	22.6127	26.3923	28.1352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)
Water heating gains (Table 5)													
	126.9866	124.4502	119.4322	108.2546	101.4470	94.3137	89.8538	93.4195	97.6146	105.5292	116.2345	125.5439	(72)
Total internal gains													
	523.5313	520.8076	504.0082	472.6117	442.5654	415.4005	399.4835	403.2364	419.2130	447.3465	481.2905	510.6314	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	541.8409	558.4080	571.3556	580.8626	585.1178	565.9350	540.8904	517.9112	500.6694	493.2996	504.4163	525.5124	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	42.5155	42.8280	43.1389	44.6615	44.9584	46.3941	46.3941	46.6701	45.8304	44.9584	44.3618	43.7548	
alpha	3.8344	3.8552	3.8759	3.9774	3.9972	4.0929	4.0929	4.1113	4.0554	3.9972	3.9575	3.9170	
util living area													
	0.9961	0.9951	0.9924	0.9849	0.9633	0.8981	0.7838	0.8177	0.9422	0.9854	0.9943	0.9966	(86)
MIT	18.9920	19.1238	19.4078	19.8515	20.2837	20.6890	20.8822	20.8553	20.5550	20.0147	19.4702	19.0170	(87)
Th 2	19.3572	19.3668	19.3763	19.4214	19.4299	19.4699	19.4699	19.4773	19.4544	19.4299	19.4127	19.3949	(88)
util rest of house													
	0.9944	0.9929	0.9886	0.9760	0.9363	0.8068	0.5847	0.6366	0.8846	0.9749	0.9912	0.9952	(89)
MIT 2	17.1184	17.2928	17.6615	18.2536	18.7961	19.2817	19.4369	19.4299	19.1379	18.4682	17.7650	17.1737	(90)
Living area fraction										fLA = Living area / (4) =		0.4815	(91)
MIT	18.0205	18.1744	18.5023	19.0230	19.5123	19.9593	20.1328	20.1162	19.8202	19.2128	18.5860	18.0612	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.0205	18.1744	18.5023	19.0230	19.5123	19.9593	20.1328	20.1162	19.8202	19.2128	18.5860	18.0612	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9923	0.9905	0.9856	0.9728	0.9382	0.8430	0.6844	0.7263	0.9026	0.9728	0.9889	0.9933	(94)
Useful gains	537.6825	553.0925	563.1062	565.0493	548.9631	477.0562	370.1692	376.1465	451.8881	479.8677	498.7990	522.0044	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1753.8008	1684.3979	1512.0090	1231.7769	944.3379	627.7689	413.8195	432.7292	678.2940	1041.0981	1407.0765	1721.6021	(97)
Space heating kWh													
	904.7920	760.2372	705.9836	480.0439	294.1589	0.0000	0.0000	0.0000	0.0000	417.5554	653.9598	892.5007	(98a)
Space heating requirement - total per year (kWh/year)												5109.2315	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	904.7920	760.2372	705.9836	480.0439	294.1589	0.0000	0.0000	0.0000	0.0000	417.5554	653.9598	892.5007	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5109.2315	
Space heating per m2											(98c) / (4) =	78.5190	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	904.7920	760.2372	705.9836	480.0439	294.1589	0.0000	0.0000	0.0000	0.0000	417.5554	653.9598	892.5007	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	904.7920	760.2372	705.9836	480.0439	294.1589	0.0000	0.0000	0.0000	0.0000	417.5554	653.9598	892.5007	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.9607	19.2221	17.3074	12.6801	9.7945	8.0022	8.9349	11.6139	15.0853	19.7927	22.3558	24.6266	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												5109.2315	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2476.9401	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												193.3763	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												7779.5478	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	5109.2315	16.4900	842.5123	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	16.4900	408.4474	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	193.3763	16.4900	31.8877	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1282.8474	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	4.1957	(257)
SAP value		33.7516	
SAP rating (Section 12)		34	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5109.2315	0.1538	785.6229	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2476.9401	0.1413	349.9027	(264)
Space and water heating			1135.5255	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	193.3763	0.1443	27.9102 (268)
Total CO2, kg/year			1163.4357 (272)
CO2 emissions per m2			17.8800 (273)
EI value			85.8363
EI rating			86 (274)
EI band			B

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700	(1b)	x 2.5000	(2b) =	162.6750	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		162.6750	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8729	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9461	0.8719	0.8533	0.7977	0.7977	0.7420	0.7420	0.7235	0.7420	0.8348	0.8162	0.8719	(22b)
Effective ac	0.9475	0.8801	0.8641	0.8181	0.8181	0.7753	0.7753	0.7617	0.7753	0.8484	0.8331	0.8801	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.2500	16.2675	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.3000	10.3350	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)
Total net area of external elements Aum(A, m2)			168.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		43.2205			(33)
Main dwelling								
Party Wall 1			56.9000	0.0000	0.0000	180.0000	10242.0000	(32)
Internal Wall 1			99.9000			9.0000	899.1000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19564.0900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		300.6622 (35)
Thermal bridges (Default value 0.200 * total exposed area)		33.7380 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	76.9585 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	47.2443	46.3853	43.9192	43.9192	41.6194	41.6194	40.8897	41.6194	45.5448	44.7228	47.2443	(38)
Heat transfer coeff	127.8234	124.2028	123.3438	120.8777	120.8777	118.5779	118.5779	117.8482	118.5779	122.5033	121.6813	124.2028	(39)
Average = Sum(39)m / 12 =												121.5912	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9644	1.9088	1.8956	1.8577	1.8577	1.8223	1.8223	1.8111	1.8223	1.8826	1.8700	1.9088	(40)
HLP (average)												1.8686	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.1208 (42)
Hot water usage for mixer showers		

	82.1947	80.9595	79.1596	75.7156	73.1741	70.3398	68.7288	70.5152	72.4733	75.5165	79.0344	81.8798	(42a)
Hot water usage for baths													
	25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424	(42b)
Hot water usage for other uses													
	36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488	(42c)
Average daily hot water use (litres/day)												132.7734	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	144.3733	141.4327	137.7707	132.0090	127.3999	122.4169	120.3592	124.0037	127.8677	133.1176	138.9738	143.9711	(44)
Energy conte	228.6520	201.3983	211.7485	180.7138	171.5048	150.5258	145.5640	153.5425	157.6737	180.6393	197.9936	225.4239	(45)
Energy content (annual)										Total = Sum(45)m =		2205.3801	
Distribution loss (46)m = 0.15 x (45)m													
	34.2978	30.2097	31.7623	27.1071	25.7257	22.5789	21.8346	23.0314	23.6511	27.0959	29.6990	33.8136	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
										Total per year (kWh/year) = Sum(64)m =		2476.9401	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	94.4780	83.6305	88.8576	77.9433	75.4765	67.9058	66.8512	69.5041	70.2825	78.5138	83.6889	93.4046	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	27.3744	24.3137	19.7732	14.9696	11.1900	9.4470	10.2079	13.2686	17.8090	22.6127	26.3923	28.1352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)
Water heating gains (Table 5)													
	126.9866	124.4502	119.4322	108.2546	101.4470	94.3137	89.8538	93.4195	97.6146	105.5292	116.2345	125.5439	(72)
Total internal gains													
	523.5313	520.8076	504.0082	472.6117	442.5654	415.4005	399.4835	403.2364	419.2130	447.3465	481.2905	510.6314	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	15.0428	0.4600	0.7000	0.7700	13.7627	(75)
Northeast	1.0600	35.0000	0.4600	0.7000	1.0000	10.7516	(82)

Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	548.0455	563.9582	580.8544	597.7303	599.0353	593.6910	563.1685	539.4900	517.5998	503.1475	512.0042	529.6317	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	42.5155	43.7548	44.0595	44.9584	44.9584	45.8304	45.8304	46.1141	45.8304	44.3618	44.6615	43.7548	
alpha	3.8344	3.9170	3.9373	3.9972	3.9972	4.0554	4.0554	4.0743	4.0554	3.9575	3.9774	3.9170	
util living area													
	0.9949	0.9940	0.9902	0.9796	0.9464	0.8444	0.6918	0.7097	0.9062	0.9768	0.9915	0.9954	(86)
MIT	19.1760	19.3001	19.5831	19.9873	20.4269	20.7910	20.9369	20.9316	20.6887	20.1907	19.6917	19.2263	(87)
Th 2	19.3572	19.3949	19.4039	19.4299	19.4299	19.4544	19.4544	19.4622	19.4544	19.4127	19.4214	19.3949	(88)
util rest of house													
	0.9925	0.9911	0.9850	0.9671	0.9047	0.7100	0.4434	0.4603	0.8102	0.9580	0.9865	0.9932	(89)
MIT 2	17.3537	17.5356	17.9019	18.4293	18.9648	19.3567	19.4449	19.4516	19.2751	18.6764	18.0528	17.4415	(90)
Living area fraction									fLA = Living area / (4) =			0.4815	(91)
MIT	18.2311	18.3852	18.7114	19.1794	19.6688	20.0473	20.1633	20.1642	19.9557	19.4055	18.8419	18.3008	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2311	18.3852	18.7114	19.1794	19.6688	20.0473	20.1633	20.1642	19.9557	19.4055	18.8419	18.3008	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9900	0.9884	0.9818	0.9643	0.9130	0.7712	0.5695	0.5875	0.8496	0.9579	0.9838	0.9910	(94)
Useful gains	542.5629	557.4431	570.2614	576.3757	546.8953	457.8748	320.7488	316.9303	439.7320	481.9414	503.6866	524.8452	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)

Heat loss rate W

1640.1172	1575.5329	1407.5228	1157.9394	854.4569	551.0677	339.5227	337.5370	587.6355	931.6990	1270.5843	1589.9012	(97)

Space heating kWh

816.5804	684.1564	622.9225	418.7258	228.8259	0.0000	0.0000	0.0000	0.0000	334.6197	552.1663	792.4017	(98a)

Space heating requirement - total per year (kWh/year) 4450.3986

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

816.5804	684.1564	622.9225	418.7258	228.8259	0.0000	0.0000	0.0000	0.0000	334.6197	552.1663	792.4017	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 4450.3986

Space heating per m2 (98c) / (4) = 68.3940 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	816.5804	684.1564	622.9225	418.7258	228.8259	0.0000	0.0000	0.0000	0.0000	334.6197	552.1663	792.4017	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	816.5804	684.1564	622.9225	418.7258	228.8259	0.0000	0.0000	0.0000	0.0000	334.6197	552.1663	792.4017	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.9607	19.2221	17.3074	12.6801	9.7945	8.0022	8.9349	11.6139	15.0853	19.7927	22.3558	24.6266	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 4450.3986 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 2476.9401 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 193.3763 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation 0.0000 (233)
Wind generation 0.0000 (234)
Hydro-electric generation (Appendix N) 0.0000 (235a)
Electricity generated - Micro CHP (Appendix N) 0.0000 (235)
Appendix Q - special features
Energy saved or generated -0.0000 (236)
Energy used 0.0000 (237)
Total delivered energy for all uses 7120.7149 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4450.3986	27.6700	1231.4253	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	27.6700	685.3693	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	193.3763	27.6700	53.5072	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1970.3018	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4450.3986	0.1541	686.0044	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2476.9401	0.1413	349.9027	(264)
Space and water heating			1035.9071	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	193.3763	0.1443	27.9102	(268)
Total CO2, kg/year			1063.8173	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4450.3986	1.5707	6990.2354	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	1.5224	3770.7983	(278)
Space and water heating			10761.0337	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	193.3763	1.5338	296.6069	(282)
Total Primary energy kWh/year			11057.6406	(286)

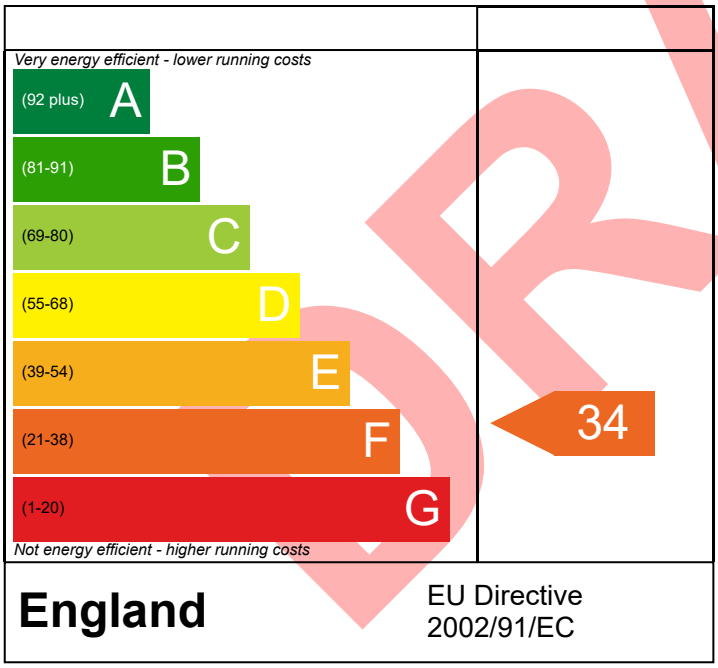
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	65.07 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

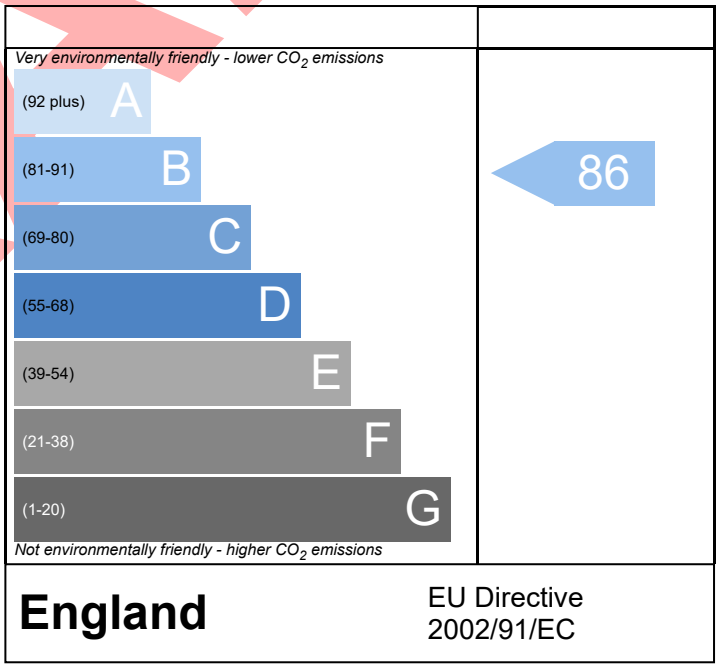
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

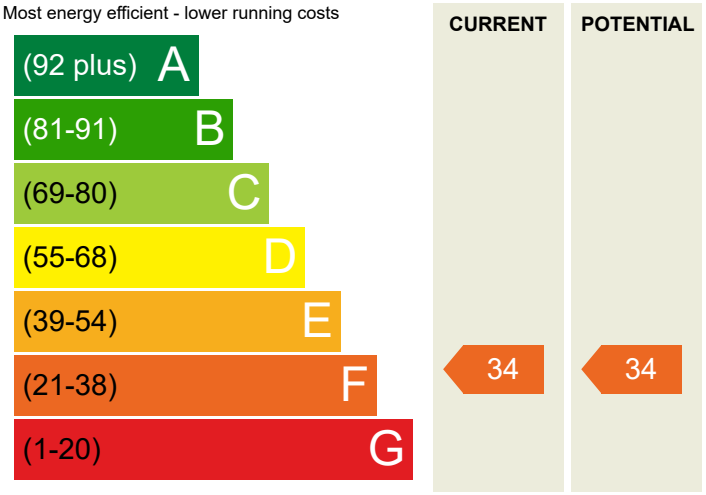
Energy Report

Dwelling Address	
Reference	Flat 6-Baseline
SAP Version	10.2
Assessment Date	29/04/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	65

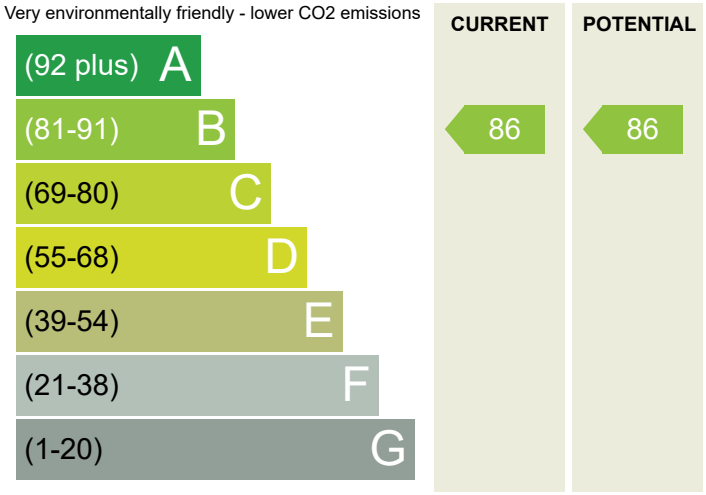
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

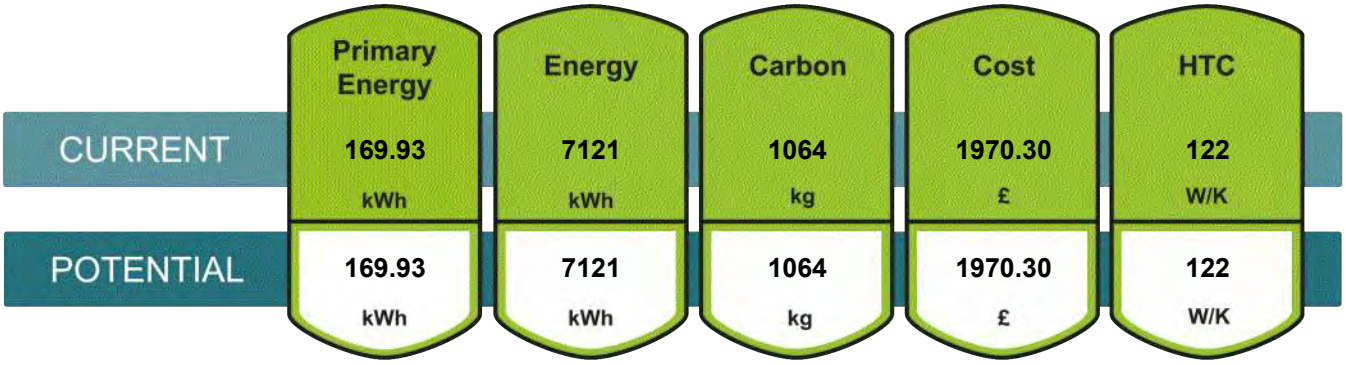


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£54	£54	
Heating	£1231	£1231	
Hot Water	£685	£685	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1970	£1970	

Estimated energy use and potential savings

Space Heating
4450
kWh per year

Water Heating
2477
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 7	Issued on Date	15/06/2026
Assessment Reference	Baseline	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	61 D	DER	10.88	TER	
Environmental	92 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.56	DFEE	37.34	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	114.05	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	382.71	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	10.07 m	58.22 m²	2.73 m

8.0 Living Area	29.09	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.30	190.00	27.49	21.94	0.00	None	5.55	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	33.47	0.00	None
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	45.43	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	111.06

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling	Timber I-joists, carpeted	20.00	58.22

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)

Summary for Input Data

elmhurst energy

Party Floor 1	Lowest occupied	Timber I-joists, carpeted		30.00	58.22

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	4.45	
NW Windows	Windows	External Wall 1	North East	1.10	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Independent	
SAP Code	903	

Summary for Input Data

Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 7	Issued on Date	15/06/2026
Assessment Reference	Baseline	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	61 D	DER	10.88	TER	
Environmental	92 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.56	DFEE	37.34	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	114.05	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8654	0.8485	0.8315	0.7466	0.7297	0.6448	0.6448	0.6279	0.6788	0.7297	0.7636	0.7976	(22b)
Effective ac	0.8745	0.8599	0.8457	0.7787	0.7662	0.7079	0.7079	0.6971	0.7304	0.7662	0.7916	0.8180	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.3000	6.5820	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		13.4404			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Party Ceiling			58.2200			20.0000	1164.4000	(32b)
Internal Walls			111.0600			9.0000	999.5400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		22281.1400	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							382.7059	(35)
Thermal bridges (Default value 0.200 * total exposed area)							5.4980	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		18.9384	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	45.1045	44.3568	40.8453	40.1883	37.1299	37.1299	36.5635	38.3079	40.1883	41.5174	42.9069	(38)

Heat transfer coeff

	64.8055	64.0428	63.2952	59.7837	59.1267	56.0682	56.0682	55.5018	57.2463	59.1267	60.4558	61.8453 (39)
Average = Sum(39)m / 12 =												59.7805

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1131	1.1000	1.0872	1.0269	1.0156	0.9630	0.9630	0.9533	0.9833	1.0156	1.0384	1.0623	(40)
HLP (average)												1.0268	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309 (42)
Hot water usage for mixer showers												
	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188 (42a)
Hot water usage for baths												
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)
Hot water usage for other uses												
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)
Average daily hot water use (litres/day)												125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	522.4665	548.6592	560.9425	559.1933	550.3056	526.1062	505.6798	495.0411	492.5073	489.1404	491.7039	504.8733	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	95.5043	96.6417	97.7832	103.5267	104.6771	110.3870	110.3870	111.5135	108.1154	104.6771	102.3758	100.0756	
alpha	7.3670	7.4428	7.5189	7.9018	7.9785	8.3591	8.3591	8.4342	8.2077	7.9785	7.8251	7.6717	
util living area													
	0.9976	0.9957	0.9903	0.9670	0.8883	0.6730	0.4872	0.5148	0.7721	0.9622	0.9937	0.9980	(86)
MIT	20.2689	20.3672	20.5263	20.7593	20.9194	20.9936	20.9996	20.9994	20.9805	20.8096	20.5372	20.2980	(87)
Th 2	19.9901	20.0008	20.0113	20.0610	20.0704	20.1142	20.1142	20.1224	20.0973	20.0704	20.0515	20.0318	(88)
util rest of house													

	0.9964	0.9936	0.9852	0.9494	0.8361	0.5848	0.3896	0.4172	0.6858	0.9388	0.9901	0.9970	(89)
MIT 2	19.1604	19.2940	19.5036	19.8305	20.0115	20.1117	20.1142	20.1223	20.0878	19.8998	19.5514	19.2309	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.7142	19.8302	20.0146	20.2946	20.4651	20.5524	20.5566	20.5605	20.5338	20.3544	20.0439	19.7641	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.7142	19.8302	20.0146	20.2946	20.4651	20.5524	20.5566	20.5605	20.5338	20.3544	20.0439	19.7641	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9960	0.9931	0.9852	0.9545	0.8602	0.6291	0.4384	0.4661	0.7292	0.9472	0.9900	0.9966	(94)
Useful gains	520.3537	544.8795	552.6249	533.7462	473.3582	330.9816	221.7108	230.7189	359.1276	463.2941	486.8062	503.1674	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	998.9274	956.1746	855.4101	681.2084	518.2530	333.7378	221.8380	230.9174	368.3136	576.7443	782.5363	962.5669	(97)
Space heating kWh	356.0589	276.3903	225.2722	106.1728	33.4018	0.0000	0.0000	0.0000	0.0000	84.4069	212.9256	341.7932	(98a)
Space heating requirement - total per year (kWh/year)												1636.4217	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	356.0589	276.3903	225.2722	106.1728	33.4018	0.0000	0.0000	0.0000	0.0000	84.4069	212.9256	341.7932	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1636.4217	
Space heating per m2											(98c) / (4) =	28.1076	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	356.0589	276.3903	225.2722	106.1728	33.4018	0.0000	0.0000	0.0000	0.0000	84.4069	212.9256	341.7932	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	356.0589	276.3903	225.2722	106.1728	33.4018	0.0000	0.0000	0.0000	0.0000	84.4069	212.9256	341.7932	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	1636.4217	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2359.4492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	163.0867	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4158.9576	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1636.4217	16.4900	269.8459	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	16.4900	389.0732	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	16.4900	26.8930	(250)
Additional standing charges			0.0000	(251)
Total energy cost			685.8121	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.3919	(257)
SAP value		61.2272	
SAP rating (Section 12)		61	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1636.4217	0.1562	255.6618	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			588.9303	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	163.0867	0.1443	23.5385	(268)
Total CO2, kg/year			612.4688	(272)
CO2 emissions per m2			10.5200	(273)
EI value			92.0489	
EI rating			92	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b) x	2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8654	0.7976	0.7806	0.7297	0.7297	0.6788	0.6788	0.6618	0.6788	0.7636	0.7466	0.7976	(22b)
Effective ac	0.8745	0.8180	0.8047	0.7662	0.7662	0.7304	0.7304	0.7190	0.7304	0.7916	0.7787	0.8180	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.3000	6.5820	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		13.4404			(33)
Main dwelling								

Party Wall to Adj Property	33.4700	0.0000	0.0000	180.0000	6024.6000 (32)
Party Wall to Adj Flat	45.4300	0.0000	0.0000	180.0000	8177.4000 (32)
Party Floor 1	58.2200			30.0000	1746.6000 (32d)
Party Ceiling	58.2200			20.0000	1164.4000 (32b)
Internal Walls	111.0600			9.0000	999.5400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 22281.1400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	382.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)	5.4980 (36)
Point Thermal bridges	(36a) = 0.0000
Total fabric heat loss	(33) + (36) + (36a) = 18.9384 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	42.9069	42.2046	40.1883	40.1883	38.3079	38.3079	37.7113	38.3079	41.5174	40.8453	42.9069	(38)
Heat transfer coeff	64.8055	61.8453	61.1430	59.1267	59.1267	57.2463	57.2463	56.6497	57.2463	60.4558	59.7837	61.8453	(39)
Average = Sum(39)m / 12 =												59.7100	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1131	1.0623	1.0502	1.0156	1.0156	0.9833	0.9833	0.9730	0.9833	1.0384	1.0269	1.0623	(40)
HLP (average)												1.0256	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309	(42)
Hot water usage for mixer showers	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)
Hot water usage for baths	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												125.7000	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
									Total per year (kWh/year) = Sum(64)m =			2359.4492	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	15.0428	0.4600	0.7000	0.7700	3.6924	(75)
Southwest	4.4500	46.3896	0.4600	0.7000	0.7700	46.0649	(79)

Solar gains	49.7573	73.4838	102.9654	135.2716	149.5616	163.0044	152.4518	138.9511	120.0610	86.7229	59.2696	40.5283	(83)
Total gains	532.9180	554.2708	568.5987	572.2765	559.2677	547.8836	522.6579	512.5054	507.9900	500.1912	503.7267	511.8724	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	95.5043	100.0756	101.2251	104.6771	104.6771	108.1154	108.1154	109.2540	108.1154	102.3758	103.5267	100.0756	
alpha	7.3670	7.6717	7.7483	7.9785	7.9785	8.2077	8.2077	8.2836	8.2077	7.8251	7.9018	7.6717	
util living area	0.9958	0.9931	0.9835	0.9469	0.8293	0.5821	0.4051	0.4088	0.6671	0.9278	0.9858	0.9962	(86)
MIT	20.3741	20.4808	20.6342	20.8256	20.9566	20.9978	20.9999	20.9999	20.9939	20.8788	20.6617	20.4115	(87)
Th 2	19.9901	20.0318	20.0417	20.0704	20.0704	20.0973	20.0973	20.1059	20.0973	20.0515	20.0610	20.0318	(88)
util rest of house	0.9936	0.9896	0.9749	0.9202	0.7611	0.4901	0.3064	0.3101	0.5718	0.8855	0.9775	0.9942	(89)
MIT 2	19.2944	19.4631	19.6628	19.9138	20.0432	20.0966	20.0973	20.1059	20.0950	19.9570	19.7148	19.3756	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.8339	19.9716	20.1481	20.3694	20.4996	20.5469	20.5483	20.5526	20.5442	20.4176	20.1879	19.8932	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8339	19.9716	20.1481	20.3694	20.4996	20.5469	20.5483	20.5526	20.5442	20.4176	20.1879	19.8932	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9931	0.9893	0.9760	0.9299	0.7944	0.5362	0.3557	0.3595	0.6198	0.9039	0.9788	0.9939	(94)
Useful gains	529.2507	548.3562	554.9597	532.1776	444.2543	293.8010	185.9272	184.2326	314.8417	452.1172	493.0725	508.7277	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	935.3964	882.6318	785.5737	636.7578	467.0755	294.6414	185.9520	184.2573	317.3828	520.9832	704.7253	890.1508	(97)
Space heating kWh	302.1724	224.6332	171.5769	75.2977	16.9790	0.0000	0.0000	0.0000	0.0000	51.2363	152.3901	283.7788	(98a)
Space heating requirement - total per year (kWh/year)												1278.0644	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	302.1724	224.6332	171.5769	75.2977	16.9790	0.0000	0.0000	0.0000	0.0000	51.2363	152.3901	283.7788	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1278.0644	
Space heating per m2											(98c) / (4) =	21.9523	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	302.1724	224.6332	171.5769	75.2977	16.9790	0.0000	0.0000	0.0000	0.0000	51.2363	152.3901	283.7788	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	302.1724	224.6332	171.5769	75.2977	16.9790	0.0000	0.0000	0.0000	0.0000	51.2363	152.3901	283.7788	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 1278.0644 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2359.4492 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 163.0867 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3800.6002 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1278.0644	27.6700	353.6404	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	27.6700	652.8596	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	27.6700	45.1261	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1051.6261	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1278.0644	0.1570	200.6905	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			533.9589	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	163.0867	0.1443	23.5385	(268)
Total CO2, kg/year			557.4974	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1278.0644	1.5814	2021.0710	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	1.5223	3591.7963	(278)
Space and water heating			5612.8673	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	163.0867	1.5338	250.1478	(282)
Total Primary energy kWh/year			5863.0151	(286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating: D 61
Current environmental impact rating: A 92

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: D 61
Potential environmental impact rating: A 92

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1052	£1052	£0
Space heating	£354	£354	£0
Water heating	£653	£653	£0
Lighting	£45	£45	£0
Total cost of fuels	£1052	£1052	£0
Total cost of uses	£1052	£1052	£0
Delivered energy	65 kWh/m²	65 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.6 tonnes	0.6 tonnes	0.0 tonnes
CO2 emissions per m²	10 kg/m²	10 kg/m²	0 kg/m²
Primary energy	101 kWh/m²	101 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8758 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8654	0.8485	0.8315	0.7466	0.7297	0.6448	0.6448	0.6279	0.6788	0.7297	0.7636	0.7976	(22b)
Effective ac	0.8745	0.8599	0.8457	0.7787	0.7662	0.7079	0.7079	0.6971	0.7304	0.7662	0.7916	0.8180	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.3000	6.5820	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		13.4404			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Party Ceiling			58.2200			20.0000	1164.4000	(32b)
Internal Walls			111.0600			9.0000	999.5400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		22281.1400	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							382.7059	(35)
Thermal bridges (Default value 0.200 * total exposed area)							5.4980	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		18.9384	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	45.1045	44.3568	40.8453	40.1883	37.1299	37.1299	36.5635	38.3079	40.1883	41.5174	42.9069	(38)
Heat transfer coeff	64.8055	64.0428	63.2952	59.7837	59.1267	56.0682	56.0682	55.5018	57.2463	59.1267	60.4558	61.8453	(39)
Average = Sum(39)m / 12 =												59.7805	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1131	1.1000	1.0872	1.0269	1.0156	0.9630	0.9630	0.9533	0.9833	1.0156	1.0384	1.0623	(40)
HLP (average)												1.0268	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309 (42)
Hot water usage for mixer showers												
77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)
Hot water usage for baths												
24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses												
34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													

Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.2400 (48)
Temperature factor from Table 2b 0.6000 (49)
Enter (49) or (54) in (55) 0.7440 (55)
Total storage loss

	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (56)

If cylinder contains dedicated solar storage

	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)

Total heat required for water heating calculated for each month

	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)

Output from w/h

	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782 (64)

Total per year (kWh/year) = Sum(64)m = 2359.4492 (64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)

Water heating gains (Table 5)

	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)

Total internal gains

	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	522.4665	548.6592	560.9425	559.1933	550.3056	526.1062	505.6798	495.0411	492.5073	489.1404	491.7039	504.8733	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	95.5043	96.6417	97.7832	103.5267	104.6771	110.3870	110.3870	111.5135	108.1154	104.6771	102.3758	100.0756	
alpha	7.3670	7.4428	7.5189	7.9018	7.9785	8.3591	8.3591	8.4342	8.2077	7.9785	7.8251	7.6717	
util living area	0.9976	0.9957	0.9903	0.9670	0.8883	0.6730	0.4872	0.5148	0.7721	0.9622	0.9937	0.9980	(86)
MIT	20.2689	20.3672	20.5263	20.7593	20.9194	20.9936	20.9996	20.9994	20.9805	20.8096	20.5372	20.2980	(87)
Th 2	19.9901	20.0008	20.0113	20.0610	20.0704	20.1142	20.1142	20.1224	20.0973	20.0704	20.0515	20.0318	(88)
util rest of house	0.9964	0.9936	0.9852	0.9494	0.8361	0.5848	0.3896	0.4172	0.6858	0.9388	0.9901	0.9970	(89)
MIT 2	19.1604	19.2940	19.5036	19.8305	20.0115	20.1117	20.1142	20.1223	20.0878	19.8998	19.5514	19.2309	(90)

Living area fraction fLA = Living area / (4) = 0.4997 (91)

MIT	19.7142	19.8302	20.0146	20.2946	20.4651	20.5524	20.5566	20.5605	20.5338	20.3544	20.0439	19.7641	(92)

Temperature adjustment 0.0000

adjusted MIT	19.7142	19.8302	20.0146	20.2946	20.4651	20.5524	20.5566	20.5605	20.5338	20.3544	20.0439	19.7641	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9960	0.9931	0.9852	0.9545	0.8602	0.6291	0.4384	0.4661	0.7292	0.9472	0.9900	0.9966	(94)
Useful gains	520.3537	544.8795	552.6249	533.7462	473.3582	330.9816	221.7108	230.7189	359.1276	463.2941	486.8062	503.1674	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)

Heat loss rate W

	998.9274	956.1746	855.4101	681.2084	518.2530	333.7378	221.8380	230.9174	368.3136	576.7443	782.5363	962.5669	(97)

Space heating kWh

	356.0589	276.3903	225.2722	106.1728	33.4018	0.0000	0.0000	0.0000	0.0000	84.4069	212.9256	341.7932	(98a)

Space heating requirement - total per year (kWh/year) 1636.4217

Solar heating kWh

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

	356.0589	276.3903	225.2722	106.1728	33.4018	0.0000	0.0000	0.0000	0.0000	84.4069	212.9256	341.7932	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 1636.4217

Space heating per m2 (98c) / (4) = 28.1076 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	356.0589	276.3903	225.2722	106.1728	33.4018	0.0000	0.0000	0.0000	0.0000	84.4069	212.9256	341.7932	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	356.0589	276.3903	225.2722	106.1728	33.4018	0.0000	0.0000	0.0000	0.0000	84.4069	212.9256	341.7932	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1636.4217	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2359.4492	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												163.0867	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												4158.9576	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1636.4217	16.4900	269.8459	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	16.4900	389.0732	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	16.4900	26.8930	(250)
Additional standing charges			0.0000	(251)
Total energy cost			685.8121	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.3919	(257)
SAP value		61.2272	
SAP rating (Section 12)		61	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1636.4217	0.1562	255.6618	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			588.9303	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	163.0867	0.1443	23.5385 (268)
Total CO2, kg/year			612.4688 (272)
CO2 emissions per m2			10.5200 (273)
EI value			92.0489
EI rating			92 (274)
EI band			A

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b) x	2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8654	0.7976	0.7806	0.7297	0.7297	0.6788	0.6788	0.6618	0.6788	0.7636	0.7466	0.7976	(22b)
Effective ac	0.8745	0.8180	0.8047	0.7662	0.7662	0.7304	0.7304	0.7190	0.7304	0.7916	0.7787	0.8180	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.3000	6.5820	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		13.4404			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Party Ceiling			58.2200			20.0000	1164.4000	(32b)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	22281.1400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		382.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)		5.4980 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	18.9384 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	42.9069	42.2046	40.1883	40.1883	38.3079	38.3079	37.7113	38.3079	41.5174	40.8453	42.9069	(38)
Heat transfer coeff	64.8055	61.8453	61.1430	59.1267	59.1267	57.2463	57.2463	56.6497	57.2463	60.4558	59.7837	61.8453	(39)
Average = Sum(39)m / 12 =												59.7100	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1131	1.0623	1.0502	1.0156	1.0156	0.9833	0.9833	0.9730	0.9833	1.0384	1.0269	1.0623	(40)
HLP (average)												1.0256	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9309 (42)
Hot water usage for mixer showers		

	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)
Hot water usage for baths													
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses													
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												125.7000	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	15.0428	0.4600	0.7000	0.7700	3.6924	(75)
Southwest	4.4500	46.3896	0.4600	0.7000	0.7700	46.0649	(79)

Solar gains	49.7573	73.4838	102.9654	135.2716	149.5616	163.0044	152.4518	138.9511	120.0610	86.7229	59.2696	40.5283	(83)
Total gains	532.9180	554.2708	568.5987	572.2765	559.2677	547.8836	522.6579	512.5054	507.9900	500.1912	503.7267	511.8724	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	95.5043	100.0756	101.2251	104.6771	104.6771	108.1154	108.1154	109.2540	108.1154	102.3758	103.5267	100.0756	
alpha	7.3670	7.6717	7.7483	7.9785	7.9785	8.2077	8.2077	8.2836	8.2077	7.8251	7.9018	7.6717	
util living area													
	0.9958	0.9931	0.9835	0.9469	0.8293	0.5821	0.4051	0.4088	0.6671	0.9278	0.9858	0.9962	(86)
MIT	20.3741	20.4808	20.6342	20.8256	20.9566	20.9978	20.9999	20.9999	20.9939	20.8788	20.6617	20.4115	(87)
Th 2	19.9901	20.0318	20.0417	20.0704	20.0704	20.0973	20.0973	20.1059	20.0973	20.0515	20.0610	20.0318	(88)
util rest of house													
	0.9936	0.9896	0.9749	0.9202	0.7611	0.4901	0.3064	0.3101	0.5718	0.8855	0.9775	0.9942	(89)
MIT 2	19.2944	19.4631	19.6628	19.9138	20.0432	20.0966	20.0973	20.1059	20.0950	19.9570	19.7148	19.3756	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.8339	19.9716	20.1481	20.3694	20.4996	20.5469	20.5483	20.5526	20.5442	20.4176	20.1879	19.8932	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8339	19.9716	20.1481	20.3694	20.4996	20.5469	20.5483	20.5526	20.5442	20.4176	20.1879	19.8932	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9931	0.9893	0.9760	0.9299	0.7944	0.5362	0.3557	0.3595	0.6198	0.9039	0.9788	0.9939	(94)
Useful gains	529.2507	548.3562	554.9597	532.1776	444.2543	293.8010	185.9272	184.2326	314.8417	452.1172	493.0725	508.7277	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)

Heat loss rate W

935.3964	882.6318	785.5737	636.7578	467.0755	294.6414	185.9520	184.2573	317.3828	520.9832	704.7253	890.1508	(97)

Space heating kWh

302.1724	224.6332	171.5769	75.2977	16.9790	0.0000	0.0000	0.0000	0.0000	51.2363	152.3901	283.7788	(98a)

Space heating requirement - total per year (kWh/year) 1278.0644

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

302.1724	224.6332	171.5769	75.2977	16.9790	0.0000	0.0000	0.0000	0.0000	51.2363	152.3901	283.7788	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 1278.0644

Space heating per m2 (98c) / (4) = 21.9523 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	302.1724	224.6332	171.5769	75.2977	16.9790	0.0000	0.0000	0.0000	0.0000	51.2363	152.3901	283.7788	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	302.1724	224.6332	171.5769	75.2977	16.9790	0.0000	0.0000	0.0000	0.0000	51.2363	152.3901	283.7788	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 1278.0644 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2359.4492 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 163.0867 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N) 0.0000 (235a)

Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated -0.0000 (236)

Energy used 0.0000 (237)

Total delivered energy for all uses 3800.6002 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1278.0644	27.6700	353.6404	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	27.6700	652.8596	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	27.6700	45.1261	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1051.6261	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1278.0644	0.1570	200.6905	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			533.9589	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	163.0867	0.1443	23.5385	(268)
Total CO2, kg/year			557.4974	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1278.0644	1.5814	2021.0710	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	1.5223	3591.7963	(278)
Space and water heating			5612.8673	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	163.0867	1.5338	250.1478	(282)
Total Primary energy kWh/year			5863.0151	(286)

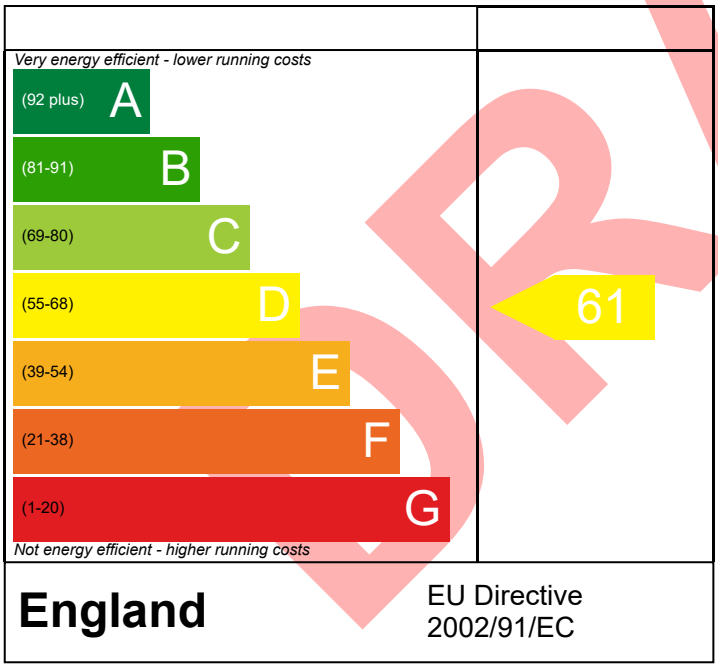
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.22 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

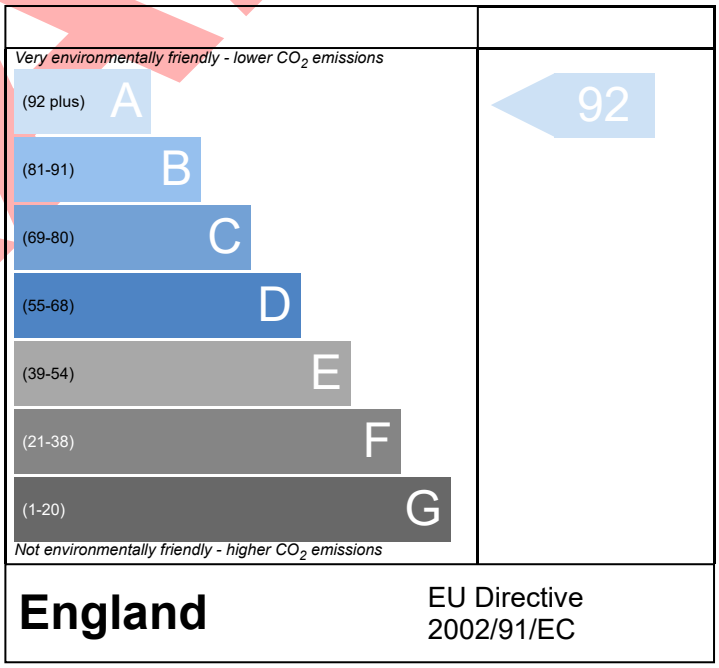
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

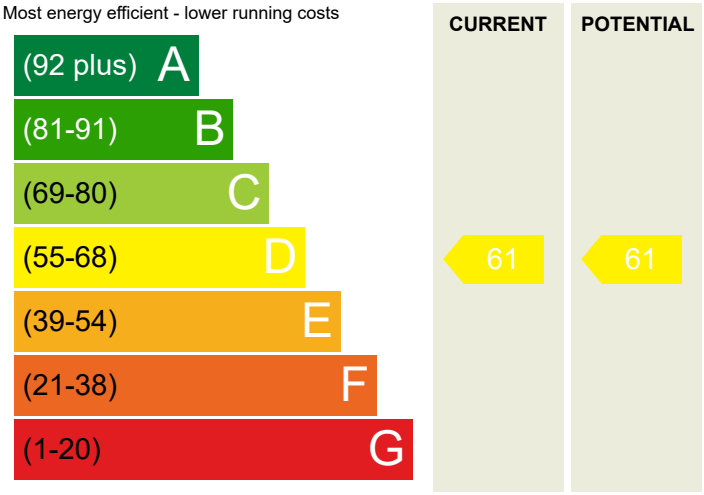
Energy Report

Dwelling Address	
Reference	Flat 7-Baseline
SAP Version	10.2
Assessment Date	30/04/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	58

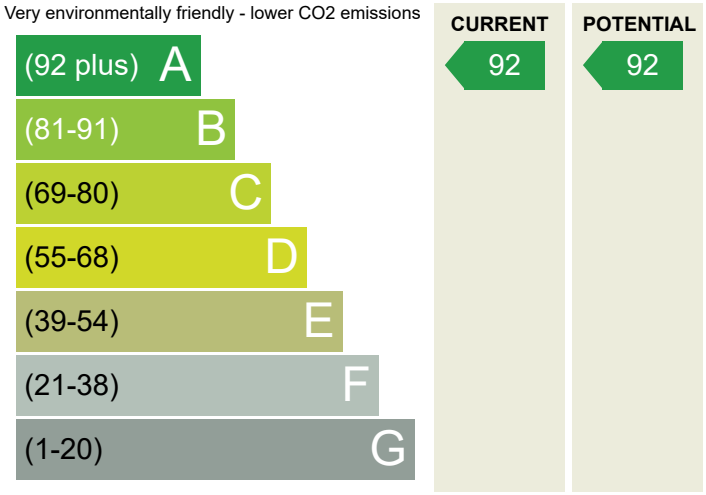
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

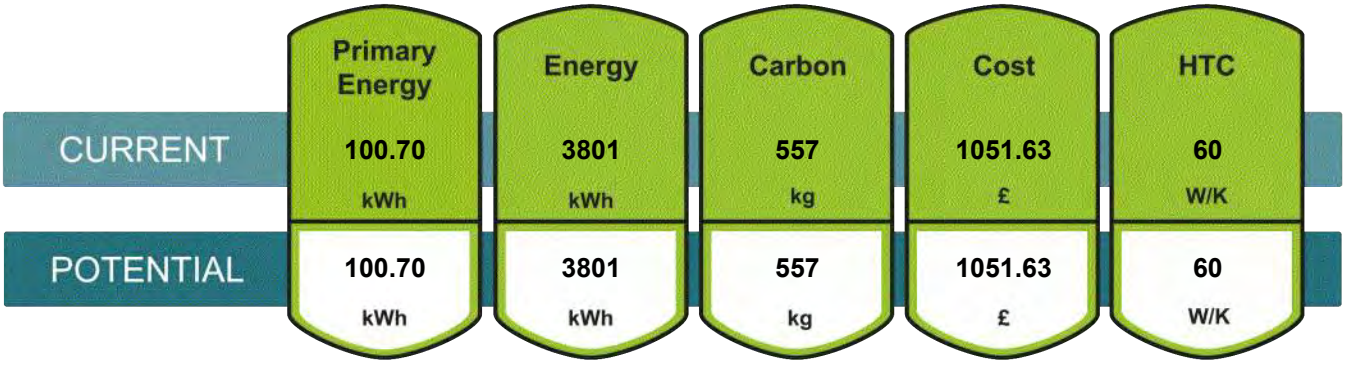


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

Energy Report

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£45	£45	
Heating	£354	£354	
Hot Water	£653	£653	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1052	£1052	

Estimated energy use and potential savings

Space Heating
1278
kWh per year

Water Heating
2359
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

Plot Reference	Flat 8	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	49 E	**DER**	14.44	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.75	**DFEE**	61.03	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	150.42	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	339.05	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.17 m	58.61 m²	2.73 m

8.0 Living Area	31.93	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.30	190.00	57.79	51.00	0.00	None	6.79	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	36.17	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	82.28

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling	Timber I-joists, carpeted	20.00	58.61

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Timber I-joists, carpeted	30.00	58.61

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	2.96	
SE Windows	Windows	External Wall 1	South East	2.19	
NE Windows	Windows	External Wall 1	North East	1.64	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	

Summary for Input Data

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over Bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 8	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	49 E	**DER**	14.44	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.75	**DFEE**	61.03	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	150.42	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

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2. Ventilation rate

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			m3 per hour	
Number of open chimneys		0 * 80 =	0.0000	(6a)
Number of open flues		0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000	(6d)
Number of flues attached to other heater		0 * 35 =	0.0000	(6e)
Number of blocked chimneys		0 * 20 =	0.0000	(6f)
Number of intermittent extract fans		2 * 10 =	20.0000	(7a)
Number of passive vents		0 * 10 =	0.0000	(7b)
Number of flueless gas fires		0 * 40 =	0.0000	(7c)
		Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =		20.0000 / (5) =	0.1250	(8)
Pressure test			No	
Pressure Test Method			Blower Door	
Measured/design AP50			15.0000	(17)
Infiltration rate			0.8750	(18)
Number of sides sheltered			1	(19)
Shelter factor		(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor		(21) = (18) x (20) =	0.8094	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0319	1.0117	0.9915	0.8903	0.8701	0.7689	0.7689	0.7487	0.8094	0.8701	0.9105	0.9510	(22b)
Effective ac	1.0319	1.0117	0.9915	0.8963	0.8785	0.7956	0.7956	0.7803	0.8275	0.8785	0.9145	0.9522	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.3000	15.3000	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.6907			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Party Ceiling			58.6100			20.0000	1172.2000	(32b)
Internal Walls			82.2800			9.0000	740.5200	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		19871.6200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							339.0483	(35)
Thermal bridges (Default value 0.200 * total exposed area)							11.5580	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		35.2487	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	53.4203	52.3538	47.3275	46.3871	42.0094	42.0094	41.1987	43.6956	46.3871	48.2895	50.2784	(38)
Heat transfer coeff													

	89.7374	88.6690	87.6025	82.5762	81.6358	77.2581	77.2581	76.4474	78.9443	81.6358	83.5382	85.5271 (39)
Average = Sum(39)m / 12 =												82.5691

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5311	1.5129	1.4947	1.4089	1.3929	1.3182	1.3182	1.3043	1.3469	1.3929	1.4253	1.4593	(40)
HLP (average)												1.4088	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421 (42)
Hot water usage for mixer showers												
	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757 (42a)
Hot water usage for baths												
	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583 (42b)
Hot water usage for other uses												
	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188 (42c)
Average daily hot water use (litres/day)												126.1167 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m													
	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.3391	19.8414	16.1361	12.2161	9.1317	7.7093	8.3302	10.8279	14.5332	18.4532	21.5376	22.9600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains													
	484.5162	482.2335	467.1493	438.5346	411.2136	386.3141	371.5410	374.8015	389.1041	414.6194	445.6426	472.6091	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579 (83)
Total gains	530.9288	562.6629	580.8393	585.5083	581.4099	557.7312	535.7851	521.3457	514.2617	504.4933	501.4840	512.1670 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	61.5117	62.2528	63.0107	66.8461	67.6161	71.4475	71.4475	72.2052	69.9214	67.6161	66.0763	64.5397
alpha	5.1008	5.1502	5.2007	5.4564	5.5077	5.7632	5.7632	5.8137	5.6614	5.5077	5.4051	5.3026
util living area												
	0.9967	0.9950	0.9907	0.9769	0.9346	0.7964	0.6168	0.6506	0.8732	0.9761	0.9939	0.9973 (86)
MIT	19.6876	19.8224	20.0547	20.4119	20.7023	20.9299	20.9868	20.9826	20.8672	20.5081	20.0898	19.7340 (87)
Th 2	19.6643	19.6779	19.6915	19.7565	19.7688	19.8266	19.8266	19.8374	19.8042	19.7688	19.7440	19.7182 (88)
util rest of house												

	0.9953	0.9926	0.9859	0.9637	0.8939	0.6890	0.4622	0.4993	0.7882	0.9598	0.9906	0.9961	(89)
MIT 2	18.1871	18.3686	18.6738	19.1697	19.5228	19.7917	19.8237	19.8330	19.7241	19.3010	18.7579	18.2849	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.0045	19.1606	19.4261	19.8465	20.1654	20.4118	20.4574	20.4593	20.3469	19.9586	19.4835	19.0744	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0045	19.1606	19.4261	19.8465	20.1654	20.4118	20.4574	20.4593	20.3469	19.9586	19.4835	19.0744	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9942	0.9914	0.9846	0.9649	0.9093	0.7466	0.5477	0.5831	0.8315	0.9630	0.9896	0.9952	(94)
Useful gains	527.8642	557.8051	571.9109	564.9742	528.6521	416.3968	293.4249	303.9853	427.6127	485.8122	496.2752	509.7018	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1319.5466	1264.4710	1132.3579	903.9181	691.0762	449.0063	298.0115	310.3238	493.1537	763.9969	1034.4959	1272.1601	(97)
Space heating kWh													
	589.0117	474.8794	416.9726	244.0396	120.8436	0.0000	0.0000	0.0000	0.0000	206.9694	387.5189	567.2690	(98a)
Space heating requirement - total per year (kWh/year)												3007.5041	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	589.0117	474.8794	416.9726	244.0396	120.8436	0.0000	0.0000	0.0000	0.0000	206.9694	387.5189	567.2690	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3007.5041	
Space heating per m2											(98c) / (4) =	51.3138	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
Fraction of space heat from main system(s)	1.0000 (202)
Efficiency of main space heating system 1 (in %)	100.0000 (206)
Efficiency of main space heating system 2 (in %)	0.0000 (207)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	589.0117	474.8794	416.9726	244.0396	120.8436	0.0000	0.0000	0.0000	0.0000	206.9694	387.5189	567.2690	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	589.0117	474.8794	416.9726	244.0396	120.8436	0.0000	0.0000	0.0000	0.0000	206.9694	387.5189	567.2690	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year	
Space heating fuel - main system 1	3007.5041 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	100.0000
Water heating fuel used	2366.3713 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
Total electricity for the above, kWh/year	0.0000 (231)
Electricity for lighting (calculated in Appendix L)	157.8062 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	5531.6815 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3007.5041	16.4900	495.9374	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	16.4900	390.2146	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	16.4900	26.0222	(250)
Additional standing charges			0.0000	(251)
Total energy cost			912.1743	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.1694	(257)
SAP value		48.6238	
SAP rating (Section 12)		49	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3007.5041	0.1549	465.7635	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			800.0120	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	157.8062	0.1443	22.7763	(268)
Total CO2, kg/year			822.7883	(272)
CO2 emissions per m2			14.0400	(273)
EI value			89.3588	
EI rating			89	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b) x	2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0319	0.9510	0.9308	0.8701	0.8701	0.8094	0.8094	0.7891	0.8094	0.9105	0.8903	0.9510	(22b)
Effective ac	1.0319	0.9522	0.9332	0.8785	0.8785	0.8275	0.8275	0.8114	0.8275	0.9145	0.8963	0.9522	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.3000	15.3000	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.6907			(33)
Main dwelling								

Party Wall to Adj Flat	36.1700	0.0000	0.0000	180.0000	6510.6000 (32)
Party Floor 1	58.6100			30.0000	1758.3000 (32d)
Party Ceiling	58.6100			20.0000	1172.2000 (32b)
Internal Walls	82.2800			9.0000	740.5200 (32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 19871.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 339.0483 (35)
Thermal bridges (Default value 0.200 * total exposed area) 11.5580 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 35.2487 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	50.2784	49.2732	46.3871	46.3871	43.6956	43.6956	42.8417	43.6956	48.2895	47.3275	50.2784	(38)
Heat transfer coeff	89.7374	85.5271	84.5218	81.6358	81.6358	78.9443	78.9443	78.0904	78.9443	83.5382	82.5762	85.5271	(39)
Average = Sum(39)m / 12 =												82.4685	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5311	1.4593	1.4421	1.3929	1.3929	1.3469	1.3469	1.3324	1.3469	1.4253	1.4089	1.4593	(40)
HLP (average)												1.4071	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9421 (42)
Hot water usage for mixer showers

78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)

Hot water usage for baths

24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)

Hot water usage for other uses

34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)

Average daily hot water use (litres/day) 126.1167 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.3391	19.8414	16.1361	12.2161	9.1317	7.7093	8.3302	10.8279	14.5332	18.4532	21.5376	22.9600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains	484.5162	482.2335	467.1493	438.5346	411.2136	386.3141	371.5410	374.8015	389.1041	414.6194	445.6426	472.6091	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	15.0428	0.4600	0.7000	0.7700	5.5051	(75)
Southeast	2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)
Southwest	2.9600	46.3896	0.4600	0.7000	0.7700	30.6409	(79)

Solar gains	58.8161	87.2005	123.0433	163.0198	181.3464	198.1421	185.1171	167.9173	143.9588	103.1595	70.1321	47.8618	(83)
Total gains	543.3323	569.4340	590.1926	601.5544	592.5600	584.4562	556.6581	542.7188	533.0628	517.7789	515.7748	520.4708	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	61.5117	64.5397	65.3073	67.6161	67.6161	69.9214	69.9214	70.6860	69.9214	66.0763	66.8461	64.5397	
alpha	5.1008	5.3026	5.3538	5.5077	5.5077	5.6614	5.6614	5.7124	5.6614	5.4051	5.4564	5.3026	
util living area													
	0.9951	0.9931	0.9865	0.9660	0.9009	0.7115	0.5182	0.5255	0.7955	0.9581	0.9889	0.9957	(86)
MIT	19.8368	19.9842	20.2111	20.5178	20.7904	20.9635	20.9949	20.9948	20.9311	20.6258	20.2699	19.8962	(87)
Th 2	19.6643	19.7182	19.7312	19.7688	19.7688	19.8042	19.8042	19.8156	19.8042	19.7440	19.7565	19.7182	(88)
util rest of house													
	0.9927	0.9898	0.9795	0.9467	0.8410	0.5817	0.3545	0.3613	0.6782	0.9278	0.9824	0.9936	(89)
MIT 2	18.3776	18.6037	18.9002	19.3075	19.6150	19.7906	19.8036	19.8149	19.7726	19.4211	18.9951	18.4922	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.1725	19.3558	19.6144	19.9669	20.2554	20.4296	20.4526	20.4577	20.4037	20.0774	19.6896	19.2571	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1725	19.3558	19.6144	19.9669	20.2554	20.4296	20.4526	20.4577	20.4037	20.0774	19.6896	19.2571	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9915	0.9885	0.9787	0.9505	0.8679	0.6529	0.4445	0.4516	0.7417	0.9376	0.9819	0.9926	(94)
Useful gains	538.6992	562.8951	577.5946	571.7838	514.3020	381.6149	247.4309	245.0922	395.3847	485.4817	506.4544	516.6078	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1235.9089	1167.9408	1040.8343	846.3060	624.9530	397.0571	248.8812	246.5848	426.5937	691.4771	932.2520	1176.6042	(97)
Space heating kWh													
	518.7240	406.5907	344.6503	197.6560	82.3243	0.0000	0.0000	0.0000	0.0000	153.2605	306.5743	491.0373	(98a)
Space heating requirement - total per year (kWh/year)												2500.8176	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	518.7240	406.5907	344.6503	197.6560	82.3243	0.0000	0.0000	0.0000	0.0000	153.2605	306.5743	491.0373	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2500.8176	
Space heating per m2											(98c) / (4) =	42.6688	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	518.7240	406.5907	344.6503	197.6560	82.3243	0.0000	0.0000	0.0000	0.0000	153.2605	306.5743	491.0373	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	518.7240	406.5907	344.6503	197.6560	82.3243	0.0000	0.0000	0.0000	0.0000	153.2605	306.5743	491.0373	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2500.8176	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2366.3713	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												157.8062	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)

Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	5024.9950 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2500.8176	27.6700	691.9762	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	27.6700	654.7749	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	27.6700	43.6650	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1390.4161	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2500.8176	0.1554	388.6449	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			722.8934	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	157.8062	0.1443	22.7763	(268)
Total CO2, kg/year			745.6697	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2500.8176	1.5754	3939.7070	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	1.5223	3602.3424	(278)
Space and water heating			7542.0494	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	157.8062	1.5338	242.0483	(282)
Total Primary energy kWh/year			7784.0978	(286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating: E 49
Current environmental impact rating: B 89

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 49
Potential environmental impact rating: B 89

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1390	£1390	£0
Space heating	£692	£692	£0
Water heating	£655	£655	£0
Lighting	£44	£44	£0
Total cost of fuels	£1390	£1390	£0
Total cost of uses	£1391	£1391	£0
Delivered energy	86 kWh/m²	86 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m²	13 kg/m²	13 kg/m²	0 kg/m²
Primary energy	133 kWh/m²	133 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8750 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0319	1.0117	0.9915	0.8903	0.8701	0.7689	0.7689	0.7487	0.8094	0.8701	0.9105	0.9510	(22b)
Effective ac	1.0319	1.0117	0.9915	0.8963	0.8785	0.7956	0.7956	0.7803	0.8275	0.8785	0.9145	0.9522	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.3000	15.3000	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.6907			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Party Ceiling			58.6100			20.0000	1172.2000	(32b)
Internal Walls			82.2800			9.0000	740.5200	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		19871.6200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							339.0483	(35)
Thermal bridges (Default value 0.200 * total exposed area)							11.5580	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		35.2487	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	53.4203	52.3538	47.3275	46.3871	42.0094	42.0094	41.1987	43.6956	46.3871	48.2895	50.2784	(38)
Heat transfer coeff	89.7374	88.6690	87.6025	82.5762	81.6358	77.2581	77.2581	76.4474	78.9443	81.6358	83.5382	85.5271	(39)
Average = Sum(39)m / 12 =												82.5691	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5311	1.5129	1.4947	1.4089	1.3929	1.3182	1.3182	1.3043	1.3469	1.3929	1.4253	1.4593	(40)
HLP (average)												1.4088	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9421 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)
Hot water usage for baths	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)
Hot water usage for other uses	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)
Average daily hot water use (litres/day)												126.1167	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)

a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.3391	19.8414	16.1361	12.2161	9.1317	7.7093	8.3302	10.8279	14.5332	18.4532	21.5376	22.9600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains													
	484.5162	482.2335	467.1493	438.5346	411.2136	386.3141	371.5410	374.8015	389.1041	414.6194	445.6426	472.6091	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579	(83)
Total gains	530.9288	562.6629	580.8393	585.5083	581.4099	557.7312	535.7851	521.3457	514.2617	504.4933	501.4840	512.1670	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	61.5117	62.2528	63.0107	66.8461	67.6161	71.4475	71.4475	72.2052	69.9214	67.6161	66.0763	64.5397	
alpha	5.1008	5.1502	5.2007	5.4564	5.5077	5.7632	5.7632	5.8137	5.6614	5.5077	5.4051	5.3026	
util living area													
	0.9967	0.9950	0.9907	0.9769	0.9346	0.7964	0.6168	0.6506	0.8732	0.9761	0.9939	0.9973	(86)
MIT	19.6876	19.8224	20.0547	20.4119	20.7023	20.9299	20.9868	20.9826	20.8672	20.5081	20.0898	19.7340	(87)
Th 2	19.6643	19.6779	19.6915	19.7565	19.7688	19.8266	19.8266	19.8374	19.8042	19.7688	19.7440	19.7182	(88)
util rest of house													
	0.9953	0.9926	0.9859	0.9637	0.8939	0.6890	0.4622	0.4993	0.7882	0.9598	0.9906	0.9961	(89)
MIT 2	18.1871	18.3686	18.6738	19.1697	19.5228	19.7917	19.8237	19.8330	19.7241	19.3010	18.7579	18.2849	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.0045	19.1606	19.4261	19.8465	20.1654	20.4118	20.4574	20.4593	20.3469	19.9586	19.4835	19.0744	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0045	19.1606	19.4261	19.8465	20.1654	20.4118	20.4574	20.4593	20.3469	19.9586	19.4835	19.0744	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9942	0.9914	0.9846	0.9649	0.9093	0.7466	0.5477	0.5831	0.8315	0.9630	0.9896	0.9952	(94)
Useful gains	527.8642	557.8051	571.9109	564.9742	528.6521	416.3968	293.4249	303.9853	427.6127	485.8122	496.2752	509.7018	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1319.5466	1264.4710	1132.3579	903.9181	691.0762	449.0063	298.0115	310.3238	493.1537	763.9969	1034.4959	1272.1601	(97)
Space heating kWh													
	589.0117	474.8794	416.9726	244.0396	120.8436	0.0000	0.0000	0.0000	0.0000	206.9694	387.5189	567.2690	(98a)
Space heating requirement - total per year (kWh/year)												3007.5041	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	589.0117	474.8794	416.9726	244.0396	120.8436	0.0000	0.0000	0.0000	0.0000	206.9694	387.5189	567.2690	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3007.5041	
Space heating per m2											(98c) / (4) =	51.3138	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	589.0117	474.8794	416.9726	244.0396	120.8436	0.0000	0.0000	0.0000	0.0000	206.9694	387.5189	567.2690	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	589.0117	474.8794	416.9726	244.0396	120.8436	0.0000	0.0000	0.0000	0.0000	206.9694	387.5189	567.2690	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3007.5041	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2366.3713	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												157.8062	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5531.6815	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3007.5041	16.4900	495.9374	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	16.4900	390.2146	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	16.4900	26.0222	(250)
Additional standing charges			0.0000	(251)
Total energy cost			912.1743	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.1694	(257)
SAP value		48.6238	
SAP rating (Section 12)		49	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3007.5041	0.1549	465.7635	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			800.0120	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	157.8062	0.1443	22.7763 (268)
Total CO2, kg/year			822.7883 (272)
CO2 emissions per m2			14.0400 (273)
EI value			89.3588
EI rating			89 (274)
EI band			B

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b) x	2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0319	0.9510	0.9308	0.8701	0.8701	0.8094	0.8094	0.7891	0.8094	0.9105	0.8903	0.9510	(22b)
Effective ac	1.0319	0.9522	0.9332	0.8785	0.8785	0.8275	0.8275	0.8114	0.8275	0.9145	0.8963	0.9522	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.3000	15.3000	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.6907			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Party Ceiling			58.6100			20.0000	1172.2000	(32b)
Internal Walls			82.2800			9.0000	740.5200	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19871.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		339.0483 (35)
Thermal bridges (Default value 0.200 * total exposed area)		11.5580 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	35.2487 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	50.2784	49.2732	46.3871	46.3871	43.6956	43.6956	42.8417	43.6956	48.2895	47.3275	50.2784	(38)
Heat transfer coeff	89.7374	85.5271	84.5218	81.6358	81.6358	78.9443	78.9443	78.0904	78.9443	83.5382	82.5762	85.5271	(39)
Average = Sum(39)m / 12 =												82.4685	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5311	1.4593	1.4421	1.3929	1.3929	1.3469	1.3469	1.3324	1.3469	1.4253	1.4089	1.4593	(40)
HLP (average)												1.4071	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421	(42)
Hot water usage for mixer showers	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)

Hot water usage for baths
24.5412 24.1768 23.6635 22.7172 22.0085 21.2228 20.7984 21.3081 21.8630 22.7038 23.6696 24.4583 (42b)
Hot water usage for other uses
34.5188 33.2635 32.0083 30.7531 29.4979 28.2426 28.2426 29.4979 30.7531 32.0083 33.2635 34.5188 (42c)
Average daily hot water use (litres/day) 126.1167 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m													
	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.3391	19.8414	16.1361	12.2161	9.1317	7.7093	8.3302	10.8279	14.5332	18.4532	21.5376	22.9600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains													
	484.5162	482.2335	467.1493	438.5346	411.2136	386.3141	371.5410	374.8015	389.1041	414.6194	445.6426	472.6091	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	15.0428	0.4600	0.7000	0.7700	5.5051	(75)
Southeast	2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)
Southwest	2.9600	46.3896	0.4600	0.7000	0.7700	30.6409	(79)

Solar gains	58.8161	87.2005	123.0433	163.0198	181.3464	198.1421	185.1171	167.9173	143.9588	103.1595	70.1321	47.8618	(83)
Total gains	543.3323	569.4340	590.1926	601.5544	592.5600	584.4562	556.6581	542.7188	533.0628	517.7789	515.7748	520.4708	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	61.5117	64.5397	65.3073	67.6161	67.6161	69.9214	69.9214	70.6860	69.9214	66.0763	66.8461	64.5397	
alpha	5.1008	5.3026	5.3538	5.5077	5.5077	5.6614	5.6614	5.7124	5.6614	5.4051	5.4564	5.3026	
util living area													
	0.9951	0.9931	0.9865	0.9660	0.9009	0.7115	0.5182	0.5255	0.7955	0.9581	0.9889	0.9957	(86)
MIT	19.8368	19.9842	20.2111	20.5178	20.7904	20.9635	20.9949	20.9948	20.9311	20.6258	20.2699	19.8962	(87)
Th 2	19.6643	19.7182	19.7312	19.7688	19.7688	19.8042	19.8042	19.8156	19.8042	19.7440	19.7565	19.7182	(88)
util rest of house													
	0.9927	0.9898	0.9795	0.9467	0.8410	0.5817	0.3545	0.3613	0.6782	0.9278	0.9824	0.9936	(89)
MIT 2	18.3776	18.6037	18.9002	19.3075	19.6150	19.7906	19.8036	19.8149	19.7726	19.4211	18.9951	18.4922	(90)
Living area fraction									fLA = Living area / (4) =			0.5448	(91)
MIT	19.1725	19.3558	19.6144	19.9669	20.2554	20.4296	20.4526	20.4577	20.4037	20.0774	19.6896	19.2571	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1725	19.3558	19.6144	19.9669	20.2554	20.4296	20.4526	20.4577	20.4037	20.0774	19.6896	19.2571	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9915	0.9885	0.9787	0.9505	0.8679	0.6529	0.4445	0.4516	0.7417	0.9376	0.9819	0.9926	(94)
Useful gains	538.6992	562.8951	577.5946	571.7838	514.3020	381.6149	247.4309	245.0922	395.3847	485.4817	506.4544	516.6078	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)

Heat loss rate W

1235.9089	1167.9408	1040.8343	846.3060	624.9530	397.0571	248.8812	246.5848	426.5937	691.4771	932.2520	1176.6042	(97)

Space heating kWh

518.7240	406.5907	344.6503	197.6560	82.3243	0.0000	0.0000	0.0000	0.0000	153.2605	306.5743	491.0373	(98a)

Space heating requirement - total per year (kWh/year) 2500.8176

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

518.7240	406.5907	344.6503	197.6560	82.3243	0.0000	0.0000	0.0000	0.0000	153.2605	306.5743	491.0373	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 2500.8176

Space heating per m2 (98c) / (4) = 42.6688 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	518.7240	406.5907	344.6503	197.6560	82.3243	0.0000	0.0000	0.0000	0.0000	153.2605	306.5743	491.0373	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	518.7240	406.5907	344.6503	197.6560	82.3243	0.0000	0.0000	0.0000	0.0000	153.2605	306.5743	491.0373	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 2500.8176 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2366.3713 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 157.8062 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N) 0.0000 (235a)

Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated -0.0000 (236)

Energy used 0.0000 (237)

Total delivered energy for all uses 5024.9950 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2500.8176	27.6700	691.9762	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	27.6700	654.7749	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	27.6700	43.6650	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1390.4161	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2500.8176	0.1554	388.6449	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			722.8934	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	157.8062	0.1443	22.7763	(268)
Total CO2, kg/year			745.6697	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2500.8176	1.5754	3939.7070	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	1.5223	3602.3424	(278)
Space and water heating			7542.0494	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	157.8062	1.5338	242.0483	(282)
Total Primary energy kWh/year			7784.0978	(286)

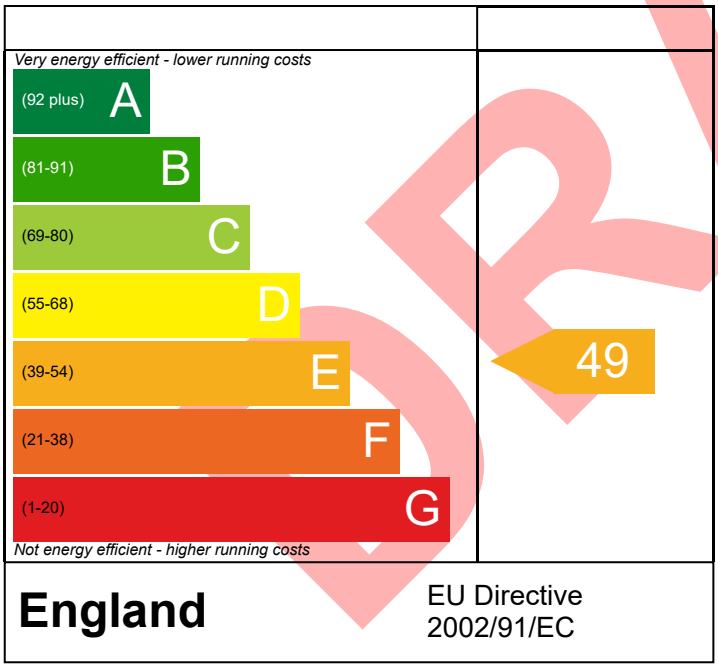
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.61 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

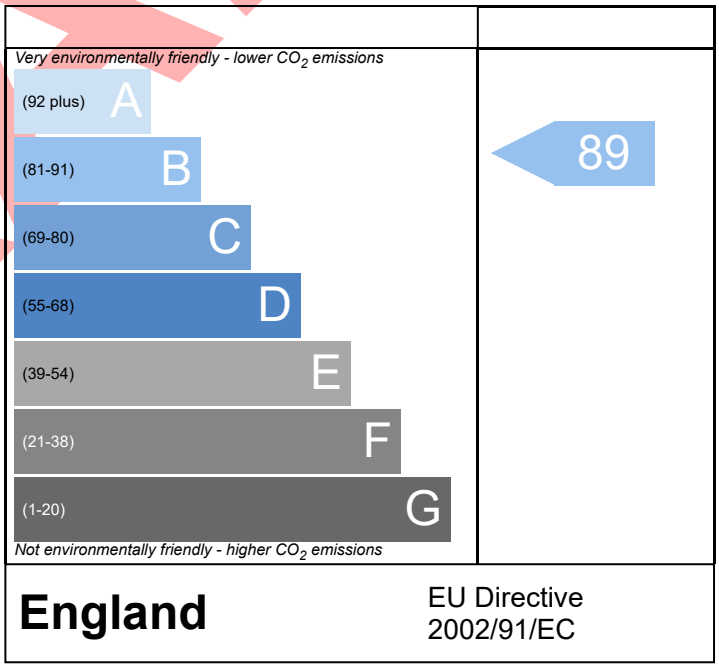
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

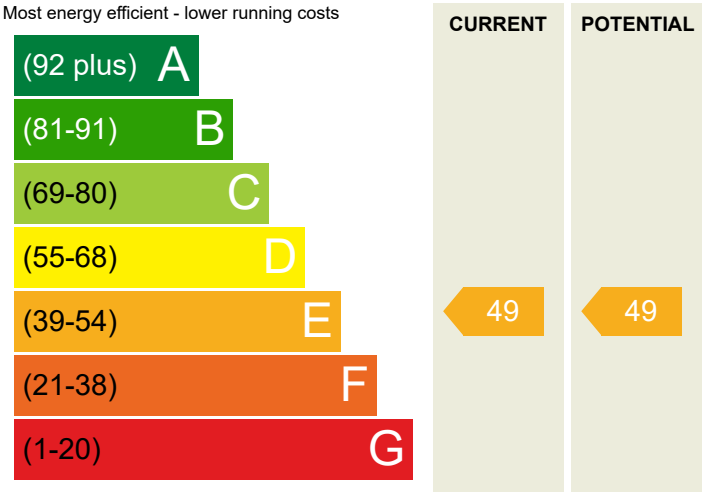
Energy Report

Dwelling Address	
Reference	Flat 8 -Baseline
SAP Version	10.2
Assessment Date	30/04/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	59

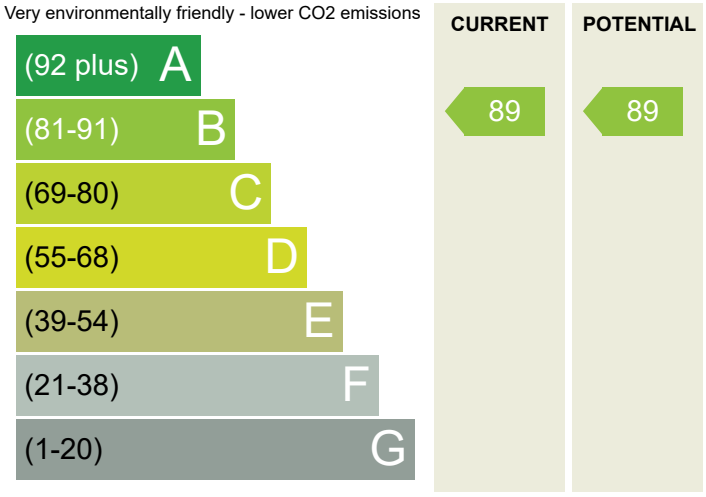
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

Energy Report

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£44	£44	
Heating	£692	£692	
Hot Water	£655	£655	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1390	£1390	

Estimated energy use and potential savings

Space Heating
2501
kWh per year

Water Heating
2366
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 9	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	50 E	**DER**	14.08	**TER**	11.18
Environmental	90 B	**% DER < TER**			-25.94
CO_2 Emissions (t/year)	0.69	**DFEE**	58.55	**TFEE**	23.21
Compliance Check	See BREL	**% DFEE < TFEE**			-152.30
% DPER < TPER	-148.85	**DPER**	146.85	**TPER**	59.01

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northeast	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	371.71	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	10.07 m	58.22 m²	2.73 m

8.0 Living Area	29.09	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	27.49	21.94	0.00	None	5.55	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	33.47	0.00	None
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	45.43	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	111.06

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	58.22	58.22	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Timber I-joists, carpeted	30.00	58.22

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	4.45	
NW Windows	Windows	External Wall 1	North East	1.10	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	

Summary for Input Data

SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 9	Issued on Date	15/06/2026
Assessment Reference	Baseline	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	50 E	DER	14.08	TER	11.18
Environmental	90 B	% DER < TER			-25.94
CO_2 Emissions (t/year)	0.69	DFEE	58.55	TFEE	23.21
Compliance Check	See BREL	% DFEE < TFEE			-152.30
% DPER < TPER	-148.85	DPER	146.85	TPER	59.01

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client			

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8654	0.8485	0.8315	0.7466	0.7297	0.6448	0.6448	0.6279	0.6788	0.7297	0.7636	0.7976	(22b)
Effective ac	0.8745	0.8599	0.8457	0.7787	0.7662	0.7079	0.7079	0.6971	0.7304	0.7662	0.7916	0.8180	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
External Roof 1	58.2200		58.2200	0.1600	9.3152	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			85.7100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8780			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21640.7200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		371.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)		17.1420 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	39.0200 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	45.1045	44.3568	40.8453	40.1883	37.1299	37.1299	36.5635	38.3079	40.1883	41.5174	42.9069	(38)

Heat transfer coeff

	84.8871	84.1244	83.3768	79.8653	79.2083	76.1498	76.1498	75.5834	77.3279	79.2083	80.5374	81.9269 (39)
Average = Sum(39)m / 12 =												79.8621

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4580	1.4449	1.4321	1.3718	1.3605	1.3080	1.3080	1.2982	1.3282	1.3605	1.3833	1.4072	(40)
HLP (average)												1.3717	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9309 (42)

Hot water usage for mixer showers

	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188 (42a)

Hot water usage for baths

	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)

Hot water usage for other uses

	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)

Average daily hot water use (litres/day) 125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	522.4665	548.6592	560.9425	559.1933	550.3056	526.1062	505.6798	495.0411	492.5073	489.1404	491.7039	504.8733	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	70.8153	71.4574	72.0981	75.2682	75.8925	78.9406	78.9406	79.5321	77.7379	75.8925	74.6400	73.3741	
alpha	5.7210	5.7638	5.8065	6.0179	6.0595	6.2627	6.2627	6.3021	6.1825	6.0595	5.9760	5.8916	
util living area													
	0.9979	0.9967	0.9938	0.9840	0.9505	0.8272	0.6447	0.6779	0.8928	0.9823	0.9959	0.9983	(86)
MIT	19.8548	19.9664	20.1648	20.4624	20.7237	20.9321	20.9882	20.9842	20.8780	20.5559	20.1876	19.8781	(87)
Th 2	19.7191	19.7290	19.7388	19.7850	19.7937	19.8346	19.8346	19.8422	19.8188	19.7937	19.7761	19.7578	(88)
util rest of house													

	0.9969	0.9951	0.9902	0.9737	0.9149	0.7204	0.4843	0.5212	0.8104	0.9687	0.9934	0.9974	(89)
MIT 2	18.4270	18.5769	18.8368	19.2466	19.5653	19.8018	19.8323	19.8386	19.7470	19.3714	18.8948	18.4854	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.1404	19.2712	19.5003	19.8541	20.1441	20.3666	20.4098	20.4110	20.3121	19.9632	19.5407	19.1813	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1404	19.2712	19.5003	19.8541	20.1441	20.3666	20.4098	20.4110	20.3121	19.9632	19.5407	19.1813	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9962	0.9942	0.9894	0.9745	0.9273	0.7738	0.5660	0.6013	0.8498	0.9711	0.9927	0.9969	(94)
Useful gains	520.4719	545.4891	554.9694	544.9261	510.3065	407.0923	286.2387	297.6690	418.5364	475.0214	488.1209	503.2846	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1259.7587	1208.9668	1083.9243	874.8498	668.8413	439.1232	290.1187	303.1674	480.3714	741.6455	1001.9443	1227.3694	(97)
Space heating kWh	550.0294	445.8570	393.5424	237.5450	117.9499	0.0000	0.0000	0.0000	0.0000	198.3683	369.9529	538.7191	(98a)
Space heating requirement - total per year (kWh/year)												2851.9640	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	550.0294	445.8570	393.5424	237.5450	117.9499	0.0000	0.0000	0.0000	0.0000	198.3683	369.9529	538.7191	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2851.9640	
Space heating per m2											(98c) / (4) =	48.9860	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	550.0294	445.8570	393.5424	237.5450	117.9499	0.0000	0.0000	0.0000	0.0000	198.3683	369.9529	538.7191	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	550.0294	445.8570	393.5424	237.5450	117.9499	0.0000	0.0000	0.0000	0.0000	198.3683	369.9529	538.7191	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2851.9640	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2359.4492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	163.0867	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5374.4999	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2851.9640	16.4900	470.2889	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	16.4900	389.0732	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	16.4900	26.8930	(250)
Additional standing charges			0.0000	(251)
Total energy cost			886.2550	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.0910	(257)
SAP value		49.8951	
SAP rating (Section 12)		50	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2851.9640	0.1548	441.3944	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			774.6629	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	163.0867	0.1443	23.5385	(268)
Total CO2, kg/year			798.2014	(272)
CO2 emissions per m2			13.7100	(273)
EI value			89.6378	
EI rating			90	(274)
EI band			B	

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b) x	2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.7127	0.6788	0.6788	0.6279	0.6279	0.5600	0.5770	0.5430	0.5600	0.5939	0.5939	0.6448	(22b)
Effective ac	0.7540	0.7304	0.7304	0.6971	0.6971	0.6568	0.6664	0.6474	0.6568	0.6764	0.6764	0.7079	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
External Roof 1	58.2200		58.2200	0.1600	9.3152	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			85.7100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8780			(33)

Main dwelling					
Party Wall to Adj Property	33.4700	0.0000	0.0000	180.0000	6024.6000 (32)
Party Wall to Adj Flat	45.4300	0.0000	0.0000	180.0000	8177.4000 (32)
Party Floor 1	58.2200			30.0000	1746.6000 (32d)
Internal Walls	111.0600			9.0000	999.5400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 21640.7200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	371.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)	17.1420 (36)
Point Thermal bridges	(36a) = 0.0000
Total fabric heat loss	(33) + (36) + (36a) = 39.0200 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.5464	38.3079	38.3079	36.5635	36.5635	34.4490	34.9550	33.9581	34.4490	35.4760	35.4760	37.1299	(38)
Heat transfer coeff	78.5664	77.3279	77.3279	75.5834	75.5834	73.4690	73.9749	72.9781	73.4690	74.4960	74.4960	76.1498	(39)
Average = Sum(39)m / 12 =												75.2852	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3495	1.3282	1.3282	1.2982	1.2982	1.2619	1.2706	1.2535	1.2619	1.2796	1.2796	1.3080	(40)
HLP (average)												1.2931	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309	(42)
Hot water usage for mixer showers	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)
Hot water usage for baths	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												125.7000	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
									Total per year (kWh/year) = Sum(64)m =			2359.4492	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	12.9236	0.4600	0.7000	0.7700	3.1722	(75)
Southwest	4.4500	40.4699	0.4600	0.7000	0.7700	40.1866	(79)

Solar gains	43.3588	67.4204	93.7963	124.6046	140.3662	151.2008	143.3455	130.9389	111.7795	80.3225	53.4001	36.6282	(83)
Total gains	526.5195	548.2074	559.4296	561.6095	550.0723	536.0800	513.5516	504.4933	499.7086	493.7908	497.8572	507.9723	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	76.5125	77.7379	77.7379	79.5321	79.5321	81.8211	81.2615	82.3714	81.8211	80.6931	80.6931	78.9406	
alpha	6.1008	6.1825	6.1825	6.3021	6.3021	6.4547	6.4174	6.4914	6.4547	6.3795	6.3795	6.2627	
util living area	0.9970	0.9955	0.9904	0.9722	0.9003	0.6652	0.4451	0.4612	0.7881	0.9656	0.9930	0.9975	(86)
MIT	20.0617	20.1620	20.3536	20.6179	20.8573	20.9860	20.9991	20.9989	20.9577	20.7079	20.3802	20.0829	(87)
Th 2	19.8023	19.8188	19.8188	19.8422	19.8422	19.8708	19.8639	19.8774	19.8708	19.8569	19.8569	19.8346	(88)
util rest of house	0.9955	0.9932	0.9849	0.9542	0.8350	0.5263	0.2828	0.3004	0.6665	0.9395	0.9886	0.9962	(89)
MIT 2	18.7533	18.8935	19.1364	19.4815	19.7454	19.8670	19.8639	19.8774	19.8538	19.6032	19.2008	18.8050	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.4071	19.5273	19.7446	20.0493	20.3010	20.4261	20.4311	20.4377	20.4054	20.1552	19.7901	19.4435	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.4071	19.5273	19.7446	20.0493	20.3010	20.4261	20.4311	20.4377	20.4054	20.1552	19.7901	19.4435	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9948	0.9924	0.9845	0.9582	0.8644	0.5969	0.3642	0.3811	0.7283	0.9478	0.9882	0.9956	(94)
Useful gains	523.7682	544.0355	550.7323	538.1174	475.4987	319.9781	187.0527	192.2687	363.9472	468.0375	492.0020	505.7152	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)
Heat loss rate W	1124.0533	1076.9697	954.5822	767.1188	551.8337	325.1804	187.2362	192.4977	382.4320	637.3277	878.3157	1092.2577	(97)
Space heating kWh	446.6121	358.1318	300.4644	164.8810	56.7932	0.0000	0.0000	0.0000	0.0000	125.9519	278.1459	436.3876	(98a)
Space heating requirement - total per year (kWh/year)												2167.3678	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	446.6121	358.1318	300.4644	164.8810	56.7932	0.0000	0.0000	0.0000	0.0000	125.9519	278.1459	436.3876	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2167.3678	
Space heating per m2											(98c) / (4) =	37.2272	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	446.6121	358.1318	300.4644	164.8810	56.7932	0.0000	0.0000	0.0000	0.0000	125.9519	278.1459	436.3876	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	446.6121	358.1318	300.4644	164.8810	56.7932	0.0000	0.0000	0.0000	0.0000	125.9519	278.1459	436.3876	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 2167.3678 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2359.4492 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 163.0867 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	4689.9037 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2167.3678	27.6700	599.7107	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	27.6700	652.8596	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	27.6700	45.1261	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1297.6964	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2167.3678	0.1557	337.4053	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			670.6737	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	163.0867	0.1443	23.5385	(268)
Total CO2, kg/year			694.2122	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2167.3678	1.5764	3416.5727	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	1.5223	3591.7963	(278)
Space and water heating			7008.3690	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	163.0867	1.5338	250.1478	(282)
Total Primary energy kWh/year			7258.5168	(286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating: E 50
Current environmental impact rating: B 90

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 50
Potential environmental impact rating: B 90

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current	Potential	Saving
Electricity	£1298	£1298	£0
Space heating	£600	£600	£0
Water heating	£653	£653	£0
Lighting	£45	£45	£0
Total cost of fuels	£1298	£1298	£0
Total cost of uses	£1298	£1298	£0
Delivered energy	81 kWh/m²	81 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m²	12 kg/m²	12 kg/m²	0 kg/m²
Primary energy	125 kWh/m²	125 kWh/m²	0 kWh/m²

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8758 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8654	0.8485	0.8315	0.7466	0.7297	0.6448	0.6448	0.6279	0.6788	0.7297	0.7636	0.7976	(22b)
Effective ac	0.8745	0.8599	0.8457	0.7787	0.7662	0.7079	0.7079	0.6971	0.7304	0.7662	0.7916	0.8180	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
External Roof 1	58.2200		58.2200	0.1600	9.3152	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			85.7100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8780			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21640.7200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		371.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)		17.1420 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	39.0200 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	45.1045	44.3568	40.8453	40.1883	37.1299	37.1299	36.5635	38.3079	40.1883	41.5174	42.9069	(38)
Heat transfer coeff	84.8871	84.1244	83.3768	79.8653	79.2083	76.1498	76.1498	75.5834	77.3279	79.2083	80.5374	81.9269	(39)
Average = Sum(39)m / 12 =												79.8621	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4580	1.4449	1.4321	1.3718	1.3605	1.3080	1.3080	1.2982	1.3282	1.3605	1.3833	1.4072	(40)
HLP (average)												1.3717	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9309 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)

Hot water usage for baths

24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day)		125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)

Water storage loss (or HIU loss):

Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
									Total per year (kWh/year) = Sum(64)m =			2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	522.4665	548.6592	560.9425	559.1933	550.3056	526.1062	505.6798	495.0411	492.5073	489.1404	491.7039	504.8733	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	70.8153	71.4574	72.0981	75.2682	75.8925	78.9406	78.9406	79.5321	77.7379	75.8925	74.6400	73.3741	
alpha	5.7210	5.7638	5.8065	6.0179	6.0595	6.2627	6.2627	6.3021	6.1825	6.0595	5.9760	5.8916	
util living area													
	0.9979	0.9967	0.9938	0.9840	0.9505	0.8272	0.6447	0.6779	0.8928	0.9823	0.9959	0.9983	(86)
MIT	19.8548	19.9664	20.1648	20.4624	20.7237	20.9321	20.9882	20.9842	20.8780	20.5559	20.1876	19.8781	(87)
Th 2	19.7191	19.7290	19.7388	19.7850	19.7937	19.8346	19.8346	19.8422	19.8188	19.7937	19.7761	19.7578	(88)
util rest of house													
	0.9969	0.9951	0.9902	0.9737	0.9149	0.7204	0.4843	0.5212	0.8104	0.9687	0.9934	0.9974	(89)
MIT 2	18.4270	18.5769	18.8368	19.2466	19.5653	19.8018	19.8323	19.8386	19.7470	19.3714	18.8948	18.4854	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.1404	19.2712	19.5003	19.8541	20.1441	20.3666	20.4098	20.4110	20.3121	19.9632	19.5407	19.1813	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1404	19.2712	19.5003	19.8541	20.1441	20.3666	20.4098	20.4110	20.3121	19.9632	19.5407	19.1813	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9962	0.9942	0.9894	0.9745	0.9273	0.7738	0.5660	0.6013	0.8498	0.9711	0.9927	0.9969	(94)
Useful gains	520.4719	545.4891	554.9694	544.9261	510.3065	407.0923	286.2387	297.6690	418.5364	475.0214	488.1209	503.2846	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1259.7587	1208.9668	1083.9243	874.8498	668.8413	439.1232	290.1187	303.1674	480.3714	741.6455	1001.9443	1227.3694	(97)
Space heating kWh													
	550.0294	445.8570	393.5424	237.5450	117.9499	0.0000	0.0000	0.0000	0.0000	198.3683	369.9529	538.7191	(98a)
Space heating requirement - total per year (kWh/year)												2851.9640	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	550.0294	445.8570	393.5424	237.5450	117.9499	0.0000	0.0000	0.0000	0.0000	198.3683	369.9529	538.7191	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2851.9640	
Space heating per m2											(98c) / (4) =	48.9860	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	550.0294	445.8570	393.5424	237.5450	117.9499	0.0000	0.0000	0.0000	0.0000	198.3683	369.9529	538.7191	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	550.0294	445.8570	393.5424	237.5450	117.9499	0.0000	0.0000	0.0000	0.0000	198.3683	369.9529	538.7191	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2851.9640	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2359.4492	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												163.0867	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5374.4999	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2851.9640	16.4900	470.2889	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	16.4900	389.0732	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	16.4900	26.8930	(250)
Additional standing charges			0.0000	(251)
Total energy cost			886.2550	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.0910	(257)
SAP value		49.8951	
SAP rating (Section 12)		50	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2851.9640	0.1548	441.3944	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			774.6629	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	163.0867	0.1443	23.5385 (268)
Total CO2, kg/year			798.2014 (272)
CO2 emissions per m2			13.7100 (273)
EI value			89.6378
EI rating			90 (274)
EI band			B

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	58.2200 (1b)	x 2.7300 (2b)	= 158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 158.9406	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8758 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.7127	0.6788	0.6788	0.6279	0.6279	0.5600	0.5770	0.5430	0.5600	0.5939	0.5939	0.6448	(22b)
Effective ac	0.7540	0.7304	0.7304	0.6971	0.6971	0.6568	0.6664	0.6474	0.6568	0.6764	0.6764	0.7079	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
External Roof 1	58.2200		58.2200	0.1600	9.3152	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			85.7100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8780			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21640.7200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		371.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)		17.1420 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	39.0200 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.5464	38.3079	38.3079	36.5635	36.5635	34.4490	34.9550	33.9581	34.4490	35.4760	35.4760	37.1299	(38)
Heat transfer coeff	78.5664	77.3279	77.3279	75.5834	75.5834	73.4690	73.9749	72.9781	73.4690	74.4960	74.4960	76.1498	(39)
Average = Sum(39)m / 12 =												75.2852	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3495	1.3282	1.3282	1.2982	1.2982	1.2619	1.2706	1.2535	1.2619	1.2796	1.2796	1.3080	(40)
HLP (average)												1.2931	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.9309 (42)
Hot water usage for mixer showers	

	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)
Hot water usage for baths													
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses													
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												125.7000	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	12.9236	0.4600	0.7000	0.7700	3.1722	(75)
Southwest	4.4500	40.4699	0.4600	0.7000	0.7700	40.1866	(79)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	43.3588	67.4204	93.7963	124.6046	140.3662	151.2008	143.3455	130.9389	111.7795	80.3225	53.4001	36.6282	(83)
Total gains	526.5195	548.2074	559.4296	561.6095	550.0723	536.0800	513.5516	504.4933	499.7086	493.7908	497.8572	507.9723	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	76.5125	77.7379	77.7379	79.5321	79.5321	81.8211	81.2615	82.3714	81.8211	80.6931	80.6931	78.9406	
alpha	6.1008	6.1825	6.1825	6.3021	6.3021	6.4547	6.4174	6.4914	6.4547	6.3795	6.3795	6.2627	
util living area													
	0.9970	0.9955	0.9904	0.9722	0.9003	0.6652	0.4451	0.4612	0.7881	0.9656	0.9930	0.9975	(86)
MIT	20.0617	20.1620	20.3536	20.6179	20.8573	20.9860	20.9991	20.9989	20.9577	20.7079	20.3802	20.0829	(87)
Th 2	19.8023	19.8188	19.8188	19.8422	19.8422	19.8708	19.8639	19.8774	19.8708	19.8569	19.8569	19.8346	(88)
util rest of house													
	0.9955	0.9932	0.9849	0.9542	0.8350	0.5263	0.2828	0.3004	0.6665	0.9395	0.9886	0.9962	(89)
MIT 2	18.7533	18.8935	19.1364	19.4815	19.7454	19.8670	19.8639	19.8774	19.8538	19.6032	19.2008	18.8050	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.4071	19.5273	19.7446	20.0493	20.3010	20.4261	20.4311	20.4377	20.4054	20.1552	19.7901	19.4435	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.4071	19.5273	19.7446	20.0493	20.3010	20.4261	20.4311	20.4377	20.4054	20.1552	19.7901	19.4435	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9948	0.9924	0.9845	0.9582	0.8644	0.5969	0.3642	0.3811	0.7283	0.9478	0.9882	0.9956	(94)
Useful gains	523.7682	544.0355	550.7323	538.1174	475.4987	319.9781	187.0527	192.2687	363.9472	468.0375	492.0020	505.7152	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)

Heat loss rate W

1124.0533	1076.9697	954.5822	767.1188	551.8337	325.1804	187.2362	192.4977	382.4320	637.3277	878.3157	1092.2577	(97)

Space heating kWh

446.6121	358.1318	300.4644	164.8810	56.7932	0.0000	0.0000	0.0000	0.0000	125.9519	278.1459	436.3876	(98a)

Space heating requirement - total per year (kWh/year) 2167.3678

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

446.6121	358.1318	300.4644	164.8810	56.7932	0.0000	0.0000	0.0000	0.0000	125.9519	278.1459	436.3876	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 2167.3678

Space heating per m2 (98c) / (4) = 37.2272 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	446.6121	358.1318	300.4644	164.8810	56.7932	0.0000	0.0000	0.0000	0.0000	125.9519	278.1459	436.3876	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	446.6121	358.1318	300.4644	164.8810	56.7932	0.0000	0.0000	0.0000	0.0000	125.9519	278.1459	436.3876	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 2167.3678 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 2359.4492 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 163.0867 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation 0.0000 (233)
Wind generation 0.0000 (234)
Hydro-electric generation (Appendix N) 0.0000 (235a)
Electricity generated - Micro CHP (Appendix N) 0.0000 (235)
Appendix Q - special features
Energy saved or generated -0.0000 (236)
Energy used 0.0000 (237)
Total delivered energy for all uses 4689.9037 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2167.3678	27.6700	599.7107	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	27.6700	652.8596	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	27.6700	45.1261	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1297.6964	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2167.3678	0.1557	337.4053	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			670.6737	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	163.0867	0.1443	23.5385	(268)
Total CO2, kg/year			694.2122	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2167.3678	1.5764	3416.5727	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	1.5223	3591.7963	(278)
Space and water heating			7008.3690	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	163.0867	1.5338	250.1478	(282)
Total Primary energy kWh/year			7258.5168	(286)

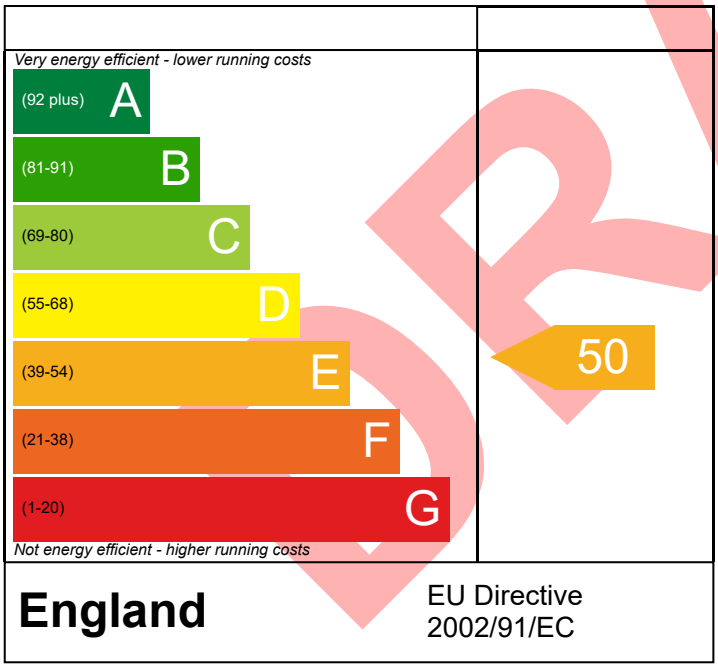
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.22 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

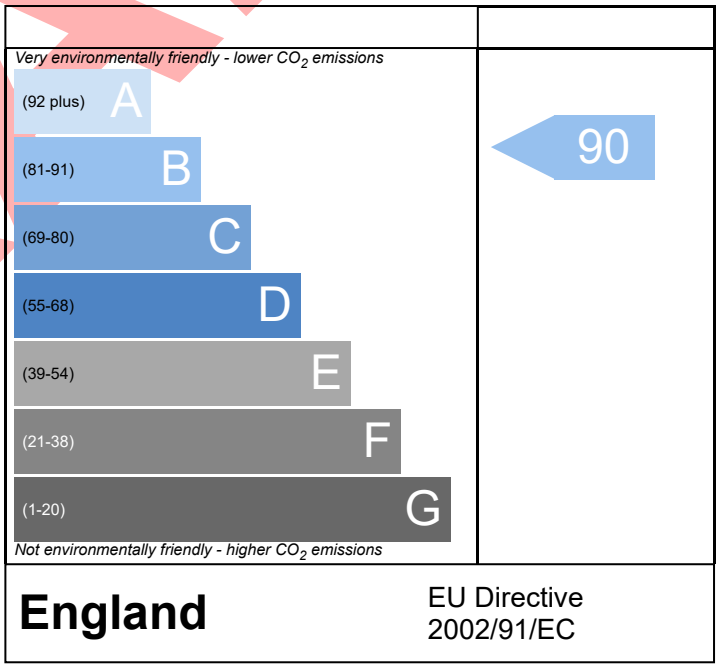
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

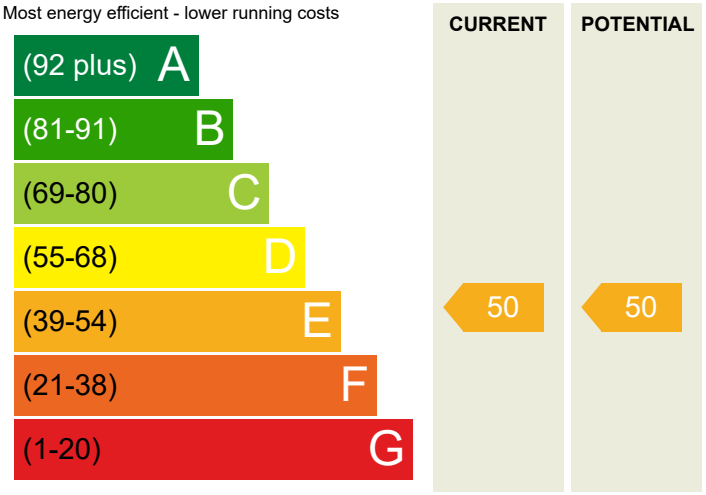
Energy Report

Dwelling Address	
Reference	Flat 9-Baseline
SAP Version	10.2
Assessment Date	08/05/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	58

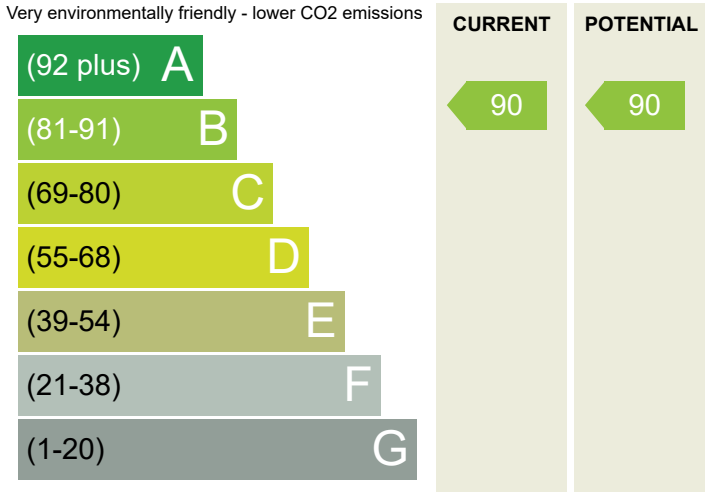
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£45	£45	
Heating	£600	£600	
Hot Water	£653	£653	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1298	£1298	

Estimated energy use and potential savings

Space Heating
2167
kWh per year

Water Heating
2359
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

Plot Reference	Flat 10	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	43 E	**DER**	16.12	**TER**	13.06
Environmental	88 B	**% DER < TER**			-23.43
CO_2 Emissions (t/year)	0.79	**DFEE**	72.27	**TFEE**	32.29
Compliance Check	See BREL	**% DFEE < TFEE**			-123.83
% DPER < TPER	-142.98	**DPER**	167.71	**TPER**	69.02

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	328.05	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.17 m	58.61 m²	2.73 m

8.0 Living Area	31.93	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.18	190.00	57.79	51.00	0.00	None	6.79	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	36.17	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	82.28

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	58.61	58.61	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)

Summary for Input Data

elmhurst energy

Party Floor 1	Lowest occupied	Timber I-joists, carpeted		30.00	58.61

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	2.96	
SE Windows	Windows	External Wall 1	South East	2.19	
NE Windows	Windows	External Wall 1	North East	1.64	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E7 Party floor between dwellings (in blocks of flats)		21.17			Yes
E14 Flat roof		21.17			Yes
E18 Party wall between dwellings		10.92			Yes
E2 Other lintels (including other steel lintels)		4.10			No
E3 Sill		4.10			No
E4 Jamb		4.65			No

Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	

22.0 Lighting

No Fixed Lighting	No				
	Name	**Efficacy**	**Power**	**Capacity**	**Count**
	Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

Summary for Input Data

elmhurst energy

27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
Immersion Heater	Single	
Cold Water Source	From mains	
Bath Count	1	

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over Bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

34.0 Small-scale Hydro	None	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 10	**Issued on Date**	15/06/2026
Assessment Reference	Baseline	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	43 E	**DER**	16.12	**TER**	13.06
Environmental	88 B	**% DER < TER**			-23.43
CO_2 Emissions (t/year)	0.79	**DFEE**	72.27	**TFEE**	32.29
Compliance Check	See BREL	**% DFEE < TFEE**			-123.83
% DPER < TPER	-142.98	**DPER**	167.71	**TPER**	69.02

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client			

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0319	1.0117	0.9915	0.8903	0.8701	0.7689	0.7689	0.7487	0.8094	0.8701	0.9105	0.9510	(22b)
Effective ac	1.0319	1.0117	0.9915	0.8963	0.8785	0.7956	0.7956	0.7803	0.8275	0.8785	0.9145	0.9522	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1800	9.1800	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.4019			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Internal Walls			82.2800			9.0000	740.5200	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19226.9100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		328.0483 (35)
Thermal bridges (Default value 0.200 * total exposed area)		23.2800 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	46.6819 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	53.4203	52.3538	47.3275	46.3871	42.0094	42.0094	41.1987	43.6956	46.3871	48.2895	50.2784	(38)

Heat transfer coeff

	101.1706	100.1022	99.0357	94.0094	93.0690	88.6913	88.6913	87.8806	90.3775	93.0690	94.9714	96.9603	(39)
Average = Sum(39)m / 12 =												94.0024	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7262	1.7079	1.6897	1.6040	1.5879	1.5132	1.5132	1.4994	1.5420	1.5879	1.6204	1.6543	(40)
HLP (average)												1.6039	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421	(42)
Hot water usage for mixer showers													
	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)
Hot water usage for baths													
	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)
Hot water usage for other uses													
	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)
Average daily hot water use (litres/day)												126.1167	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m													
	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
									Total per year (kWh/year) = Sum(64)m =			2366.3713	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.3391	19.8414	16.1361	12.2161	9.1317	7.7093	8.3302	10.8279	14.5332	18.4532	21.5376	22.9600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains													
	484.5162	482.2335	467.1493	438.5346	411.2136	386.3141	371.5410	374.8015	389.1041	414.6194	445.6426	472.6091	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579	(83)
Total gains	530.9288	562.6629	580.8393	585.5083	581.4099	557.7312	535.7851	521.3457	514.2617	504.4933	501.4840	512.1670	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	52.7901	53.3536	53.9281	56.8114	57.3855	60.2180	60.2180	60.7735	59.0944	57.3855	56.2359	55.0824	
alpha	4.5193	4.5569	4.5952	4.7874	4.8257	5.0145	5.0145	5.0516	4.9396	4.8257	4.7491	4.6722	
util living area													
	0.9963	0.9946	0.9906	0.9794	0.9466	0.8410	0.6809	0.7141	0.9008	0.9789	0.9937	0.9969	(86)
MIT	19.4297	19.5731	19.8298	20.2240	20.5655	20.8627	20.9646	20.9554	20.7775	20.3464	19.8720	19.4720	(87)
Th 2	19.5221	19.5352	19.5482	19.6104	19.6222	19.6776	19.6776	19.6879	19.6561	19.6222	19.5984	19.5737	(88)
util rest of house													

	0.9947	0.9921	0.9859	0.9674	0.9103	0.7339	0.5008	0.5413	0.8216	0.9640	0.9903	0.9955	(89)
MIT 2	17.7652	17.9569	18.2926	18.8328	19.2541	19.6043	19.6693	19.6759	19.5143	18.9970	18.3824	17.8543	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	18.6720	18.8373	19.1301	19.5907	19.9685	20.2898	20.3750	20.3729	20.2025	19.7321	19.1939	18.7356	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6720	18.8373	19.1301	19.5907	19.9685	20.2898	20.3750	20.3729	20.2025	19.7321	19.1939	18.7356	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9933	0.9904	0.9840	0.9671	0.9215	0.7894	0.6013	0.6377	0.8593	0.9656	0.9889	0.9944	(94)
Useful gains	527.3642	557.2718	571.5485	566.2669	535.7483	440.2960	322.1748	332.4520	441.9258	487.1144	495.9176	509.2782	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1454.0217	1395.1587	1250.8271	1005.0276	769.5446	504.6396	334.8070	349.1442	551.5272	849.9194	1148.5786	1409.3762	(97)
Space heating kWh													
	689.4332	563.0600	505.3832	315.9077	173.9444	0.0000	0.0000	0.0000	0.0000	269.9270	469.9159	669.6729	(98a)
Space heating requirement - total per year (kWh/year)												3657.2445	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	689.4332	563.0600	505.3832	315.9077	173.9444	0.0000	0.0000	0.0000	0.0000	269.9270	469.9159	669.6729	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3657.2445	
Space heating per m2											(98c) / (4) =	62.3997	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
Fraction of space heat from main system(s)	1.0000 (202)
Efficiency of main space heating system 1 (in %)	100.0000 (206)
Efficiency of main space heating system 2 (in %)	0.0000 (207)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	689.4332	563.0600	505.3832	315.9077	173.9444	0.0000	0.0000	0.0000	0.0000	269.9270	469.9159	669.6729	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	689.4332	563.0600	505.3832	315.9077	173.9444	0.0000	0.0000	0.0000	0.0000	269.9270	469.9159	669.6729	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year	
Space heating fuel - main system 1	3657.2445 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	100.0000
Water heating fuel used	2366.3713 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
Total electricity for the above, kWh/year	0.0000 (231)
Electricity for lighting (calculated in Appendix L)	157.8062 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	6181.4219 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3657.2445	16.4900	603.0796	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	16.4900	390.2146	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	16.4900	26.0222	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1019.3165	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.5417	(257)
SAP value		42.6202	
SAP rating (Section 12)		43	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3657.2445	0.1544	564.7504	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			898.9989	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	157.8062	0.1443	22.7763	(268)
Total CO2, kg/year			921.7752	(272)
CO2 emissions per m2			15.7300	(273)
EI value			88.0786	
EI rating			88	(274)
EI band			B	

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b) x	2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.8498	0.8094	0.8094	0.7487	0.7487	0.6677	0.6880	0.6475	0.6677	0.7082	0.7082	0.7689	(22b)
Effective ac	0.8611	0.8275	0.8275	0.7803	0.7803	0.7229	0.7366	0.7096	0.7229	0.7508	0.7508	0.7956	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1800	9.1800	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.4019			(33)

Main dwelling

Party Wall to Adj Flat	36.1700	0.0000	0.0000	180.0000	6510.6000 (32)
Party Floor 1	58.6100			30.0000	1758.3000 (32d)
Internal Walls	82.2800			9.0000	740.5200 (32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 19226.9100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 328.0483 (35)
Thermal bridges (Default value 0.200 * total exposed area) 23.2800 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 46.6819 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.4683	43.6956	43.6956	41.1987	41.1987	38.1721	38.8963	37.4695	38.1721	39.6422	39.6422	42.0094	(38)
Heat transfer coeff	92.1502	90.3775	90.3775	87.8806	87.8806	84.8540	85.5782	84.1514	84.8540	86.3241	86.3241	88.6913	(39)
Average = Sum(39)m / 12 =												87.4536	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5723	1.5420	1.5420	1.4994	1.4994	1.4478	1.4601	1.4358	1.4478	1.4729	1.4729	1.5132	(40)
HLP (average)												1.4921	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9421 (42)
Hot water usage for mixer showers

78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)

Hot water usage for baths

24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)

Hot water usage for other uses

34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)

Average daily hot water use (litres/day) 126.1167 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.3391	19.8414	16.1361	12.2161	9.1317	7.7093	8.3302	10.8279	14.5332	18.4532	21.5376	22.9600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains	484.5162	482.2335	467.1493	438.5346	411.2136	386.3141	371.5410	374.8015	389.1041	414.6194	445.6426	472.6091	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	12.9236	0.4600	0.7000	0.7700	4.7295	(75)
Southeast	2.1900	40.4699	0.4600	0.7000	0.7700	19.7772	(77)
Southwest	2.9600	40.4699	0.4600	0.7000	0.7700	26.7309	(79)

Solar gains	51.2376	79.9745	112.0314	150.0885	170.1223	183.7233	173.9883	158.1581	133.9603	95.5050	63.1666	43.2442	(83)
Total gains	535.7538	562.2080	579.1807	588.6231	581.3359	570.0374	545.5293	532.9596	523.0644	510.1244	508.8092	515.8533	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	57.9576	59.0944	59.0944	60.7735	60.7735	62.9411	62.4085	63.4667	62.9411	61.8693	61.8693	60.2180	
alpha	4.8638	4.9396	4.9396	5.0516	5.0516	5.1961	5.1606	5.2311	5.1961	5.1246	5.1246	5.0145	
util living area	0.9952	0.9932	0.9870	0.9676	0.9030	0.6954	0.4802	0.4981	0.8120	0.9635	0.9904	0.9959	(86)
MIT	19.7123	19.8436	20.0877	20.4334	20.7515	20.9608	20.9953	20.9946	20.9052	20.5518	20.1339	19.7512	(87)
Th 2	19.6337	19.6561	19.6561	19.6879	19.6879	19.7269	19.7175	19.7360	19.7269	19.7079	19.7079	19.6776	(88)
util rest of house	0.9930	0.9900	0.9802	0.9483	0.8393	0.5429	0.2848	0.3053	0.6884	0.9374	0.9850	0.9940	(89)
MIT 2	18.2024	18.3853	18.6948	19.1472	19.5092	19.7147	19.7172	19.7356	19.6835	19.3093	18.7921	18.2830	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.0250	19.1798	19.4536	19.8479	20.1859	20.3936	20.4135	20.4215	20.3491	19.9862	19.5231	19.0829	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0250	19.1798	19.4536	19.8479	20.1859	20.3936	20.4135	20.4215	20.3491	19.9862	19.5231	19.0829	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9916	0.9884	0.9788	0.9513	0.8673	0.6272	0.3923	0.4115	0.7550	0.9444	0.9840	0.9928	(94)
Useful gains	531.2677	555.7030	566.9225	559.9312	504.1833	357.5096	214.0290	219.3172	394.8901	481.7394	500.6694	512.1302	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)
Heat loss rate W	1283.1889	1227.3071	1089.3784	874.2272	631.5052	372.8127	215.1018	220.6037	436.9197	723.9304	994.7190	1240.1600	(97)
Space heating kWh	559.4294	451.3179	388.7071	226.2931	94.7275	0.0000	0.0000	0.0000	0.0000	180.1901	355.7157	541.6542	(98a)
Space heating requirement - total per year (kWh/year)												2798.0350	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	559.4294	451.3179	388.7071	226.2931	94.7275	0.0000	0.0000	0.0000	0.0000	180.1901	355.7157	541.6542	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2798.0350	
Space heating per m2											(98c) / (4) =	47.7399	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	559.4294	451.3179	388.7071	226.2931	94.7275	0.0000	0.0000	0.0000	0.0000	180.1901	355.7157	541.6542	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	559.4294	451.3179	388.7071	226.2931	94.7275	0.0000	0.0000	0.0000	0.0000	180.1901	355.7157	541.6542	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 2798.0350 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2366.3713 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 157.8062 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	5322.2125 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2798.0350	27.6700	774.2163	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	27.6700	654.7749	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	27.6700	43.6650	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1472.6562	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2798.0350	0.1552	434.2425	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			768.4911	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	157.8062	0.1443	22.7763	(268)
Total CO2, kg/year			791.2674	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2798.0350	1.5746	4405.7607	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	1.5223	3602.3424	(278)
Space and water heating			8008.1030	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	157.8062	1.5338	242.0483	(282)
Total Primary energy kWh/year			8250.1514	(286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating:	E 43
Current environmental impact rating:	B 88

N	Solar water heating		Not applicable
U	Solar photovoltaic panels		Not applicable
V2	Wind turbine		Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating:	E 43
Potential environmental impact rating:	B 88

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current	Potential	Saving
Electricity	£1473	£1473	£0
Space heating	£774	£774	£0
Water heating	£655	£655	£0
Lighting	£44	£44	£0
Total cost of fuels	£1473	£1473	£0
Total cost of uses	£1473	£1473	£0
Delivered energy	91 kWh/m²	91 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m²	14 kg/m²	14 kg/m²	0 kg/m²
Primary energy	141 kWh/m²	141 kWh/m²	0 kWh/m²

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8750 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0319	1.0117	0.9915	0.8903	0.8701	0.7689	0.7689	0.7487	0.8094	0.8701	0.9105	0.9510	(22b)
Effective ac	1.0319	1.0117	0.9915	0.8963	0.8785	0.7956	0.7956	0.7803	0.8275	0.8785	0.9145	0.9522	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1800	9.1800	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.4019			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Internal Walls			82.2800			9.0000	740.5200	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		19226.9100	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							328.0483	(35)
Thermal bridges (Default value 0.200 * total exposed area)							23.2800	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		46.6819	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	53.4203	52.3538	47.3275	46.3871	42.0094	42.0094	41.1987	43.6956	46.3871	48.2895	50.2784	(38)
Heat transfer coeff	101.1706	100.1022	99.0357	94.0094	93.0690	88.6913	88.6913	87.8806	90.3775	93.0690	94.9714	96.9603	(39)
Average = Sum(39)m / 12 =												94.0024	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7262	1.7079	1.6897	1.6040	1.5879	1.5132	1.5132	1.4994	1.5420	1.5879	1.6204	1.6543	(40)
HLP (average)												1.6039	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy											1.9421	(42)
Hot water usage for mixer showers	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)
Hot water usage for baths	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)
Hot water usage for other uses	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)
Average daily hot water use (litres/day)												126.1167	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)

a) If manufacturer declared loss factor is known (kWh/day): 1.2400 (48)
Temperature factor from Table 2b 0.6000 (49)
Enter (49) or (54) in (55) 0.7440 (55)
Total storage loss
23.0640 20.8320 23.0640 22.3200 23.0640 22.3200 23.0640 23.0640 22.3200 23.0640 22.3200 23.0640 (56)
If cylinder contains dedicated solar storage
23.0640 20.8320 23.0640 22.3200 23.0640 22.3200 23.0640 23.0640 22.3200 23.0640 22.3200 23.0640 (57)
Primary loss 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (59)
Combi loss 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (61)
Total heat required for water heating calculated for each month
240.2521 212.1330 224.1965 193.9737 185.9705 165.2993 161.3301 168.9085 172.0884 194.6465 210.3868 237.1858 (62)
WWHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63a)
PV diverter 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63b)
Solar input 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63c)
FGHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63d)
Output from w/h
240.2521 212.1330 224.1965 193.9737 185.9705 165.2993 161.3301 168.9085 172.0884 194.6465 210.3868 237.1858 (64)
Total per year (kWh/year) = Sum(64)m = 2366.3713 (64)
Electric shower(s)
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)
Heat gains from water heating, kWh/month
90.6663 80.2732 85.3278 74.9309 72.6176 65.3966 64.4247 66.9445 67.6540 75.5024 80.3882 89.6467 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5
22.3391 19.8414 16.1361 12.2161 9.1317 7.7093 8.3302 10.8279 14.5332 18.4532 21.5376 22.9600 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5
252.8779 255.5020 248.8894 234.8119 217.0417 200.3402 189.1825 186.5584 193.1710 207.2485 225.0187 241.7203 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5
48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 (69)
Pumps, fans 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)
-77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 (71)
Water heating gains (Table 5)
121.8632 119.4542 114.6879 104.0706 97.6043 90.8287 86.5923 89.9791 93.9639 101.4817 111.6503 120.4929 (72)
Total internal gains
484.5162 482.2335 467.1493 438.5346 411.2136 386.3141 371.5410 374.8015 389.1041 414.6194 445.6426 472.6091 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains 46.4126 80.4294 113.6900 146.9737 170.1963 171.4171 164.2441 146.5442 125.1576 89.8739 55.8414 39.5579 (83)
Total gains 530.9288 562.6629 580.8393 585.5083 581.4099 557.7312 535.7851 521.3457 514.2617 504.4933 501.4840 512.1670 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	52.7901	53.3536	53.9281	56.8114	57.3855	60.2180	60.2180	60.7735	59.0944	57.3855	56.2359	55.0824	
alpha	4.5193	4.5569	4.5952	4.7874	4.8257	5.0145	5.0145	5.0516	4.9396	4.8257	4.7491	4.6722	

util living area
0.9963 0.9946 0.9906 0.9794 0.9466 0.8410 0.6809 0.7141 0.9008 0.9789 0.9937 0.9969 (86)

MIT 19.4297 19.5731 19.8298 20.2240 20.5655 20.8627 20.9646 20.9554 20.7775 20.3464 19.8720 19.4720 (87)
Th 2 19.5221 19.5352 19.5482 19.6104 19.6222 19.6776 19.6776 19.6879 19.6561 19.6222 19.5984 19.5737 (88)
util rest of house
0.9947 0.9921 0.9859 0.9674 0.9103 0.7339 0.5008 0.5413 0.8216 0.9640 0.9903 0.9955 (89)
MIT 2 17.7652 17.9569 18.2926 18.8328 19.2541 19.6043 19.6693 19.6759 19.5143 18.9970 18.3824 17.8543 (90)
Living area fraction fLA = Living area / (4) = 0.5448 (91)
MIT 18.6720 18.8373 19.1301 19.5907 19.9685 20.2898 20.3750 20.3729 20.2025 19.7321 19.1939 18.7356 (92)
Temperature adjustment 0.0000
adjusted MIT 18.6720 18.8373 19.1301 19.5907 19.9685 20.2898 20.3750 20.3729 20.2025 19.7321 19.1939 18.7356 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9933	0.9904	0.9840	0.9671	0.9215	0.7894	0.6013	0.6377	0.8593	0.9656	0.9889	0.9944	(94)
Useful gains	527.3642	557.2718	571.5485	566.2669	535.7483	440.2960	322.1748	332.4520	441.9258	487.1144	495.9176	509.2782	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)

Heat loss rate W
1454.0217 1395.1587 1250.8271 1005.0276 769.5446 504.6396 334.8070 349.1442 551.5272 849.9194 1148.5786 1409.3762 (97)
Space heating kWh
689.4332 563.0600 505.3832 315.9077 173.9444 0.0000 0.0000 0.0000 0.0000 269.9270 469.9159 669.6729 (98a)
Space heating requirement - total per year (kWh/year) 3657.2445
Solar heating kWh
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (98b)
Solar heating contribution - total per year (kWh/year) 0.0000
Space heating kWh
689.4332 563.0600 505.3832 315.9077 173.9444 0.0000 0.0000 0.0000 0.0000 269.9270 469.9159 669.6729 (98c)
Space heating requirement after solar contribution - total per year (kWh/year) 3657.2445
Space heating per m2 (98c) / (4) = 62.3997 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	689.4332	563.0600	505.3832	315.9077	173.9444	0.0000	0.0000	0.0000	0.0000	269.9270	469.9159	669.6729	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	689.4332	563.0600	505.3832	315.9077	173.9444	0.0000	0.0000	0.0000	0.0000	269.9270	469.9159	669.6729	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3657.2445	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2366.3713	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												157.8062	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												6181.4219	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3657.2445	16.4900	603.0796	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	16.4900	390.2146	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	16.4900	26.0222	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1019.3165	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.5417	(257)
SAP value		42.6202	
SAP rating (Section 12)		43	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3657.2445	0.1544	564.7504	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			898.9989	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	157.8062	0.1443	22.7763 (268)
Total CO2, kg/year			921.7752 (272)
CO2 emissions per m2			15.7300 (273)
EI value			88.0786
EI rating			88 (274)
EI band			B

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8750 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.8498	0.8094	0.8094	0.7487	0.7487	0.6677	0.6880	0.6475	0.6677	0.7082	0.7082	0.7689	(22b)
Effective ac	0.8611	0.8275	0.8275	0.7803	0.7803	0.7229	0.7366	0.7096	0.7229	0.7508	0.7508	0.7956	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1800	9.1800	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.4019			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Internal Walls			82.2800			9.0000	740.5200	(32c)
Heat capacity Cm = Sum(A x k)				(28)...(30) + (32) + (32a)...(32e) =			19226.9100	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							328.0483	(35)
Thermal bridges (Default value 0.200 * total exposed area)							23.2800	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		46.6819	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.4683	43.6956	43.6956	41.1987	41.1987	38.1721	38.8963	37.4695	38.1721	39.6422	39.6422	42.0094	(38)
Heat transfer coeff	92.1502	90.3775	90.3775	87.8806	87.8806	84.8540	85.5782	84.1514	84.8540	86.3241	86.3241	88.6913	(39)
Average = Sum(39)m / 12 =												87.4536	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5723	1.5420	1.5420	1.4994	1.4994	1.4478	1.4601	1.4358	1.4478	1.4729	1.4729	1.5132	(40)
HLP (average)												1.4921	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421	(42)
Hot water usage for mixer showers	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)

Hot water usage for baths
24.5412 24.1768 23.6635 22.7172 22.0085 21.2228 20.7984 21.3081 21.8630 22.7038 23.6696 24.4583 (42b)
Hot water usage for other uses
34.5188 33.2635 32.0083 30.7531 29.4979 28.2426 28.2426 29.4979 30.7531 32.0083 33.2635 34.5188 (42c)
Average daily hot water use (litres/day) 126.1167 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m													
	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.3391	19.8414	16.1361	12.2161	9.1317	7.7093	8.3302	10.8279	14.5332	18.4532	21.5376	22.9600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains													
	484.5162	482.2335	467.1493	438.5346	411.2136	386.3141	371.5410	374.8015	389.1041	414.6194	445.6426	472.6091	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	12.9236	0.4600	0.7000	0.7700	4.7295	(75)
Southeast	2.1900	40.4699	0.4600	0.7000	0.7700	19.7772	(77)
Southwest	2.9600	40.4699	0.4600	0.7000	0.7700	26.7309	(79)

Solar gains	51.2376	79.9745	112.0314	150.0885	170.1223	183.7233	173.9883	158.1581	133.9603	95.5050	63.1666	43.2442	(83)
Total gains	535.7538	562.2080	579.1807	588.6231	581.3359	570.0374	545.5293	532.9596	523.0644	510.1244	508.8092	515.8533	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	57.9576	59.0944	59.0944	60.7735	60.7735	62.9411	62.4085	63.4667	62.9411	61.8693	61.8693	60.2180	
alpha	4.8638	4.9396	4.9396	5.0516	5.0516	5.1961	5.1606	5.2311	5.1961	5.1246	5.1246	5.0145	
util living area													
	0.9952	0.9932	0.9870	0.9676	0.9030	0.6954	0.4802	0.4981	0.8120	0.9635	0.9904	0.9959	(86)
MIT	19.7123	19.8436	20.0877	20.4334	20.7515	20.9608	20.9953	20.9946	20.9052	20.5518	20.1339	19.7512	(87)
Th 2	19.6337	19.6561	19.6561	19.6879	19.6879	19.7269	19.7175	19.7360	19.7269	19.7079	19.7079	19.6776	(88)
util rest of house													
	0.9930	0.9900	0.9802	0.9483	0.8393	0.5429	0.2848	0.3053	0.6884	0.9374	0.9850	0.9940	(89)
MIT 2	18.2024	18.3853	18.6948	19.1472	19.5092	19.7147	19.7172	19.7356	19.6835	19.3093	18.7921	18.2830	(90)
Living area fraction									fLA = Living area / (4) =			0.5448	(91)
MIT	19.0250	19.1798	19.4536	19.8479	20.1859	20.3936	20.4135	20.4215	20.3491	19.9862	19.5231	19.0829	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0250	19.1798	19.4536	19.8479	20.1859	20.3936	20.4135	20.4215	20.3491	19.9862	19.5231	19.0829	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9916	0.9884	0.9788	0.9513	0.8673	0.6272	0.3923	0.4115	0.7550	0.9444	0.9840	0.9928	(94)
Useful gains	531.2677	555.7030	566.9225	559.9312	504.1833	357.5096	214.0290	219.3172	394.8901	481.7394	500.6694	512.1302	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)

Heat loss rate W

1283.1889	1227.3071	1089.3784	874.2272	631.5052	372.8127	215.1018	220.6037	436.9197	723.9304	994.7190	1240.1600	(97)

Space heating kWh

559.4294	451.3179	388.7071	226.2931	94.7275	0.0000	0.0000	0.0000	0.0000	180.1901	355.7157	541.6542	(98a)

Space heating requirement - total per year (kWh/year) 2798.0350

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

559.4294	451.3179	388.7071	226.2931	94.7275	0.0000	0.0000	0.0000	0.0000	180.1901	355.7157	541.6542	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 2798.0350

Space heating per m2 (98c) / (4) = 47.7399 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	559.4294	451.3179	388.7071	226.2931	94.7275	0.0000	0.0000	0.0000	0.0000	180.1901	355.7157	541.6542	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	559.4294	451.3179	388.7071	226.2931	94.7275	0.0000	0.0000	0.0000	0.0000	180.1901	355.7157	541.6542	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 2798.0350 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2366.3713 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 157.8062 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N) 0.0000 (235a)

Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated -0.0000 (236)

Energy used 0.0000 (237)

Total delivered energy for all uses 5322.2125 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2798.0350	27.6700	774.2163	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	27.6700	654.7749	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	27.6700	43.6650	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1472.6562	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2798.0350	0.1552	434.2425	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			768.4911	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	157.8062	0.1443	22.7763	(268)
Total CO2, kg/year			791.2674	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2798.0350	1.5746	4405.7607	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	1.5223	3602.3424	(278)
Space and water heating			8008.1030	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	157.8062	1.5338	242.0483	(282)
Total Primary energy kWh/year			8250.1514	(286)

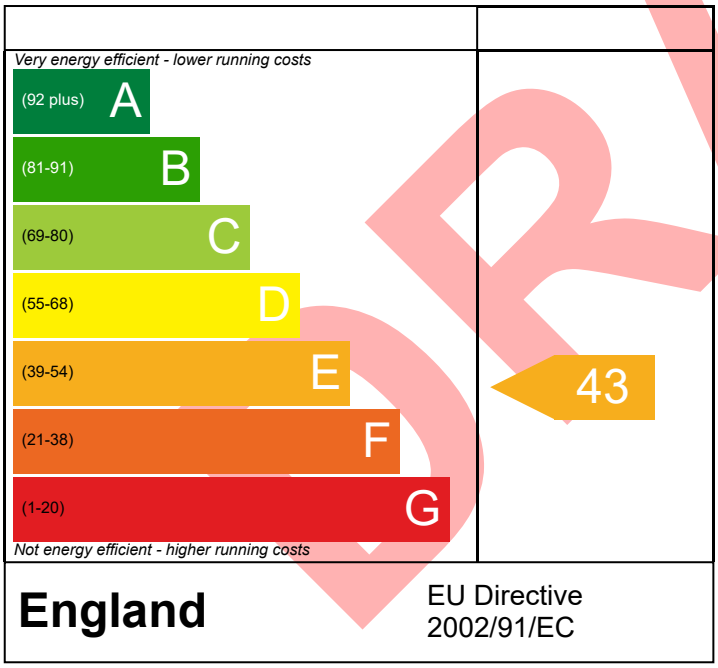
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.61 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

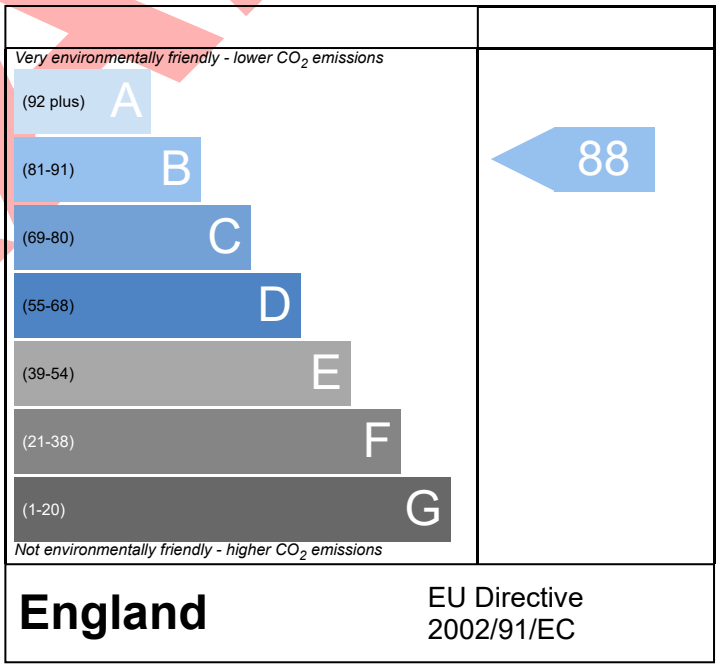
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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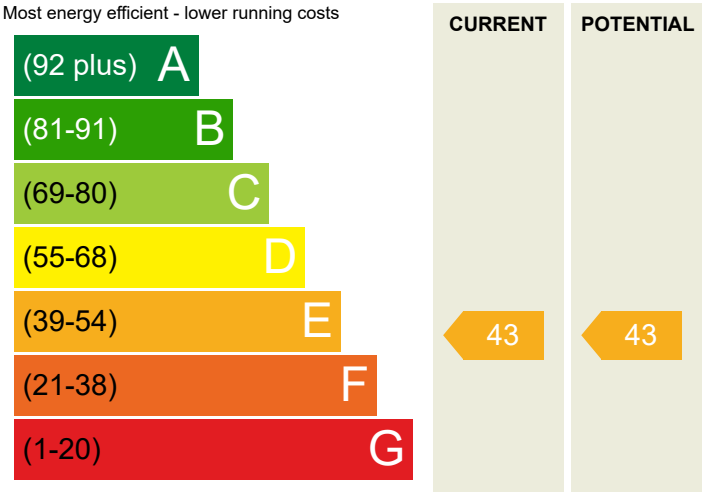
Energy Report

Dwelling Address	
Reference	Flat 10-Baseline
SAP Version	10.2
Assessment Date	08/05/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	59

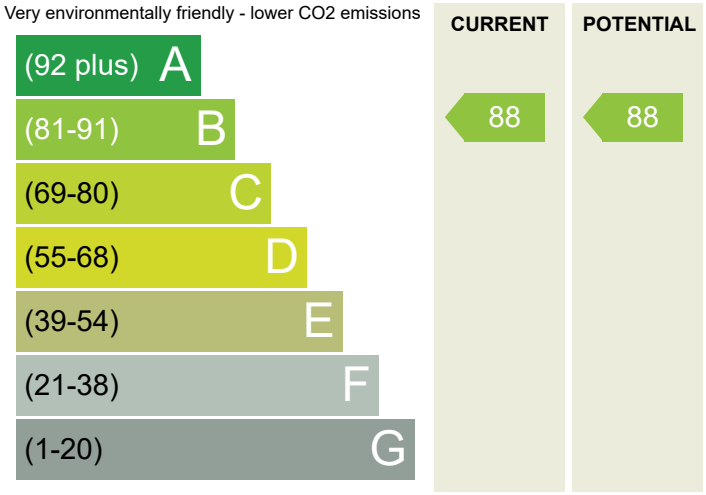
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

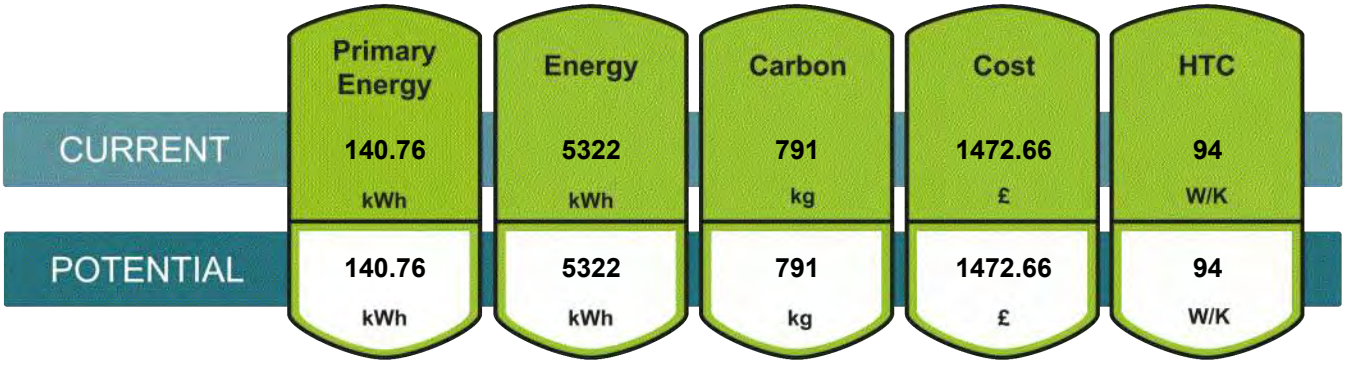


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m²K	Very Good
Roof	Average thermal transmittance 0.11 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£44	£44	You could save £0
Heating	£774	£774	
Hot Water	£655	£655	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1473	£1473	

Estimated energy use and potential savings

Space Heating
2798
kWh per year

Water Heating
2366
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

11. APPENDIX D SAP OUTPUT SHEETS_BE LEAN CASE

Summary for Input Data

Plot Reference	Flat 1	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	52 E	**DER**	14.49	**TER**	
Environmental	90 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.64	**DFEE**	55.15	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	151.19	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	254.27	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	7.40 m	50.01 m²	2.50 m

8.0 Living Area	23.40	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.26	17.00	18.50	11.07	0.00	None	7.43	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	17.70	0.00	None
Party Wall to Adj Flat	Filled Cavity with Edge Sealing	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	36.20	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall	Plasterboard on timber frame	9.00	91.70

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Timber I-joists, carpeted	20.00	50.01

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Suspended timber, insulation between joists	0.18	None	0.00	20.00	50.01

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Opening	Windows	External Wall 1	South West	7.43	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	3	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
LED Downlight	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	
Flue Gas Heat Recovery System	No	

Summary for Input Data

Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 1	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	52 E	**DER**	14.49	**TER**	
Environmental	90 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.64	**DFEE**	55.15	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	151.19	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b)	x 2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	125.0250	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9900	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0729	1.0518	1.0308	0.9256	0.9046	0.7994	0.7994	0.7783	0.8415	0.9046	0.9466	0.9887	(22b)
Effective ac	1.0729	1.0518	1.0308	0.9284	0.9091	0.8195	0.8195	0.8029	0.8540	0.9091	0.9481	0.9888	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.1800	9.0018	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.2600	2.8782	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.0616			(33)
Main dwelling								
Party Wall to Adj Property			17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat			36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1			50.0100			20.0000	1000.2000	(32b)
Internal Wall			91.7000			9.0000	825.3000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12715.8900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		254.2669 (35)
Thermal bridges (Default value 0.200 * total exposed area)		13.7020 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	34.7636 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	43.3964	42.5285	38.3030	37.5088	33.8115	33.8115	33.1268	35.2357	37.5088	39.1155	40.7953	(38)

Heat transfer coeff

79.0279	78.1600	77.2920	73.0666	72.2724	68.5751	68.5751	67.8904	69.9992	72.2724	73.8791	75.5588 (39)

Average = Sum(39)m / 12 = 73.0474

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5802	1.5629	1.5455	1.4610	1.4452	1.3712	1.3712	1.3575	1.3997	1.4452	1.4773	1.5109	(40)
HLP (average)												1.4607	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.6904 (42)

Hot water usage for mixer showers

72.2726	71.1864	69.6038	66.5756	64.3409	61.8487	60.4322	62.0029	63.7247	66.4005	69.4937	71.9956 (42a)

Hot water usage for baths

22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497 (42b)

Hot water usage for other uses

31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413 (42c)

Average daily hot water use (litres/day) 116.7415 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	126.9404	124.3553	121.1358	116.0698	112.0173	107.6360	105.8265	109.0307	112.4278	117.0437	122.1929	126.5867	(44)
Energy conte	201.0426	177.0803	186.1812	158.8937	150.7968	132.3511	127.9880	135.0027	138.6348	158.8273	174.0862	198.2042	(45)
Energy content (annual)										Total = Sum(45)m =		1939.0889	
Distribution loss (46)m = 0.15 x (45)m													
	30.1564	26.5620	27.9272	23.8341	22.6195	19.8527	19.1982	20.2504	20.7952	23.8241	26.1129	29.7306	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
										Total per year (kWh/year) = Sum(64)m =		2210.6489	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	85.2979	75.5448	80.3565	70.6882	68.5912	61.8627	61.0072	63.3396	63.9521	71.2613	75.7397	84.3541	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.2944	16.2489	13.2145	10.0042	7.4783	6.3135	6.8219	8.8674	11.9018	15.1121	17.6380	18.8028	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)													
	114.6477	112.4179	108.0060	98.1780	92.1924	85.9205	81.9989	85.1339	88.8223	95.7813	105.1940	113.3792	(72)
Total internal gains													
	433.3736	431.3791	418.1854	392.9116	368.9549	347.0019	333.8911	336.7908	349.2610	371.6658	399.0496	422.9158	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	36.7938	0.4600	0.7000	0.7700	61.0032	(79)

Solar gains	61.0032	103.9111	142.1757	176.1626	197.3168	195.8899	188.8587	173.0768	153.9462	114.8439	73.0678	52.2061	(83)
Total gains	494.3769	535.2902	560.3611	569.0742	566.2717	542.8918	522.7498	509.8675	503.2072	486.5097	472.1174	475.1219	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.6955	45.1918	45.6993	48.3421	48.8733	51.5084	51.5084	52.0279	50.4605	48.8733	47.8105	46.7476	
alpha	3.9797	4.0128	4.0466	4.2228	4.2582	4.4339	4.4339	4.4685	4.3640	4.2582	4.1874	4.1165	
util living area													
	0.9873	0.9811	0.9688	0.9384	0.8722	0.7204	0.5547	0.5840	0.7965	0.9384	0.9788	0.9890	(86)
MIT	19.3673	19.5564	19.8590	20.2988	20.6420	20.9028	20.9761	20.9704	20.8337	20.4073	19.8718	19.4121	(87)
Th 2	19.6279	19.6407	19.6535	19.7168	19.7289	19.7855	19.7855	19.7960	19.7636	19.7289	19.7046	19.6794	(88)
util rest of house													
	0.9831	0.9748	0.9576	0.9147	0.8196	0.6165	0.4127	0.4450	0.7060	0.9101	0.9704	0.9853	(89)

MIT 2	17.8007	18.0481	18.4372	19.0234	19.4295	19.7309	19.7785	19.7864	19.6566	19.1697	18.4921	17.8916	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.5337	18.7539	19.1024	19.6201	19.9968	20.2793	20.3388	20.3404	20.2074	19.7488	19.1376	18.6030	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5337	18.7539	19.1024	19.6201	19.9968	20.2793	20.3388	20.3404	20.2074	19.7488	19.1376	18.6030	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9784	0.9692	0.9517	0.9126	0.8323	0.6617	0.4796	0.5103	0.7419	0.9107	0.9656	0.9811	(94)
Useful gains	483.6859	518.7873	533.2958	519.3131	471.2818	359.2483	250.7240	260.1754	373.3484	443.0437	455.8866	466.1628	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1124.8620	1082.8183	974.0678	783.2836	599.6321	389.4550	256.3919	267.5139	427.5114	661.2038	889.3298	1088.2753	(97)
Space heating kWh	477.0351	379.0288	327.9344	190.0588	95.4926	0.0000	0.0000	0.0000	0.0000	162.3111	312.0791	462.8518	(98a)
Space heating requirement - total per year (kWh/year)												2406.7917	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	477.0351	379.0288	327.9344	190.0588	95.4926	0.0000	0.0000	0.0000	0.0000	162.3111	312.0791	462.8518	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2406.7917	
Space heating per m2											(98c) / (4) =	48.1262	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	477.0351	379.0288	327.9344	190.0588	95.4926	0.0000	0.0000	0.0000	0.0000	162.3111	312.0791	462.8518	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	477.0351	379.0288	327.9344	190.0588	95.4926	0.0000	0.0000	0.0000	0.0000	162.3111	312.0791	462.8518	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.0130	12.8462	11.5666	8.4742	6.5457	5.3479	5.9712	7.7616	10.0815	13.2275	14.9404	16.4580	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2406.7917	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2210.6489	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	129.2337	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4746.6743	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2406.7917	16.4900	396.8799	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	2210.6489	16.4900	364.5360	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	129.2337	16.4900	21.3106	(250)
Additional standing charges			0.0000	(251)
Total energy cost			782.7266	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.9658	(257)
SAP value		51.9242	
SAP rating (Section 12)		52	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2406.7917	0.1550	373.0018	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2210.6489	0.1412	312.2016	(264)
Space and water heating			685.2034	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	129.2337	0.1443	18.6524	(268)
Total CO2, kg/year			703.8558	(272)
CO2 emissions per m2			14.0700	(273)
EI value			90.0730	
EI rating			90	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b)	x 2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		125.0250	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9900	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0729	0.9887	0.9677	0.9046	0.9046	0.8415	0.8415	0.8204	0.8415	0.9466	0.9256	0.9887	(22b)
Effective ac	1.0729	0.9888	0.9682	0.9091	0.9091	0.8540	0.8540	0.8365	0.8540	0.9481	0.9284	0.9888	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.1800	9.0018	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.2600	2.8782	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.0616			(33)
Main dwelling								

Party Wall to Adj Property	17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat	36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1	50.0100			20.0000	1000.2000	(32b)
Internal Wall	91.7000			9.0000	825.3000	(32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 12715.8900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 254.2669 (35)
Thermal bridges (Default value 0.200 * total exposed area) 13.7020 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 34.7636 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	40.7953	39.9463	37.5088	37.5088	35.2357	35.2357	34.5145	35.2357	39.1155	38.3030	40.7953	(38)
Heat transfer coeff	79.0279	75.5588	74.7098	72.2724	72.2724	69.9992	69.9992	69.2780	69.9992	73.8791	73.0666	75.5588	(39)
Average = Sum(39)m / 12 =												72.9684	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5802	1.5109	1.4939	1.4452	1.4452	1.3997	1.3997	1.3853	1.3997	1.4773	1.4610	1.5109	(40)
HLP (average)												1.4591	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.6904 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	72.2726	71.1864	69.6038	66.5756	64.3409	61.8487	60.4322	62.0029	63.7247	66.4005	69.4937	71.9956	(42a)
Hot water usage for baths	22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497	(42b)
Hot water usage for other uses	31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413	(42c)
Average daily hot water use (litres/day)												116.7415	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	126.9404	124.3553	121.1358	116.0698	112.0173	107.6360	105.8265	109.0307	112.4278	117.0437	122.1929	126.5867	(44)
Energy conte	201.0426	177.0803	186.1812	158.8937	150.7968	132.3511	127.9880	135.0027	138.6348	158.8273	174.0862	198.2042	(45)
Energy content (annual)										Total = Sum(45)m =		1939.0889	
Distribution loss (46)m = 0.15 x (45)m	30.1564	26.5620	27.9272	23.8341	22.6195	19.8527	19.1982	20.2504	20.7952	23.8241	26.1129	29.7306	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
										Total per year (kWh/year) = Sum(64)m =		2210.6489	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month	85.2979	75.5448	80.3565	70.6882	68.5912	61.8627	61.0072	63.3396	63.9521	71.2613	75.7397	84.3541	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	18.2944	16.2489	13.2145	10.0042	7.4783	6.3135	6.8219	8.8674	11.9018	15.1121	17.6380	18.8028	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)	114.6477	112.4179	108.0060	98.1780	92.1924	85.9205	81.9989	85.1339	88.8223	95.7813	105.1940	113.3792	(72)
Total internal gains	433.3736	431.3791	418.1854	392.9116	368.9549	347.0019	333.8911	336.7908	349.2610	371.6658	399.0496	422.9158	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	46.3896	0.4600	0.7000	0.7700	76.9128	(79)

Solar gains	76.9128	111.8951	152.4928	193.4785	208.3854	224.6334	211.0798	196.4229	175.3780	130.8100	91.2565	62.8726	(83)
Total gains	510.2864	543.2742	570.6782	586.3902	577.3403	571.6354	544.9709	533.2137	524.6390	502.4758	490.3061	485.7884	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.6955	46.7476	47.2788	48.8733	48.8733	50.4605	50.4605	50.9858	50.4605	47.8105	48.3421	46.7476	
alpha	3.9797	4.1165	4.1519	4.2582	4.2582	4.3640	4.3640	4.3991	4.3640	4.1874	4.2228	4.1165	
util living area	0.9823	0.9758	0.9588	0.9186	0.8296	0.6379	0.4654	0.4706	0.7137	0.9070	0.9661	0.9842	(86)
MIT	19.5637	19.7568	20.0512	20.4271	20.7427	20.9446	20.9891	20.9890	20.9078	20.5527	20.1047	19.6235	(87)
Th 2	19.6279	19.6794	19.6921	19.7289	19.7289	19.7636	19.7636	19.7746	19.7636	19.7046	19.7168	19.6794	(88)
util rest of house	0.9760	0.9675	0.9439	0.8877	0.7611	0.5176	0.3150	0.3200	0.6004	0.8627	0.9521	0.9786	(89)
MIT 2	18.0500	18.3269	18.7026	19.1837	19.5335	19.7387	19.7615	19.7726	19.7157	19.3188	18.7914	18.1604	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.7583	18.9960	19.3336	19.7655	20.0993	20.3030	20.3359	20.3418	20.2735	19.8961	19.4059	18.8450	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7583	18.9960	19.3336	19.7655	20.0993	20.3030	20.3359	20.3418	20.2735	19.8961	19.4059	18.8450	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9706	0.9618	0.9388	0.8887	0.7834	0.5727	0.3860	0.3911	0.6506	0.8704	0.9478	0.9737	(94)
Useful gains	495.2785	522.5199	535.7352	521.1293	452.2880	327.3786	210.3705	208.5660	341.3258	437.3771	464.6879	473.0278	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1055.6761	1004.6277	899.0283	734.6870	541.9913	343.2040	212.5119	210.7268	369.1404	598.1342	804.1631	1008.3300	(97)
Space heating kWh	416.9358	323.9765	270.2900	153.7615	66.7392	0.0000	0.0000	0.0000	0.0000	119.6033	244.4221	398.2648	(98a)
Space heating requirement - total per year (kWh/year)												1993.9933	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	416.9358	323.9765	270.2900	153.7615	66.7392	0.0000	0.0000	0.0000	0.0000	119.6033	244.4221	398.2648	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1993.9933	
Space heating per m2											(98c) / (4) =	39.8719	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	416.9358	323.9765	270.2900	153.7615	66.7392	0.0000	0.0000	0.0000	0.0000	119.6033	244.4221	398.2648	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	416.9358	323.9765	270.2900	153.7615	66.7392	0.0000	0.0000	0.0000	0.0000	119.6033	244.4221	398.2648	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.0130	12.8462	11.5666	8.4742	6.5457	5.3479	5.9712	7.7616	10.0815	13.2275	14.9404	16.4580	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 1993.9933 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 2210.6489 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 129.2337 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation 0.0000 (233)
Wind generation 0.0000 (234)
Hydro-electric generation (Appendix N) 0.0000 (235a)
Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4333.8759	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1993.9933	27.6700	551.7380	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2210.6489	27.6700	611.6865	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	129.2337	27.6700	35.7590	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1199.1835	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1993.9933	0.1555	310.0396	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2210.6489	0.1412	312.2016	(264)
Space and water heating			622.2412	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	129.2337	0.1443	18.6524	(268)
Total CO2, kg/year			640.8936	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1993.9933	1.5757	3141.8467	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2210.6489	1.5222	3365.0931	(278)
Space and water heating			6506.9398	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	129.2337	1.5338	198.2230	(282)
Total Primary energy kWh/year			6705.1628	(286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: E 52
Current environmental impact rating: B 90

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 52
Potential environmental impact rating: B 90

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1199	£1199	£0
Space heating	£552	£552	£0
Water heating	£612	£612	£0
Lighting	£36	£36	£0
Total cost of fuels	£1199	£1199	£0
Total cost of uses	£1200	£1200	£0
Delivered energy	87 kWh/m²	87 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.6 tonnes	0.6 tonnes	0.0 tonnes
CO2 emissions per m²	13 kg/m²	13 kg/m²	0 kg/m²
Primary energy	134 kWh/m²	134 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b)	x 2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	125.0250	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	3 * 10 =	30.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.9900 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0729	1.0518	1.0308	0.9256	0.9046	0.7994	0.7994	0.7783	0.8415	0.9046	0.9466	0.9887	(22b)
Effective ac	1.0729	1.0518	1.0308	0.9284	0.9091	0.8195	0.8195	0.8029	0.8540	0.9091	0.9481	0.9888	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.1800	9.0018	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.2600	2.8782	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.0616			(33)
Main dwelling								
Party Wall to Adj Property			17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat			36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1			50.0100			20.0000	1000.2000	(32b)
Internal Wall			91.7000			9.0000	825.3000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12715.8900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		254.2669 (35)
Thermal bridges (Default value 0.200 * total exposed area)		13.7020 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	34.7636 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	43.3964	42.5285	38.3030	37.5088	33.8115	33.8115	33.1268	35.2357	37.5088	39.1155	40.7953	(38)
Heat transfer coeff	79.0279	78.1600	77.2920	73.0666	72.2724	68.5751	68.5751	67.8904	69.9992	72.2724	73.8791	75.5588	(39)
Average = Sum(39)m / 12 =												73.0474	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5802	1.5629	1.5455	1.4610	1.4452	1.3712	1.3712	1.3575	1.3997	1.4452	1.4773	1.5109	(40)
HLP (average)												1.4607	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.6904 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
72.2726	71.1864	69.6038	66.5756	64.3409	61.8487	60.4322	62.0029	63.7247	66.4005	69.4937	71.9956	(42a)

Hot water usage for baths

22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497	(42b)

Hot water usage for other uses

31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413	(42c)

Average daily hot water use (litres/day)	116.7415 (43)

Daily hot water use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
126.9404	124.3553	121.1358	116.0698	112.0173	107.6360	105.8265	109.0307	112.4278	117.0437	122.1929	126.5867	(44)
Energy conte 201.0426	177.0803	186.1812	158.8937	150.7968	132.3511	127.9880	135.0027	138.6348	158.8273	174.0862	198.2042	(45)

Energy content (annual)	Total = Sum(45)m = 1939.0889

Distribution loss (46)m = 0.15 x (45)m

30.1564	26.5620	27.9272	23.8341	22.6195	19.8527	19.1982	20.2504	20.7952	23.8241	26.1129	29.7306	(46)

Water storage loss (or HIU loss):	
Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2400 (48)

Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
									Total per year (kWh/year) = Sum(64)m =			2210.6489	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
	85.2979	75.5448	80.3565	70.6882	68.5912	61.8627	61.0072	63.3396	63.9521	71.2613	75.7397	84.3541	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.2944	16.2489	13.2145	10.0042	7.4783	6.3135	6.8219	8.8674	11.9018	15.1121	17.6380	18.8028	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)													
	114.6477	112.4179	108.0060	98.1780	92.1924	85.9205	81.9989	85.1339	88.8223	95.7813	105.1940	113.3792	(72)
Total internal gains													
	433.3736	431.3791	418.1854	392.9116	368.9549	347.0019	333.8911	336.7908	349.2610	371.6658	399.0496	422.9158	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	36.7938	0.4600	0.7000	0.7700	61.0032	(79)

Solar gains	61.0032	103.9111	142.1757	176.1626	197.3168	195.8899	188.8587	173.0768	153.9462	114.8439	73.0678	52.2061	(83)
Total gains	494.3769	535.2902	560.3611	569.0742	566.2717	542.8918	522.7498	509.8675	503.2072	486.5097	472.1174	475.1219	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.6955	45.1918	45.6993	48.3421	48.8733	51.5084	51.5084	52.0279	50.4605	48.8733	47.8105	46.7476	
alpha	3.9797	4.0128	4.0466	4.2228	4.2582	4.4339	4.4339	4.4685	4.3640	4.2582	4.1874	4.1165	
util living area													
	0.9873	0.9811	0.9688	0.9384	0.8722	0.7204	0.5547	0.5840	0.7965	0.9384	0.9788	0.9890	(86)
MIT	19.3673	19.5564	19.8590	20.2988	20.6420	20.9028	20.9761	20.9704	20.8337	20.4073	19.8718	19.4121	(87)
Th 2	19.6279	19.6407	19.6535	19.7168	19.7289	19.7855	19.7855	19.7960	19.7636	19.7289	19.7046	19.6794	(88)
util rest of house													
	0.9831	0.9748	0.9576	0.9147	0.8196	0.6165	0.4127	0.4450	0.7060	0.9101	0.9704	0.9853	(89)
MIT 2	17.8007	18.0481	18.4372	19.0234	19.4295	19.7309	19.7785	19.7864	19.6566	19.1697	18.4921	17.8916	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.5337	18.7539	19.1024	19.6201	19.9968	20.2793	20.3388	20.3404	20.2074	19.7488	19.1376	18.6030	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5337	18.7539	19.1024	19.6201	19.9968	20.2793	20.3388	20.3404	20.2074	19.7488	19.1376	18.6030	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9784	0.9692	0.9517	0.9126	0.8323	0.6617	0.4796	0.5103	0.7419	0.9107	0.9656	0.9811	(94)
Useful gains	483.6859	518.7873	533.2958	519.3131	471.2818	359.2483	250.7240	260.1754	373.3484	443.0437	455.8866	466.1628	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1124.8620	1082.8183	974.0678	783.2836	599.6321	389.4550	256.3919	267.5139	427.5114	661.2038	889.3298	1088.2753	(97)
Space heating kWh													
	477.0351	379.0288	327.9344	190.0588	95.4926	0.0000	0.0000	0.0000	0.0000	162.3111	312.0791	462.8518	(98a)
Space heating requirement - total per year (kWh/year)												2406.7917	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	477.0351	379.0288	327.9344	190.0588	95.4926	0.0000	0.0000	0.0000	0.0000	162.3111	312.0791	462.8518	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2406.7917	
Space heating per m2											(98c) / (4) =	48.1262	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	477.0351	379.0288	327.9344	190.0588	95.4926	0.0000	0.0000	0.0000	0.0000	162.3111	312.0791	462.8518	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	477.0351	379.0288	327.9344	190.0588	95.4926	0.0000	0.0000	0.0000	0.0000	162.3111	312.0791	462.8518	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.0130	12.8462	11.5666	8.4742	6.5457	5.3479	5.9712	7.7616	10.0815	13.2275	14.9404	16.4580	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2406.7917	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2210.6489	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	129.2337	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4746.6743	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2406.7917	16.4900	396.8799	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2210.6489	16.4900	364.5360	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	129.2337	16.4900	21.3106	(250)
Additional standing charges			0.0000	(251)
Total energy cost			782.7266	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.9658	(257)
SAP value		51.9242	
SAP rating (Section 12)		52	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2406.7917	0.1550	373.0018	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2210.6489	0.1412	312.2016	(264)
Space and water heating			685.2034	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	129.2337	0.1443	18.6524	(268)
Total CO2, kg/year			703.8558	(272)
CO2 emissions per m2			14.0700	(273)

EI value	90.0730	
EI rating	90	(274)
EI band	B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b)	x 2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	125.0250	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9900	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0729	0.9887	0.9677	0.9046	0.9046	0.8415	0.8415	0.8204	0.8415	0.9466	0.9256	0.9887	(22b)
Effective ac	1.0729	0.9888	0.9682	0.9091	0.9091	0.8540	0.8540	0.8365	0.8540	0.9481	0.9284	0.9888	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.1800	9.0018	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.2600	2.8782	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.0616			(33)
Main dwelling								
Party Wall to Adj Property			17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat			36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1			50.0100			20.0000	1000.2000	(32b)
Internal Wall			91.7000			9.0000	825.3000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12715.8900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		254.2669 (35)
Thermal bridges (Default value 0.200 * total exposed area)		13.7020 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	34.7636 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	40.7953	39.9463	37.5088	37.5088	35.2357	35.2357	34.5145	35.2357	39.1155	38.3030	40.7953	(38)
Heat transfer coeff	79.0279	75.5588	74.7098	72.2724	72.2724	69.9992	69.9992	69.2780	69.9992	73.8791	73.0666	75.5588	(39)
Average = Sum(39)m / 12 =												72.9684	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5802	1.5109	1.4939	1.4452	1.4452	1.3997	1.3997	1.3853	1.3997	1.4773	1.4610	1.5109	(40)
HLP (average)												1.4591	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.6904	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	72.2726	71.1864	69.6038	66.5756	64.3409	61.8487	60.4322	62.0029	63.7247	66.4005	69.4937	71.9956	(42a)
Hot water usage for baths	22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497	(42b)

Hot water usage for other uses

	31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413 (42c)

Average daily hot water use (litres/day) 116.7415 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	126.9404	124.3553	121.1358	116.0698	112.0173	107.6360	105.8265	109.0307	112.4278	117.0437	122.1929	126.5867	(44)
Energy conte	201.0426	177.0803	186.1812	158.8937	150.7968	132.3511	127.9880	135.0027	138.6348	158.8273	174.0862	198.2042	(45)
Energy content (annual)										Total = Sum(45)m =		1939.0889	
Distribution loss (46)m = 0.15 x (45)m													
	30.1564	26.5620	27.9272	23.8341	22.6195	19.8527	19.1982	20.2504	20.7952	23.8241	26.1129	29.7306	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
										Total per year (kWh/year) = Sum(64)m =		2210.6489	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	85.2979	75.5448	80.3565	70.6882	68.5912	61.8627	61.0072	63.3396	63.9521	71.2613	75.7397	84.3541	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.2944	16.2489	13.2145	10.0042	7.4783	6.3135	6.8219	8.8674	11.9018	15.1121	17.6380	18.8028	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)													
	114.6477	112.4179	108.0060	98.1780	92.1924	85.9205	81.9989	85.1339	88.8223	95.7813	105.1940	113.3792	(72)
Total internal gains													
	433.3736	431.3791	418.1854	392.9116	368.9549	347.0019	333.8911	336.7908	349.2610	371.6658	399.0496	422.9158	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	46.3896	0.4600	0.7000	0.7700	76.9128	(79)

Solar gains	76.9128	111.8951	152.4928	193.4785	208.3854	224.6334	211.0798	196.4229	175.3780	130.8100	91.2565	62.8726	(83)
Total gains	510.2864	543.2742	570.6782	586.3902	577.3403	571.6354	544.9709	533.2137	524.6390	502.4758	490.3061	485.7884	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.6955	46.7476	47.2788	48.8733	48.8733	50.4605	50.4605	50.9858	50.4605	47.8105	48.3421	46.7476	
alpha	3.9797	4.1165	4.1519	4.2582	4.2582	4.3640	4.3640	4.3991	4.3640	4.1874	4.2228	4.1165	
util living area													
	0.9823	0.9758	0.9588	0.9186	0.8296	0.6379	0.4654	0.4706	0.7137	0.9070	0.9661	0.9842	(86)
MIT	19.5637	19.7568	20.0512	20.4271	20.7427	20.9446	20.9891	20.9890	20.9078	20.5527	20.1047	19.6235	(87)
Th 2	19.6279	19.6794	19.6921	19.7289	19.7289	19.7636	19.7636	19.7746	19.7636	19.7046	19.7168	19.6794	(88)
util rest of house													
	0.9760	0.9675	0.9439	0.8877	0.7611	0.5176	0.3150	0.3200	0.6004	0.8627	0.9521	0.9786	(89)
MIT 2	18.0500	18.3269	18.7026	19.1837	19.5335	19.7387	19.7615	19.7726	19.7157	19.3188	18.7914	18.1604	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.7583	18.9960	19.3336	19.7655	20.0993	20.3030	20.3359	20.3418	20.2735	19.8961	19.4059	18.8450	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7583	18.9960	19.3336	19.7655	20.0993	20.3030	20.3359	20.3418	20.2735	19.8961	19.4059	18.8450	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9706	0.9618	0.9388	0.8887	0.7834	0.5727	0.3860	0.3911	0.6506	0.8704	0.9478	0.9737	(94)
Useful gains	495.2785	522.5199	535.7352	521.1293	452.2880	327.3786	210.3705	208.5660	341.3258	437.3771	464.6879	473.0278	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1055.6761	1004.6277	899.0283	734.6870	541.9913	343.2040	212.5119	210.7268	369.1404	598.1342	804.1631	1008.3300	(97)
Space heating kWh													
	416.9358	323.9765	270.2900	153.7615	66.7392	0.0000	0.0000	0.0000	0.0000	119.6033	244.4221	398.2648	(98a)

Space heating requirement - total per year (kWh/year)												1993.9933	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	416.9358	323.9765	270.2900	153.7615	66.7392	0.0000	0.0000	0.0000	0.0000	119.6033	244.4221	398.2648	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1993.9933	
Space heating per m2											(98c) / (4) =	39.8719	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	416.9358	323.9765	270.2900	153.7615	66.7392	0.0000	0.0000	0.0000	0.0000	119.6033	244.4221	398.2648	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	416.9358	323.9765	270.2900	153.7615	66.7392	0.0000	0.0000	0.0000	0.0000	119.6033	244.4221	398.2648	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	224.1066	197.9123	209.2452	181.2137	173.8608	154.6711	151.0520	158.0667	160.9548	181.8913	196.4062	221.2682	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.0130	12.8462	11.5666	8.4742	6.5457	5.3479	5.9712	7.7616	10.0815	13.2275	14.9404	16.4580	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1993.9933	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2210.6489	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												129.2337	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												4333.8759	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1993.9933	27.6700	551.7380	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2210.6489	27.6700	611.6865	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	129.2337	27.6700	35.7590	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1199.1835	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1993.9933	0.1555	310.0396	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2210.6489	0.1412	312.2016	(264)
Space and water heating			622.2412	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	129.2337	0.1443	18.6524 (268)
Total CO2, kg/year			640.8936 (272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1993.9933	1.5757	3141.8467	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2210.6489	1.5222	3365.0931	(278)
Space and water heating			6506.9398	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	129.2337	1.5338	198.2230	(282)
Total Primary energy kWh/year			6705.1628	(286)

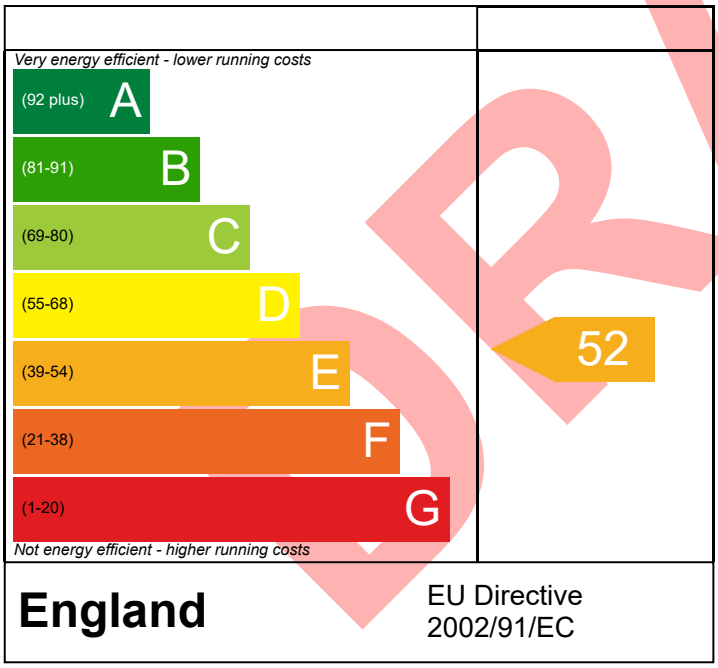
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	50.01 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

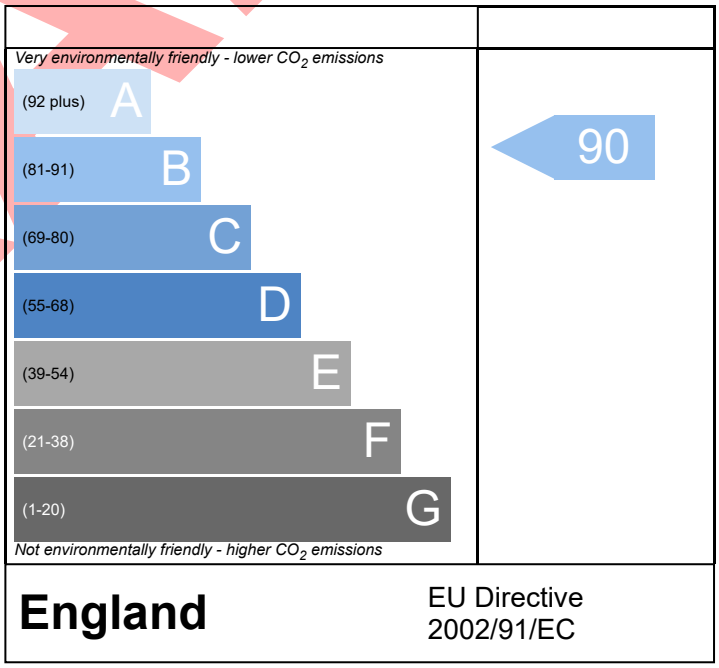
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

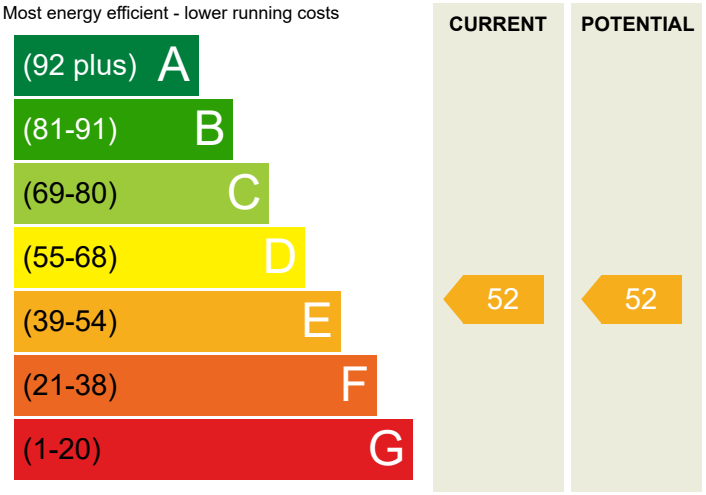
Energy Report

Dwelling Address	
Reference	Flat 1-Be Lean
SAP Version	10.2
Assessment Date	15/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	50

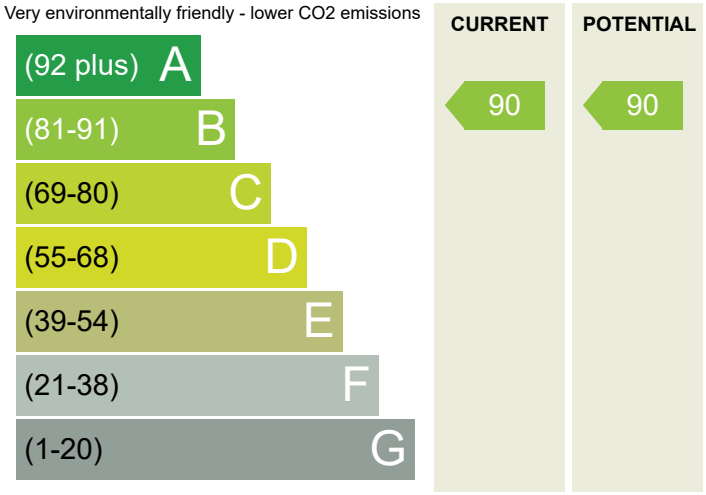
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

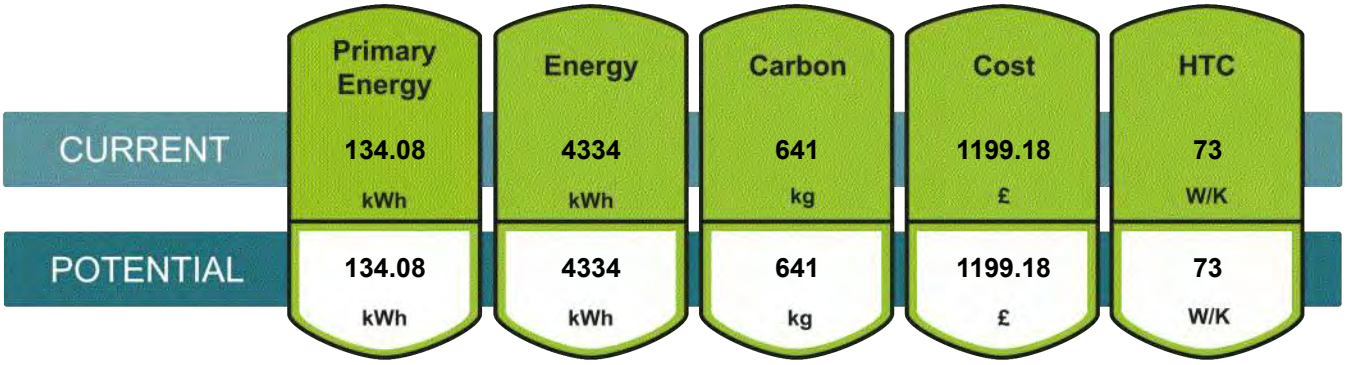


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£36	£36	You could save £0
Heating	£552	£552	
Hot Water	£612	£612	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1199	£1199	

Estimated energy use and potential savings

Space Heating
1994
kWh per year

Water Heating
2211
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 2	Issued on Date	15/06/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	47 E	DER	15.08	TER	
Environmental	89 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.78	DFEE	65.40	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	157.02	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	299.39	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	17.16 m	58.22 m²	2.50 m

8.0 Living Area	29.09	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	42.90	34.90	0.00	None	8.00	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	42.88	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	83.56

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Timber I-joists, carpeted	20.00	58.22

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	58.22

12.0 Opening Types

Summary for Input Data

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	5.81	
SE Windows	Windows	External Wall 1	South East	2.19	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation		
Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	

Summary for Input Data

Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower Over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 2	Issued on Date	15/06/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	47 E	DER	15.08	TER	
Environmental	89 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.78	DFEE	65.40	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	157.02	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	145.5500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9617	0.9429	0.9240	0.8297	0.8109	0.7166	0.7166	0.6977	0.7543	0.8109	0.8486	0.8863	(22b)
Effective ac	0.9625	0.9445	0.9269	0.8442	0.8288	0.7567	0.7567	0.7434	0.7845	0.8288	0.8600	0.8928	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.1800	10.4796	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.2600	9.0740	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		29.4395			(33)
Main dwelling								
Party Wall 1			42.8800	0.0000	0.0000	180.0000	7718.4000	(32)
Party Ceiling 1			58.2200			20.0000	1164.4000	(32b)
Internal Wall 1			83.5600			9.0000	752.0400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	17430.2400	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		299.3858	(35)
Thermal bridges (Default value 0.200 * total exposed area)		20.2240	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	49.6635	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	45.3660	44.5205	40.5494	39.8064	36.3476	36.3476	35.7071	37.6799	39.8064	41.3094	42.8808	(38)

Heat transfer coeff

	95.8921	95.0295	94.1840	90.2129	89.4699	86.0112	86.0112	85.3707	87.3434	89.4699	90.9730	92.5443 (39)
Average = Sum(39)m / 12 =												90.2093
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.6471	1.6322	1.6177	1.5495	1.5368	1.4773	1.4773	1.4663	1.5002	1.5368	1.5626	1.5896 (40)
HLP (average)												1.5495
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309 (42)
Hot water usage for mixer showers												
	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188 (42a)
Hot water usage for baths												
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)
Hot water usage for other uses												
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)
Average daily hot water use (litres/day)												125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3233	18.9391	15.4023	11.6606	8.7164	7.3588	7.9514	10.3355	13.8723	17.6141	20.5583	21.9159	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	481.3974	479.2208	464.3596	436.0406	408.9853	384.2706	369.5486	372.6996	386.7819	412.0117	442.7571	469.5318	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	5.8100	36.7938	0.4600	0.7000	0.7700	47.7024	(79)

Solar gains	65.6832	111.8827	153.0828	189.6771	212.4541	210.9178	203.3472	186.3545	165.7563	123.6543	78.6733	56.2111 (83)
Total gains	547.0805	591.1036	617.4425	625.7177	621.4394	595.1884	572.8958	559.0542	552.5382	535.6660	521.4304	525.7429 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	50.4915	50.9498	51.4072	53.6701	54.1158	56.2919	56.2919	56.7143	55.4333	54.1158	53.2217	52.3180
alpha	4.3661	4.3967	4.4271	4.5780	4.6077	4.7528	4.7528	4.7810	4.6956	4.6077	4.5481	4.4879
util living area												
	0.9939	0.9906	0.9835	0.9650	0.9181	0.7924	0.6262	0.6581	0.8582	0.9651	0.9895	0.9949 (86)
MIT	19.4380	19.6021	19.8751	20.2692	20.6074	20.8806	20.9701	20.9624	20.8061	20.3793	19.8806	19.4634 (87)
Th 2	19.5790	19.5898	19.6004	19.6506	19.6600	19.7045	19.7045	19.7128	19.6873	19.6600	19.6409	19.6210 (88)
util rest of house												
	0.9915	0.9867	0.9761	0.9477	0.8728	0.6825	0.4594	0.4961	0.7697	0.9443	0.9844	0.9928 (89)

MIT 2	17.8303	18.0462	18.3991	18.9261	19.3329	19.6407	19.6971	19.7022	19.5658	19.0730	18.4366	17.8911	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	18.6336	18.8236	19.1366	19.5972	19.9697	20.2603	20.3332	20.3318	20.1855	19.7257	19.1581	18.6767	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6336	18.8236	19.1366	19.5972	19.9697	20.2603	20.3332	20.3318	20.1855	19.7257	19.1581	18.6767	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9891	0.9838	0.9729	0.9469	0.8852	0.7343	0.5442	0.5783	0.8081	0.9456	0.9819	0.9908	(94)
Useful gains	541.1388	581.5174	600.7061	592.4811	550.0861	437.0765	311.7538	323.3130	446.4924	506.5024	511.9871	520.9150	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1374.4786	1323.1563	1190.1644	965.0273	739.8934	486.8449	321.0945	335.6629	531.5313	816.4729	1096.9639	1339.7365	(97)
Space heating kWh	620.0048	498.3814	438.5570	268.2332	141.2166	0.0000	0.0000	0.0000	0.0000	230.6180	421.1832	609.2033	(98a)
Space heating requirement - total per year (kWh/year)												3227.3976	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	620.0048	498.3814	438.5570	268.2332	141.2166	0.0000	0.0000	0.0000	0.0000	230.6180	421.1832	609.2033	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3227.3976	
Space heating per m2											(98c) / (4) =	55.4345	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	620.0048	498.3814	438.5570	268.2332	141.2166	0.0000	0.0000	0.0000	0.0000	230.6180	421.1832	609.2033	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	620.0048	498.3814	438.5570	268.2332	141.2166	0.0000	0.0000	0.0000	0.0000	230.6180	421.1832	609.2033	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6641	14.9731	13.4816	9.8772	7.6294	6.2333	6.9598	9.0466	11.7507	15.4175	17.4141	19.1829	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3227.3976	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2359.4492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	150.6303	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5737.4770	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3227.3976	16.4900	532.1979	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	2359.4492	16.4900	389.0732	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6303	16.4900	24.8389	(250)
Additional standing charges			0.0000	(251)
Total energy cost			946.1100	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.2997	(257)
SAP value		46.5111	
SAP rating (Section 12)		47	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3227.3976	0.1547	499.1618	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			832.4303	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6303	0.1443	21.7406	(268)
Total CO2, kg/year			854.1709	(272)
CO2 emissions per m2			14.6700	(273)
EI value			88.9112	
EI rating			89	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9617	0.8863	0.8674	0.8109	0.8109	0.7543	0.7543	0.7354	0.7543	0.8486	0.8297	0.8863	(22b)
Effective ac	0.9625	0.8928	0.8762	0.8288	0.8288	0.7845	0.7845	0.7704	0.7845	0.8600	0.8442	0.8928	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.1800	10.4796	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.2600	9.0740	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		29.4395			(33)
Main dwelling								

Party Wall 1	42.8800	0.0000	0.0000	180.0000	7718.4000 (32)
Party Ceiling 1	58.2200			20.0000	1164.4000 (32b)
Internal Wall 1	83.5600			9.0000	752.0400 (32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 17430.2400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 299.3858 (35)
Thermal bridges (Default value 0.200 * total exposed area) 20.2240 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 49.6635 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	42.8808	42.0866	39.8064	39.8064	37.6799	37.6799	37.0052	37.6799	41.3094	40.5494	42.8808	(38)
Heat transfer coeff	95.8921	92.5443	91.7501	89.4699	89.4699	87.3434	87.3434	86.6688	87.3434	90.9730	90.2129	92.5443	(39)
Average = Sum(39)m / 12 =												90.1296	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6471	1.5896	1.5759	1.5368	1.5368	1.5002	1.5002	1.4886	1.5002	1.5626	1.5495	1.5896	(40)
HLP (average)												1.5481	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9309 (42)
Hot water usage for mixer showers

77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)

Hot water usage for baths

24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day) 125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
									Total per year (kWh/year) = Sum(64)m =			2359.4492	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.3233	18.9391	15.4023	11.6606	8.7164	7.3588	7.9514	10.3355	13.8723	17.6141	20.5583	21.9159	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains	481.3974	479.2208	464.3596	436.0406	408.9853	384.2706	369.5486	372.6996	386.7819	412.0117	442.7571	469.5318	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)
Southwest	5.8100	46.3896	0.4600	0.7000	0.7700	60.1431	(79)

Solar gains	82.8132	120.4793	164.1915	208.3215	224.3718	241.8664	227.2731	211.4917	188.8323	140.8452	98.2573	67.6960	(83)
Total gains	564.2106	599.7001	628.5511	644.3621	633.3571	626.1371	596.8216	584.1913	575.6142	552.8569	541.0144	537.2278	(84)

7. Mean internal temperature (heating season)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	50.4915	52.3180	52.7709	54.1158	54.1158	55.4333	55.4333	55.8648	55.4333	53.2217	53.6701	52.3180	
alpha	4.3661	4.4879	4.5181	4.6077	4.6077	4.6956	4.6956	4.7243	4.6956	4.5481	4.5780	4.4879	
util living area	0.9911	0.9877	0.9777	0.9520	0.8841	0.7102	0.5271	0.5339	0.7837	0.9428	0.9822	0.9923	(86)
MIT	19.6166	19.7733	20.0412	20.3897	20.7124	20.9329	20.9871	20.9867	20.8899	20.5279	20.0931	19.6576	(87)
Th 2	19.5790	19.6210	19.6310	19.6600	19.6600	19.6873	19.6873	19.6960	19.6873	19.6409	19.6506	19.6210	(88)
util rest of house	0.9873	0.9825	0.9675	0.9280	0.8206	0.5753	0.3477	0.3537	0.6628	0.9067	0.9730	0.9890	(89)
MIT 2	18.0580	18.2848	18.6290	19.0782	19.4444	19.6598	19.6854	19.6941	19.6333	19.2341	18.7113	18.1389	(90)
Living area fraction									fLA = Living area / (4) =			0.4997	(91)
MIT	18.8367	19.0286	19.3346	19.7335	20.0780	20.2959	20.3358	20.3399	20.2612	19.8805	19.4017	18.8977	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.8367	19.0286	19.3346	19.7335	20.0780	20.2959	20.3358	20.3399	20.2612	19.8805	19.4017	18.8977	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9845	0.9794	0.9646	0.9297	0.8434	0.6422	0.4388	0.4452	0.7210	0.9146	0.9707	0.9866	(94)
Useful gains	555.4884	587.3541	606.3262	599.0379	534.1949	402.0907	261.8595	260.0713	414.9984	505.6252	525.1767	530.0190	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1288.4771	1233.4828	1104.1776	906.6455	669.0543	427.6245	265.1573	263.4682	459.5288	735.1093	992.4996	1239.8820	(97)
Space heating kWh	545.3435	434.1984	370.4015	221.4775	100.3354	0.0000	0.0000	0.0000	0.0000	170.7362	336.4725	528.1381	(98a)
Space heating requirement - total per year (kWh/year)												2707.1031	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	545.3435	434.1984	370.4015	221.4775	100.3354	0.0000	0.0000	0.0000	0.0000	170.7362	336.4725	528.1381	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2707.1031	
Space heating per m2											(98c) / (4) =	46.4978	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	545.3435	434.1984	370.4015	221.4775	100.3354	0.0000	0.0000	0.0000	0.0000	170.7362	336.4725	528.1381	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	545.3435	434.1984	370.4015	221.4775	100.3354	0.0000	0.0000	0.0000	0.0000	170.7362	336.4725	528.1381	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6641	14.9731	13.4816	9.8772	7.6294	6.2333	6.9598	9.0466	11.7507	15.4175	17.4141	19.1829	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2707.1031	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2359.4492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	150.6303	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)

Appendix Q - special features		
Energy saved or generated		-0.0000 (236)
Energy used		0.0000 (237)
Total delivered energy for all uses		5217.1825 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2707.1031	27.6700	749.0554	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	27.6700	652.8596	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6303	27.6700	41.6794	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1443.5944	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2707.1031	0.1552	420.0637	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			753.3322	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6303	0.1443	21.7406	(268)
Total CO2, kg/year			775.0728	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2707.1031	1.5745	4262.3121	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	1.5223	3591.7963	(278)
Space and water heating			7854.1084	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	150.6303	1.5338	231.0417	(282)
Total Primary energy kWh/year			8085.1501	(286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: E 47
Current environmental impact rating: B 89

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings		Energy efficiency	Environmental impact
Recommended measures				
(none)				
Total Savings	£0	0.00 kg/m²		

Potential energy efficiency rating: E 47
Potential environmental impact rating: B 89

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1444	£1444	£0
Space heating	£749	£749	£0
Water heating	£653	£653	£0
Lighting	£42	£42	£0
Total cost of fuels	£1444	£1444	£0
Total cost of uses	£1444	£1444	£0
Delivered energy	90 kWh/m²	90 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m²	13 kg/m²	13 kg/m²	0 kg/m²
Primary energy	139 kWh/m²	139 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	145.5500	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8874 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9617	0.9429	0.9240	0.8297	0.8109	0.7166	0.7166	0.6977	0.7543	0.8109	0.8486	0.8863	(22b)
Effective ac	0.9625	0.9445	0.9269	0.8442	0.8288	0.7567	0.7567	0.7434	0.7845	0.8288	0.8600	0.8928	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.1800	10.4796	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.2600	9.0740	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	29.4395			(33)
Main dwelling								
Party Wall 1			42.8800	0.0000	0.0000	180.0000	7718.4000	(32)
Party Ceiling 1			58.2200			20.0000	1164.4000	(32b)
Internal Wall 1			83.5600			9.0000	752.0400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	17430.2400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		299.3858 (35)
Thermal bridges (Default value 0.200 * total exposed area)		20.2240 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	49.6635 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	45.3660	44.5205	40.5494	39.8064	36.3476	36.3476	35.7071	37.6799	39.8064	41.3094	42.8808	(38)
Heat transfer coeff	95.8921	95.0295	94.1840	90.2129	89.4699	86.0112	86.0112	85.3707	87.3434	89.4699	90.9730	92.5443	(39)
Average = Sum(39)m / 12 =												90.2093	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6471	1.6322	1.6177	1.5495	1.5368	1.4773	1.4773	1.4663	1.5002	1.5368	1.5626	1.5896	(40)
HLP (average)												1.5495	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.9309 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)

Hot water usage for baths

24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day)	125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)

Water storage loss (or HIU loss):	
Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2400 (48)
Temperature factor from Table 2b	0.6000 (49)

Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3233	18.9391	15.4023	11.6606	8.7164	7.3588	7.9514	10.3355	13.8723	17.6141	20.5583	21.9159	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	481.3974	479.2208	464.3596	436.0406	408.9853	384.2706	369.5486	372.6996	386.7819	412.0117	442.7571	469.5318	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	5.8100	36.7938	0.4600	0.7000	0.7700	47.7024	(79)

Solar gains	65.6832	111.8827	153.0828	189.6771	212.4541	210.9178	203.3472	186.3545	165.7563	123.6543	78.6733	56.2111	(83)
Total gains	547.0805	591.1036	617.4425	625.7177	621.4394	595.1884	572.8958	559.0542	552.5382	535.6660	521.4304	525.7429	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	50.4915	50.9498	51.4072	53.6701	54.1158	56.2919	56.2919	56.7143	55.4333	54.1158	53.2217	52.3180	
alpha	4.3661	4.3967	4.4271	4.5780	4.6077	4.7528	4.7528	4.7810	4.6956	4.6077	4.5481	4.4879	
util living area													
	0.9939	0.9906	0.9835	0.9650	0.9181	0.7924	0.6262	0.6581	0.8582	0.9651	0.9895	0.9949	(86)
MIT	19.4380	19.6021	19.8751	20.2692	20.6074	20.8806	20.9701	20.9624	20.8061	20.3793	19.8806	19.4634	(87)
Th 2	19.5790	19.5898	19.6004	19.6506	19.6600	19.7045	19.7045	19.7128	19.6873	19.6600	19.6409	19.6210	(88)
util rest of house													
	0.9915	0.9867	0.9761	0.9477	0.8728	0.6825	0.4594	0.4961	0.7697	0.9443	0.9844	0.9928	(89)
MIT 2	17.8303	18.0462	18.3991	18.9261	19.3329	19.6407	19.6971	19.7022	19.5658	19.0730	18.4366	17.8911	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	18.6336	18.8236	19.1366	19.5972	19.9697	20.2603	20.3332	20.3318	20.1855	19.7257	19.1581	18.6767	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6336	18.8236	19.1366	19.5972	19.9697	20.2603	20.3332	20.3318	20.1855	19.7257	19.1581	18.6767	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9891	0.9838	0.9729	0.9469	0.8852	0.7343	0.5442	0.5783	0.8081	0.9456	0.9819	0.9908	(94)
Useful gains	541.1388	581.5174	600.7061	592.4811	550.0861	437.0765	311.7538	323.3130	446.4924	506.5024	511.9871	520.9150	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1374.4786	1323.1563	1190.1644	965.0273	739.8934	486.8449	321.0945	335.6629	531.5313	816.4729	1096.9639	1339.7365	(97)
Space heating kWh													
	620.0048	498.3814	438.5570	268.2332	141.2166	0.0000	0.0000	0.0000	0.0000	230.6180	421.1832	609.2033	(98a)
Space heating requirement - total per year (kWh/year)												3227.3976	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	620.0048	498.3814	438.5570	268.2332	141.2166	0.0000	0.0000	0.0000	0.0000	230.6180	421.1832	609.2033	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3227.3976	
Space heating per m2											(98c) / (4) =	55.4345	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	620.0048	498.3814	438.5570	268.2332	141.2166	0.0000	0.0000	0.0000	0.0000	230.6180	421.1832	609.2033	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	620.0048	498.3814	438.5570	268.2332	141.2166	0.0000	0.0000	0.0000	0.0000	230.6180	421.1832	609.2033	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6641	14.9731	13.4816	9.8772	7.6294	6.2333	6.9598	9.0466	11.7507	15.4175	17.4141	19.1829	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3227.3976	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2359.4492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	150.6303	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5737.4770	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3227.3976	16.4900	532.1979	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	16.4900	389.0732	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6303	16.4900	24.8389	(250)
Additional standing charges			0.0000	(251)
Total energy cost			946.1100	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.2997	(257)
SAP value		46.5111	
SAP rating (Section 12)		47	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3227.3976	0.1547	499.1618	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			832.4303	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6303	0.1443	21.7406	(268)
Total CO2, kg/year			854.1709	(272)
CO2 emissions per m2			14.6700	(273)

EI value 88.9112
EI rating 89 (274)
EI band B

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5500	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8874 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9617	0.8863	0.8674	0.8109	0.8109	0.7543	0.7543	0.7354	0.7543	0.8486	0.8297	0.8863	(22b)
Effective ac	0.9625	0.8928	0.8762	0.8288	0.8288	0.7845	0.7845	0.7704	0.7845	0.8600	0.8442	0.8928	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.1800	10.4796	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.2600	9.0740	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		29.4395			(33)
Main dwelling								
Party Wall 1			42.8800	0.0000	0.0000	180.0000	7718.4000	(32)
Party Ceiling 1			58.2200			20.0000	1164.4000	(32b)
Internal Wall 1			83.5600			9.0000	752.0400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		17430.2400	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							299.3858	(35)
Thermal bridges (Default value 0.200 * total exposed area)							20.2240	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		49.6635	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	42.8808	42.0866	39.8064	39.8064	37.6799	37.6799	37.0052	37.6799	41.3094	40.5494	42.8808	(38)
Heat transfer coeff	95.8921	92.5443	91.7501	89.4699	89.4699	87.3434	87.3434	86.6688	87.3434	90.9730	90.2129	92.5443	(39)
Average = Sum(39)m / 12 =												90.1296	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6471	1.5896	1.5759	1.5368	1.5368	1.5002	1.5002	1.4886	1.5002	1.5626	1.5495	1.5896	(40)
HLP (average)												1.5481	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309	(42)
Hot water usage for mixer showers	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)
Hot water usage for baths	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses													

	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)
Average daily hot water use (litres/day)												125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)											Total = Sum(45)m =	2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3233	18.9391	15.4023	11.6606	8.7164	7.3588	7.9514	10.3355	13.8723	17.6141	20.5583	21.9159	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	481.3974	479.2208	464.3596	436.0406	408.9853	384.2706	369.5486	372.6996	386.7819	412.0117	442.7571	469.5318	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)
Southwest	5.8100	46.3896	0.4600	0.7000	0.7700	60.1431	(79)

Solar gains	82.8132	120.4793	164.1915	208.3215	224.3718	241.8664	227.2731	211.4917	188.8323	140.8452	98.2573	67.6960	(83)
Total gains	564.2106	599.7001	628.5511	644.3621	633.3571	626.1371	596.8216	584.1913	575.6142	552.8569	541.0144	537.2278	(84)

7. Mean internal temperature (heating season)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
tau	50.4915	52.3180	52.7709	54.1158	54.1158	55.4333	55.4333	55.8648	55.4333	53.2217	53.6701	52.3180	
alpha	4.3661	4.4879	4.5181	4.6077	4.6077	4.6956	4.6956	4.7243	4.6956	4.5481	4.5780	4.4879	
util living area													
	0.9911	0.9877	0.9777	0.9520	0.8841	0.7102	0.5271	0.5339	0.7837	0.9428	0.9822	0.9923	(86)
MIT	19.6166	19.7733	20.0412	20.3897	20.7124	20.9329	20.9871	20.9867	20.8899	20.5279	20.0931	19.6576	(87)
Th 2	19.5790	19.6210	19.6310	19.6600	19.6600	19.6873	19.6873	19.6960	19.6873	19.6409	19.6506	19.6210	(88)
util rest of house													
	0.9873	0.9825	0.9675	0.9280	0.8206	0.5753	0.3477	0.3537	0.6628	0.9067	0.9730	0.9890	(89)
MIT 2	18.0580	18.2848	18.6290	19.0782	19.4444	19.6598	19.6854	19.6941	19.6333	19.2341	18.7113	18.1389	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	18.8367	19.0286	19.3346	19.7335	20.0780	20.2959	20.3358	20.3399	20.2612	19.8805	19.4017	18.8977	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.8367	19.0286	19.3346	19.7335	20.0780	20.2959	20.3358	20.3399	20.2612	19.8805	19.4017	18.8977	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9845	0.9794	0.9646	0.9297	0.8434	0.6422	0.4388	0.4452	0.7210	0.9146	0.9707	0.9866	(94)
Useful gains	555.4884	587.3541	606.3262	599.0379	534.1949	402.0907	261.8595	260.0713	414.9984	505.6252	525.1767	530.0190	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1288.4771	1233.4828	1104.1776	906.6455	669.0543	427.6245	265.1573	263.4682	459.5288	735.1093	992.4996	1239.8820	(97)
Space heating kWh													
	545.3435	434.1984	370.4015	221.4775	100.3354	0.0000	0.0000	0.0000	0.0000	170.7362	336.4725	528.1381	(98a)

Space heating requirement - total per year (kWh/year)												2707.1031	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	545.3435	434.1984	370.4015	221.4775	100.3354	0.0000	0.0000	0.0000	170.7362	336.4725	528.1381	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												2707.1031	
Space heating per m2											(98c) / (4) =	46.4978	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	545.3435	434.1984	370.4015	221.4775	100.3354	0.0000	0.0000	0.0000	0.0000	170.7362	336.4725	528.1381	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	545.3435	434.1984	370.4015	221.4775	100.3354	0.0000	0.0000	0.0000	0.0000	170.7362	336.4725	528.1381	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6641	14.9731	13.4816	9.8772	7.6294	6.2333	6.9598	9.0466	11.7507	15.4175	17.4141	19.1829	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2707.1031	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2359.4492	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												150.6303	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5217.1825	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2707.1031	27.6700	749.0554	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	27.6700	652.8596	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6303	27.6700	41.6794	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1443.5944	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2707.1031	0.1552	420.0637	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			753.3322	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	150.6303	0.1443	21.7406	(268)
Total CO2, kg/year			775.0728	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2707.1031	1.5745	4262.3121	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	1.5223	3591.7963	(278)
Space and water heating			7854.1084	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	150.6303	1.5338	231.0417	(282)
Total Primary energy kWh/year			8085.1501	(286)

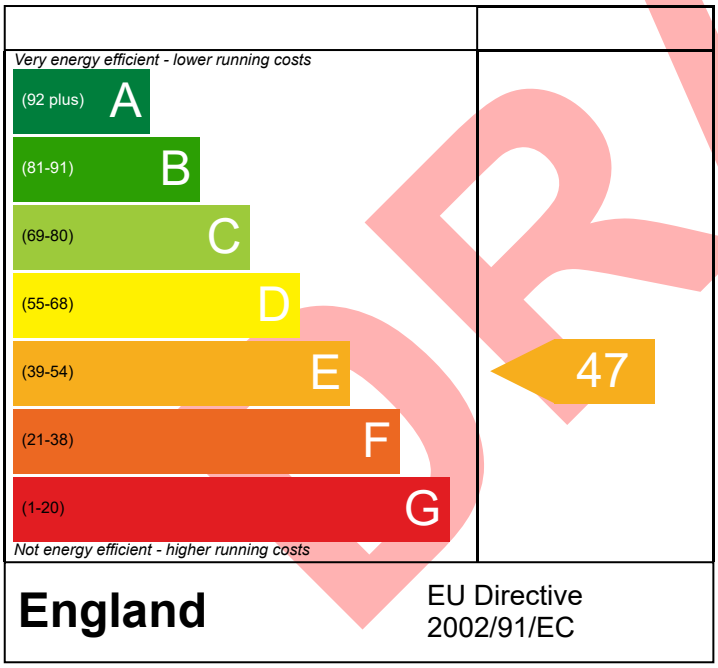
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.22 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

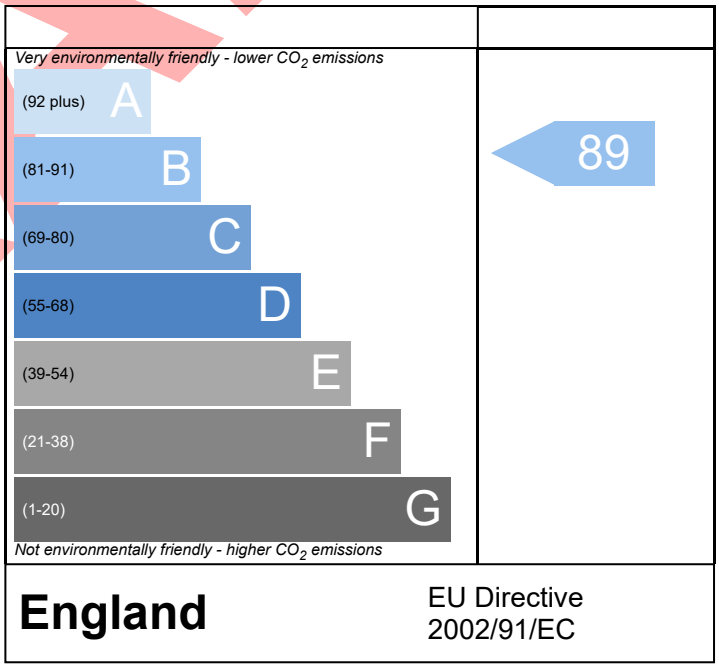
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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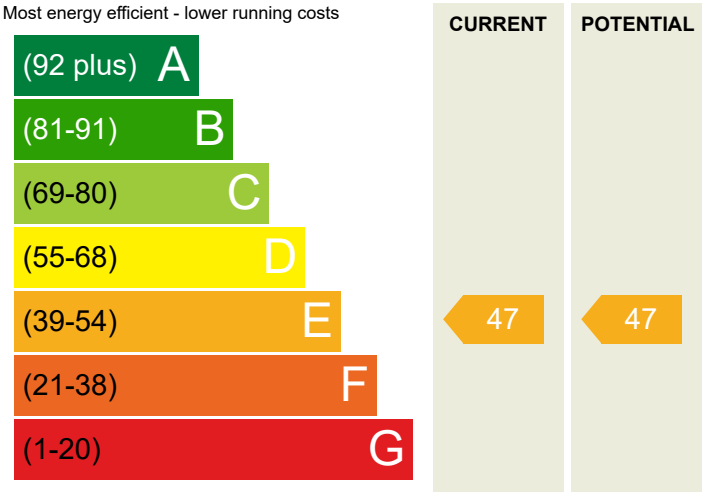
Energy Report

Dwelling Address	
Reference	Flat 2-Be Lean
SAP Version	10.2
Assessment Date	15/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	58

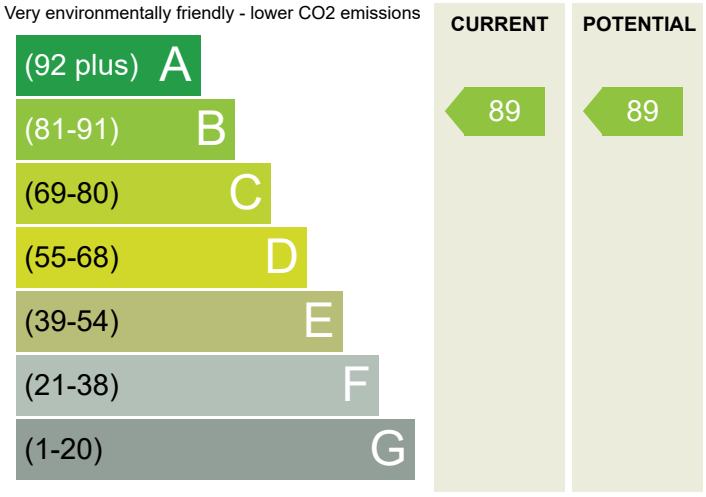
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£42	£42	
Heating	£749	£749	
Hot Water	£653	£653	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1444	£1444	

Estimated energy use and potential savings

Space Heating
2707
kWh per year

Water Heating
2359
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 3	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	39 E	**DER**	15.39	**TER**	
Environmental	87 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.1	**DFEE**	74.34	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	159.75	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	4	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	268.49	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	14.12 m	80.13 m²	2.50 m

8.0 Living Area 35.96 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	35.30	28.25	0.00	None	7.05	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	70.78	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	122.36

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	80.13	78.01	None	0.00	Enter Gross Area	2.12

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	80.13

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Rooflight	Manufacturer	Roof Light	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SE Windows	Windows	External Wall 1	South East	2.63	
Roof light	Rooflight	External Roof 1	North East	2.12	0
NE Windows	Windows	External Wall 1	North East	4.42	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	

Summary for Input Data

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 3	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	39 E	**DER**	15.39	**TER**	
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Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	159.75	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		80.1300	(1b)	x 2.5000	(2b) =	200.3250	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	200.3250	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8498	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7585	0.7436	0.7287	0.6544	0.6395	0.5651	0.5651	0.5503	0.5949	0.6395	0.6692	0.6990	(22b)
Effective ac	0.7876	0.7765	0.7655	0.7141	0.7045	0.6597	0.6597	0.6514	0.6769	0.7045	0.7239	0.7443	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.1800	14.4234	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.2600	7.3450	190.0000	5367.5000	(29a)
External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900	(30)
Total net area of external elements Aum(A, m2)			195.5600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.5817			(33)
Main dwelling								
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000	(32)
Internal Walls			122.3600			9.0000	1101.2400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21513.8300	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		268.4866	(35)
Thermal bridges (Default value 0.200 * total exposed area)		39.1120	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	84.6937	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	51.3307	50.6070	47.2074	46.5714	43.6105	43.6105	43.0622	44.7510	46.5714	47.8581	49.2033	(38)

Heat transfer coeff

	136.7629	136.0245	135.3007	131.9012	131.2651	128.3042	128.3042	127.7559	129.4447	131.2651	132.5518	133.8970 (39)
Average = Sum(39)m / 12 =												131.8981

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7068	1.6975	1.6885	1.6461	1.6382	1.6012	1.6012	1.5944	1.6154	1.6382	1.6542	1.6710	(40)
HLP (average)												1.6461	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4653 (42)

Hot water usage for mixer showers

	90.1382	88.7836	86.8097	83.0330	80.2458	77.1376	75.3709	77.3299	79.4773	82.8146	86.6724	89.7929 (42a)

Hot water usage for baths

	28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183 (42b)

Hot water usage for other uses

	39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774 (42c)

Average daily hot water use (litres/day) 145.6082 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	158.3296	155.1045	151.0883	144.7696	139.7149	134.2500	131.9937	135.9908	140.2285	145.9859	152.4081	157.8886	(44)
Energy conte	250.7555	220.8667	232.2171	198.1824	188.0831	165.0761	159.6349	168.3850	172.9158	198.1014	217.1333	247.2153	(45)
Energy content (annual)										Total = Sum(45)m =		2418.5665	
Distribution loss (46)m = 0.15 x (45)m													
	37.6133	33.1300	34.8326	29.7274	28.2125	24.7614	23.9452	25.2577	25.9374	29.7152	32.5700	37.0823	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
										Total per year (kWh/year) = Sum(64)m =		2690.1265	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	101.8274	90.1038	95.6634	83.7516	80.9888	72.7438	71.5298	74.4392	75.3505	84.3199	90.0528	100.6503	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	32.1264	28.5344	23.2057	17.5682	13.1324	11.0870	11.9799	15.5719	20.9005	26.5380	30.9738	33.0193	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)													
	136.8648	134.0830	128.5798	116.3217	108.8559	101.0331	96.1422	100.0527	104.6535	113.3332	125.0734	135.2827	(72)
Total internal gains													
	598.4833	595.5124	576.1054	539.9544	505.0086	473.4820	455.0150	459.1146	477.6191	510.1918	549.4119	583.3250	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	11.2829	0.4600	0.7000	0.7700	11.1284	(75)
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Northeast	2.1200	26.0000	0.4600	0.7000	1.0000	15.9738	(82)

Solar gains	48.6955	92.6100	150.1182	221.5380	277.8995	288.2653	272.8211	229.3534	174.8758	108.8830	60.1407	40.4693	(83)
Total gains	647.1788	688.1223	726.2236	761.4923	782.9082	761.7472	727.8360	688.4680	652.4950	619.0748	609.5526	623.7943	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	43.6965	43.9337	44.1688	45.3071	45.5267	46.5773	46.5773	46.7772	46.1669	45.5267	45.0847	44.6318	
alpha	3.9131	3.9289	3.9446	4.0205	4.0351	4.1052	4.1052	4.1185	4.0778	4.0351	4.0056	3.9755	
util living area													
	0.9948	0.9927	0.9874	0.9726	0.9331	0.8331	0.6912	0.7363	0.9060	0.9771	0.9920	0.9956	(86)
MIT	19.1083	19.2594	19.5601	20.0040	20.4284	20.7812	20.9280	20.9052	20.6466	20.1136	19.5604	19.1112	(87)
Th 2	19.5360	19.5426	19.5491	19.5797	19.5855	19.6125	19.6125	19.6175	19.6020	19.5855	19.5738	19.5617	(88)

util rest of house													
	0.9929	0.9899	0.9821	0.9594	0.8954	0.7309	0.5117	0.5661	0.8366	0.9633	0.9883	0.9939	(89)
MIT 2	17.4031	17.6001	17.9871	18.5665	19.0857	19.4824	19.5913	19.5854	19.3522	18.7131	18.0054	17.4230	(90)
Living area fraction										fLA = Living area / (4) =		0.4488	(91)
MIT	18.1683	18.3448	18.6930	19.2116	19.6882	20.0653	20.1912	20.1777	19.9331	19.3416	18.7033	18.1806	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1683	18.3448	18.6930	19.2116	19.6882	20.0653	20.1912	20.1777	19.9331	19.3416	18.7033	18.1806	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9901	0.9865	0.9776	0.9548	0.8988	0.7695	0.5937	0.6431	0.8569	0.9600	0.9850	0.9915	(94)
Useful gains	640.8008	678.8252	709.9660	727.0791	703.7023	586.1562	432.1045	442.7360	559.1470	594.3324	600.4330	618.5032	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1896.6711	1828.8155	1649.7270	1360.1087	1048.5785	701.2195	460.7616	482.6187	755.0661	1147.4620	1538.0323	1871.9638	(97)
Space heating kWh	934.3675	772.7935	699.1822	455.7813	256.5879	0.0000	0.0000	0.0000	0.0000	411.5284	675.0714	932.5746	(98a)
Space heating requirement - total per year (kWh/year)												5137.8868	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	934.3675	772.7935	699.1822	455.7813	256.5879	0.0000	0.0000	0.0000	0.0000	411.5284	675.0714	932.5746	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5137.8868	
Space heating per m2											(98c) / (4) =	64.1194	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	934.3675	772.7935	699.1822	455.7813	256.5879	0.0000	0.0000	0.0000	0.0000	411.5284	675.0714	932.5746	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	934.3675	772.7935	699.1822	455.7813	256.5879	0.0000	0.0000	0.0000	0.0000	411.5284	675.0714	932.5746	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	28.1200	22.5589	20.3118	14.8813	11.4948	9.3913	10.4859	13.6300	17.7040	23.2286	26.2366	28.9016	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												5137.8868	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2690.1265	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												226.9448	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												8054.9581	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	

Space heating - main system 1	5137.8868	16.4900	847.2375	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	16.4900	443.6019	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	226.9448	16.4900	37.4232	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1328.2626	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.8214	(257)
SAP value		38.6419	
SAP rating (Section 12)		39	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5137.8868	0.1541	791.8834	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2690.1265	0.1413	380.0853	(264)
Space and water heating			1171.9686	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	226.9448	0.1443	32.7551	(268)
Total CO2, kg/year			1204.7238	(272)
CO2 emissions per m2			15.0300	(273)
EI value			87.0988	
EI rating			87	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	80.1300	(1b) x	2.5000	(2b) =	200.3250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		200.3250	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8498	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7585	0.6990	0.6841	0.6395	0.6395	0.5949	0.5949	0.5800	0.5949	0.6692	0.6544	0.6990	(22b)
Effective ac	0.7876	0.7443	0.7340	0.7045	0.7045	0.6769	0.6769	0.6682	0.6769	0.7239	0.7141	0.7443	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.1800	14.4234	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.2600	7.3450	190.0000	5367.5000	(29a)

External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900 (30)
Total net area of external elements Aum(A, m2)			195.5600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.5817		(33)
Main dwelling							
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000 (32)
Internal Walls			122.3600			9.0000	1101.2400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 21513.8300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	268.4866 (35)
Thermal bridges (Default value 0.200 * total exposed area)	39.1120 (36)
Point Thermal bridges	(36a) = 0.0000
Total fabric heat loss	(33) + (36) + (36a) = 84.6937 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	49.2033	48.5234	46.5714	46.5714	44.7510	44.7510	44.1734	44.7510	47.8581	47.2074	49.2033	(38)
Heat transfer coeff	136.7629	133.8970	133.2171	131.2651	131.2651	129.4447	129.4447	128.8672	129.4447	132.5518	131.9012	133.8970	(39)
Average = Sum(39)m / 12 =												131.8299	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7068	1.6710	1.6625	1.6382	1.6382	1.6154	1.6154	1.6082	1.6154	1.6542	1.6461	1.6710	(40)
HLP (average)												1.6452	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4653	(42)
Hot water usage for mixer showers	90.1382	88.7836	86.8097	83.0330	80.2458	77.1376	75.3709	77.3299	79.4773	82.8146	86.6724	89.7929	(42a)
Hot water usage for baths	28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183	(42b)
Hot water usage for other uses	39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774	(42c)
Average daily hot water use (litres/day)												145.6082	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	158.3296	155.1045	151.0883	144.7696	139.7149	134.2500	131.9937	135.9908	140.2285	145.9859	152.4081	157.8886	(44)
Energy conte	250.7555	220.8667	232.2171	198.1824	188.0831	165.0761	159.6349	168.3850	172.9158	198.1014	217.1333	247.2153	(45)
Energy content (annual)										Total = Sum(45)m =		2418.5665	
Distribution loss (46)m = 0.15 x (45)m	37.6133	33.1300	34.8326	29.7274	28.2125	24.7614	23.9452	25.2577	25.9374	29.7152	32.5700	37.0823	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
										Total per year (kWh/year) = Sum(64)m =		2690.1265	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	101.8274	90.1038	95.6634	83.7516	80.9888	72.7438	71.5298	74.4392	75.3505	84.3199	90.0528	100.6503	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	32.1264	28.5344	23.2057	17.5682	13.1324	11.0870	11.9799	15.5719	20.9005	26.5380	30.9738	33.0193	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)	136.8648	134.0830	128.5798	116.3217	108.8559	101.0331	96.1422	100.0527	104.6535	113.3332	125.0734	135.2827	(72)
Total internal gains	598.4833	595.5124	576.1054	539.9544	505.0086	473.4820	455.0150	459.1146	477.6191	510.1918	549.4119	583.3250	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	15.0428	0.4600	0.7000	0.7700	14.8368	(75)
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)
Northeast	2.1200	35.0000	0.4600	0.7000	1.0000	21.5032	(82)

Solar gains	63.5648	103.6851	167.6921	252.0822	301.6358	338.2744	312.6335	268.8103	207.2278	129.1161	77.8743	50.3850	(83)
Total gains	662.0481	699.1975	743.7975	792.0366	806.6444	811.7564	767.6485	727.9248	684.8469	639.3079	627.2862	633.7100	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	43.6965	44.6318	44.8596	45.5267	45.5267	46.1669	46.1669	46.3738	46.1669	45.0847	45.3071	44.6318	
alpha	3.9131	3.9755	3.9906	4.0351	4.0351	4.0778	4.0778	4.0916	4.0778	4.0056	4.0205	3.9755	
util living area	0.9929	0.9908	0.9833	0.9623	0.9041	0.7552	0.5862	0.6098	0.8501	0.9627	0.9875	0.9938	(86)
MIT	19.2974	19.4273	19.7297	20.1439	20.5647	20.8691	20.9661	20.9614	20.7724	20.2976	19.7860	19.3232	(87)
Th 2	19.5360	19.5617	19.5678	19.5855	19.5855	19.6020	19.6020	19.6073	19.6020	19.5738	19.5797	19.5617	(88)
util rest of house	0.9900	0.9870	0.9760	0.9437	0.8492	0.6204	0.3831	0.4022	0.7435	0.9382	0.9813	0.9912	(89)
MIT 2	17.6448	17.8264	18.2140	18.7427	19.2384	19.5414	19.5962	19.6005	19.4721	18.9312	18.2960	17.6942	(90)
Living area fraction										fLA = Living area / (4) =		0.4488	(91)
MIT	18.3864	18.5448	18.8942	19.3715	19.8336	20.1373	20.2110	20.2112	20.0556	19.5444	18.9647	18.4253	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3864	18.5448	18.8942	19.3715	19.8336	20.1373	20.2110	20.2112	20.0556	19.5444	18.9647	18.4253	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9867	0.9832	0.9712	0.9400	0.8609	0.6779	0.4768	0.4982	0.7844	0.9376	0.9774	0.9882	(94)
Useful gains	653.2435	687.4769	722.3583	744.5361	694.4077	550.2793	365.9819	362.6594	537.1992	599.3971	613.0949	626.2586	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1776.0598	1719.8839	1544.5492	1282.6622	949.5197	613.2136	376.8122	375.1587	654.4258	1026.5325	1393.4935	1730.6544	(97)
Space heating kWh	835.3753	693.7775	611.7101	387.4508	189.8034	0.0000	0.0000	0.0000	0.0000	317.7888	561.8870	821.6704	(98a)
Space heating requirement - total per year (kWh/year)												4419.4632	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	835.3753	693.7775	611.7101	387.4508	189.8034	0.0000	0.0000	0.0000	0.0000	317.7888	561.8870	821.6704	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4419.4632	
Space heating per m2											(98c) / (4) =	55.1537	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	835.3753	693.7775	611.7101	387.4508	189.8034	0.0000	0.0000	0.0000	0.0000	317.7888	561.8870	821.6704	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	835.3753	693.7775	611.7101	387.4508	189.8034	0.0000	0.0000	0.0000	0.0000	317.7888	561.8870	821.6704	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	28.1200	22.5589	20.3118	14.8813	11.4948	9.3913	10.4859	13.6300	17.7040	23.2286	26.2366	28.9016	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 4419.4632 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 2690.1265 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 226.9448 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7336.5345	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4419.4632	27.6700	1222.8655	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	27.6700	744.3580	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	226.9448	27.6700	62.7956	(250)
Additional standing charges			0.0000	(251)
Total energy cost			2030.0191	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4419.4632	0.1546	683.2182	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2690.1265	0.1413	380.0853	(264)
Space and water heating			1063.3035	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	226.9448	0.1443	32.7551	(268)
Total CO2, kg/year			1096.0586	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4419.4632	1.5724	6948.9911	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	1.5225	4095.5963	(278)
Space and water heating			11044.5873	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	226.9448	1.5338	348.0955	(282)
Total Primary energy kWh/year			11392.6828	(286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: E 39
Current environmental impact rating: B 87

N	Solar water heating		Not applicable
U	Solar photovoltaic panels		Not applicable
V2	Wind turbine		Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 39
Potential environmental impact rating: B 87

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£2030	£2030	£0
Space heating	£1223	£1223	£0
Water heating	£744	£744	£0
Lighting	£63	£63	£0
Total cost of fuels	£2030	£2030	£0
Total cost of uses	£2030	£2030	£0
Delivered energy	92 kWh/m²	92 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m²	14 kg/m²	14 kg/m²	0 kg/m²
Primary energy	142 kWh/m²	142 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	80.1300	(1b)	x 2.5000	(2b) =	200.3250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		200.3250	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8498 (18)
Number of sides sheltered		4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7585	0.7436	0.7287	0.6544	0.6395	0.5651	0.5651	0.5503	0.5949	0.6395	0.6692	0.6990	(22b)
Effective ac	0.7876	0.7765	0.7655	0.7141	0.7045	0.6597	0.6597	0.6514	0.6769	0.7045	0.7239	0.7443	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.1800	14.4234	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.2600	7.3450	190.0000	5367.5000	(29a)
External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900	(30)
Total net area of external elements Aum(A, m2)			195.5600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.5817			(33)
Main dwelling								
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000	(32)
Internal Walls			122.3600			9.0000	1101.2400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21513.8300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		268.4866 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.1120 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	84.6937 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	51.3307	50.6070	47.2074	46.5714	43.6105	43.6105	43.0622	44.7510	46.5714	47.8581	49.2033	(38)
Heat transfer coeff	136.7629	136.0245	135.3007	131.9012	131.2651	128.3042	128.3042	127.7559	129.4447	131.2651	132.5518	133.8970	(39)
Average = Sum(39)m / 12 =												131.8981	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7068	1.6975	1.6885	1.6461	1.6382	1.6012	1.6012	1.5944	1.6154	1.6382	1.6542	1.6710	(40)
HLP (average)												1.6461	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.4653 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
90.1382	88.7836	86.8097	83.0330	80.2458	77.1376	75.3709	77.3299	79.4773	82.8146	86.6724	89.7929	(42a)

Hot water usage for baths

28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183	(42b)

Hot water usage for other uses

39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774	(42c)

Average daily hot water use (litres/day)	145.6082 (43)

Daily hot water use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
158.3296	155.1045	151.0883	144.7696	139.7149	134.2500	131.9937	135.9908	140.2285	145.9859	152.4081	157.8886	(44)
Energy conte 250.7555	220.8667	232.2171	198.1824	188.0831	165.0761	159.6349	168.3850	172.9158	198.1014	217.1333	247.2153	(45)

Energy content (annual)	Total = Sum(45)m =	2418.5665
Distribution loss (46)m = 0.15 x (45)m		

	37.6133	33.1300	34.8326	29.7274	28.2125	24.7614	23.9452	25.2577	25.9374	29.7152	32.5700	37.0823 (46)
Water storage loss (or HIU loss):												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												0.7440 (55)
Total storage loss												
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (56)
If cylinder contains dedicated solar storage												
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793 (64)
									Total per year (kWh/year) = Sum(64)m =			2690.1265 (64)
Electric shower(s)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				0.0000 (64a)
Heat gains from water heating, kWh/month												
	101.8274	90.1038	95.6634	83.7516	80.9888	72.7438	71.5298	74.4392	75.3505	84.3199	90.0528	100.6503 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	32.1264	28.5344	23.2057	17.5682	13.1324	11.0870	11.9799	15.5719	20.9005	26.5380	30.9738	33.0193	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)													
	136.8648	134.0830	128.5798	116.3217	108.8559	101.0331	96.1422	100.0527	104.6535	113.3332	125.0734	135.2827	(72)
Total internal gains													
	598.4833	595.5124	576.1054	539.9544	505.0086	473.4820	455.0150	459.1146	477.6191	510.1918	549.4119	583.3250	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	11.2829	0.4600	0.7000	0.7700	11.1284	(75)
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Northeast	2.1200	26.0000	0.4600	0.7000	1.0000	15.9738	(82)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	48.6955	92.6100	150.1182	221.5380	277.8995	288.2653	272.8211	229.3534	174.8758	108.8830	60.1407	40.4693	(83)
Total gains	647.1788	688.1223	726.2236	761.4923	782.9082	761.7472	727.8360	688.4680	652.4950	619.0748	609.5526	623.7943	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	43.6965	43.9337	44.1688	45.3071	45.5267	46.5773	46.5773	46.7772	46.1669	45.5267	45.0847	44.6318
alpha	3.9131	3.9289	3.9446	4.0205	4.0351	4.1052	4.1052	4.1185	4.0778	4.0351	4.0056	3.9755
util living area												
	0.9948	0.9927	0.9874	0.9726	0.9331	0.8331	0.6912	0.7363	0.9060	0.9771	0.9920	0.9956 (86)
MIT	19.1083	19.2594	19.5601	20.0040	20.4284	20.7812	20.9280	20.9052	20.6466	20.1136	19.5604	19.1112 (87)
Th 2	19.5360	19.5426	19.5491	19.5797	19.5855	19.6125	19.6125	19.6175	19.6020	19.5855	19.5738	19.5617 (88)
util rest of house												
	0.9929	0.9899	0.9821	0.9594	0.8954	0.7309	0.5117	0.5661	0.8366	0.9633	0.9883	0.9939 (89)
MIT 2	17.4031	17.6001	17.9871	18.5665	19.0857	19.4824	19.5913	19.5854	19.3522	18.7131	18.0054	17.4230 (90)
Living area fraction										fLA = Living area / (4) =		0.4488 (91)
MIT	18.1683	18.3448	18.6930	19.2116	19.6882	20.0653	20.1912	20.1777	19.9331	19.3416	18.7033	18.1806 (92)
Temperature adjustment												0.0000
adjusted MIT	18.1683	18.3448	18.6930	19.2116	19.6882	20.0653	20.1912	20.1777	19.9331	19.3416	18.7033	18.1806 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9901	0.9865	0.9776	0.9548	0.8988	0.7695	0.5937	0.6431	0.8569	0.9600	0.9850	0.9915	(94)
Useful gains	640.8008	678.8252	709.9660	727.0791	703.7023	586.1562	432.1045	442.7360	559.1470	594.3324	600.4330	618.5032	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1896.6711	1828.8155	1649.7270	1360.1087	1048.5785	701.2195	460.7616	482.6187	755.0661	1147.4620	1538.0323	1871.9638	(97)
Space heating kWh													
	934.3675	772.7935	699.1822	455.7813	256.5879	0.0000	0.0000	0.0000	0.0000	411.5284	675.0714	932.5746	(98a)
Space heating requirement - total per year (kWh/year)												5137.8868	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	934.3675	772.7935	699.1822	455.7813	256.5879	0.0000	0.0000	0.0000	0.0000	411.5284	675.0714	932.5746	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5137.8868	
Space heating per m2											(98c) / (4) =	64.1194	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	934.3675	772.7935	699.1822	455.7813	256.5879	0.0000	0.0000	0.0000	0.0000	411.5284	675.0714	932.5746	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	934.3675	772.7935	699.1822	455.7813	256.5879	0.0000	0.0000	0.0000	0.0000	411.5284	675.0714	932.5746	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	28.1200	22.5589	20.3118	14.8813	11.4948	9.3913	10.4859	13.6300	17.7040	23.2286	26.2366	28.9016	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 5137.8868 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 2690.1265 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 226.9448 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation 0.0000 (233)
Wind generation 0.0000 (234)
Hydro-electric generation (Appendix N) 0.0000 (235a)
Electricity generated - Micro CHP (Appendix N) 0.0000 (235)
Appendix Q - special features
Energy saved or generated -0.0000 (236)
Energy used 0.0000 (237)
Total delivered energy for all uses 8054.9581 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	5137.8868	16.4900	847.2375	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	16.4900	443.6019	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	226.9448	16.4900	37.4232	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1328.2626	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12): 0.3600 (256)
Energy cost factor (ECF) [(255) x (256)] / [(4) + 45.0] = 3.8214 (257)
SAP value 38.6419
SAP rating (Section 12) 39 (258)
SAP band E

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5137.8868	0.1541	791.8834	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2690.1265	0.1413	380.0853	(264)
Space and water heating			1171.9686	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	226.9448	0.1443	32.7551	(268)
Total CO2, kg/year			1204.7238	(272)
CO2 emissions per m2			15.0300	(273)
EI value			87.0988	
EI rating			87	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	80.1300	(1b) x	2.5000	(2b) =	200.3250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		200.3250	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8498	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7585	0.6990	0.6841	0.6395	0.6395	0.5949	0.5949	0.5800	0.5949	0.6692	0.6544	0.6990	(22b)
Effective ac	0.7876	0.7443	0.7340	0.7045	0.7045	0.6769	0.6769	0.6682	0.6769	0.7239	0.7141	0.7443	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.1800	14.4234	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.2600	7.3450	190.0000	5367.5000	(29a)
External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900	(30)
Total net area of external elements Aum(A, m2)			195.5600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.5817			(33)
Main dwelling								
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000	(32)
Internal Walls			122.3600			9.0000	1101.2400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21513.8300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		268.4866 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.1120 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	84.6937 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	49.2033	48.5234	46.5714	46.5714	44.7510	44.7510	44.1734	44.7510	47.8581	47.2074	49.2033	(38)
Heat transfer coeff	136.7629	133.8970	133.2171	131.2651	131.2651	129.4447	129.4447	128.8672	129.4447	132.5518	131.9012	133.8970	(39)
Average = Sum(39)m / 12 =												131.8299	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7068	1.6710	1.6625	1.6382	1.6382	1.6154	1.6154	1.6082	1.6154	1.6542	1.6461	1.6710	(40)
HLP (average)												1.6452	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4653	(42)
Hot water usage for mixer showers													
	90.1382	88.7836	86.8097	83.0330	80.2458	77.1376	75.3709	77.3299	79.4773	82.8146	86.6724	89.7929	(42a)
Hot water usage for baths													
	28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183	(42b)
Hot water usage for other uses													
	39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774	(42c)
Average daily hot water use (litres/day)												145.6082	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	158.3296	155.1045	151.0883	144.7696	139.7149	134.2500	131.9937	135.9908	140.2285	145.9859	152.4081	157.8886	(44)
Energy conte	250.7555	220.8667	232.2171	198.1824	188.0831	165.0761	159.6349	168.3850	172.9158	198.1014	217.1333	247.2153	(45)
Energy content (annual)										Total = Sum(45)m =		2418.5665	
Distribution loss (46)m = 0.15 x (45)m													
	37.6133	33.1300	34.8326	29.7274	28.2125	24.7614	23.9452	25.2577	25.9374	29.7152	32.5700	37.0823	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
										Total per year (kWh/year) = Sum(64)m =		2690.1265	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	101.8274	90.1038	95.6634	83.7516	80.9888	72.7438	71.5298	74.4392	75.3505	84.3199	90.0528	100.6503	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	32.1264	28.5344	23.2057	17.5682	13.1324	11.0870	11.9799	15.5719	20.9005	26.5380	30.9738	33.0193	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)													
	136.8648	134.0830	128.5798	116.3217	108.8559	101.0331	96.1422	100.0527	104.6535	113.3332	125.0734	135.2827	(72)
Total internal gains													
	598.4833	595.5124	576.1054	539.9544	505.0086	473.4820	455.0150	459.1146	477.6191	510.1918	549.4119	583.3250	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	15.0428	0.4600	0.7000	0.7700	14.8368	(75)
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)
Northeast	2.1200	35.0000	0.4600	0.7000	1.0000	21.5032	(82)

Solar gains	63.5648	103.6851	167.6921	252.0822	301.6358	338.2744	312.6335	268.8103	207.2278	129.1161	77.8743	50.3850	(83)
Total gains	662.0481	699.1975	743.7975	792.0366	806.6444	811.7564	767.6485	727.9248	684.8469	639.3079	627.2862	633.7100	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	43.6965	44.6318	44.8596	45.5267	45.5267	46.1669	46.1669	46.3738	46.1669	45.0847	45.3071	44.6318	
alpha	3.9131	3.9755	3.9906	4.0351	4.0351	4.0778	4.0778	4.0916	4.0778	4.0056	4.0205	3.9755	
util living area													
	0.9929	0.9908	0.9833	0.9623	0.9041	0.7552	0.5862	0.6098	0.8501	0.9627	0.9875	0.9938	(86)
MIT	19.2974	19.4273	19.7297	20.1439	20.5647	20.8691	20.9661	20.9614	20.7724	20.2976	19.7860	19.3232	(87)
Th 2	19.5360	19.5617	19.5678	19.5855	19.5855	19.6020	19.6020	19.6073	19.6020	19.5738	19.5797	19.5617	(88)
util rest of house													
	0.9900	0.9870	0.9760	0.9437	0.8492	0.6204	0.3831	0.4022	0.7435	0.9382	0.9813	0.9912	(89)
MIT 2	17.6448	17.8264	18.2140	18.7427	19.2384	19.5414	19.5962	19.6005	19.4721	18.9312	18.2960	17.6942	(90)
Living area fraction										fLA = Living area / (4) =		0.4488	(91)
MIT	18.3864	18.5448	18.8942	19.3715	19.8336	20.1373	20.2110	20.2112	20.0556	19.5444	18.9647	18.4253	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3864	18.5448	18.8942	19.3715	19.8336	20.1373	20.2110	20.2112	20.0556	19.5444	18.9647	18.4253	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9867	0.9832	0.9712	0.9400	0.8609	0.6779	0.4768	0.4982	0.7844	0.9376	0.9774	0.9882	(94)
Useful gains	653.2435	687.4769	722.3583	744.5361	694.4077	550.2793	365.9819	362.6594	537.1992	599.3971	613.0949	626.2586	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1776.0598	1719.8839	1544.5492	1282.6622	949.5197	613.2136	376.8122	375.1587	654.4258	1026.5325	1393.4935	1730.6544	(97)
Space heating kWh													
	835.3753	693.7775	611.7101	387.4508	189.8034	0.0000	0.0000	0.0000	0.0000	317.7888	561.8870	821.6704	(98a)
Space heating requirement - total per year (kWh/year)												4419.4632	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	835.3753	693.7775	611.7101	387.4508	189.8034	0.0000	0.0000	0.0000	0.0000	317.7888	561.8870	821.6704	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4419.4632	
Space heating per m2											(98c) / (4) =	55.1537	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	835.3753	693.7775	611.7101	387.4508	189.8034	0.0000	0.0000	0.0000	0.0000	317.7888	561.8870	821.6704	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	835.3753	693.7775	611.7101	387.4508	189.8034	0.0000	0.0000	0.0000	0.0000	317.7888	561.8870	821.6704	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	273.8195	241.6987	255.2811	220.5024	211.1471	187.3961	182.6989	191.4490	195.2358	221.1654	239.4533	270.2793	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	28.1200	22.5589	20.3118	14.8813	11.4948	9.3913	10.4859	13.6300	17.7040	23.2286	26.2366	28.9016	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4419.4632	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2690.1265	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	226.9448	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7336.5345	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4419.4632	27.6700	1222.8655	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	27.6700	744.3580	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	226.9448	27.6700	62.7956	(250)
Additional standing charges			0.0000	(251)
Total energy cost			2030.0191	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4419.4632	0.1546	683.2182	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2690.1265	0.1413	380.0853	(264)
Space and water heating			1063.3035	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	226.9448	0.1443	32.7551	(268)
Total CO2, kg/year			1096.0586	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4419.4632	1.5724	6948.9911	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2690.1265	1.5225	4095.5963	(278)
Space and water heating			11044.5873	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	226.9448	1.5338	348.0955	(282)
Total Primary energy kWh/year			11392.6828	(286)

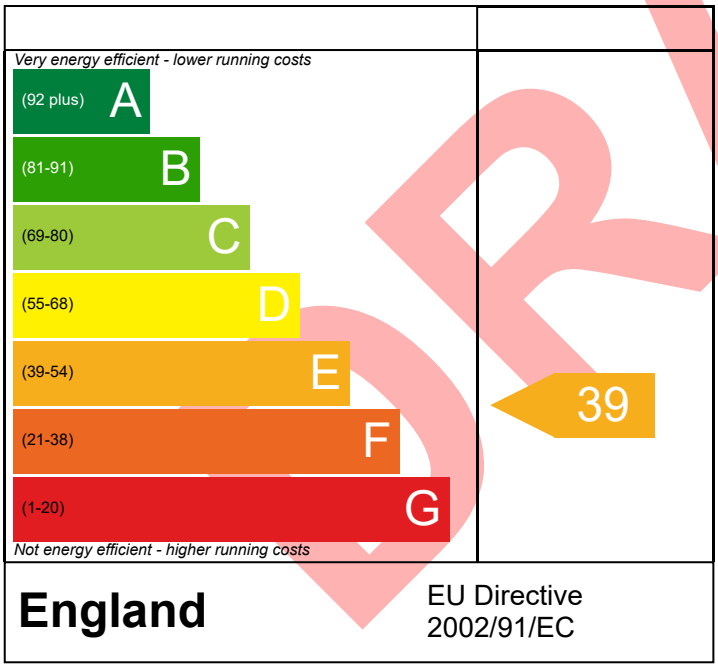
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	80.13 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

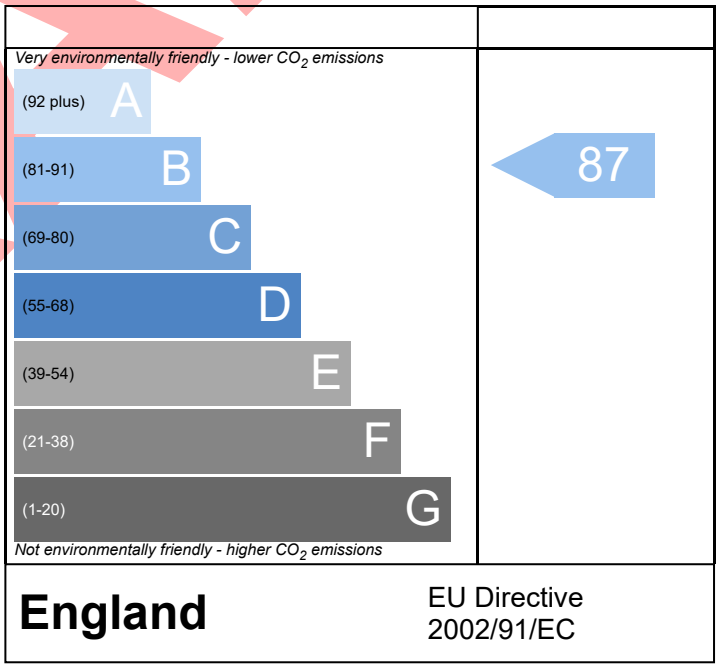
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

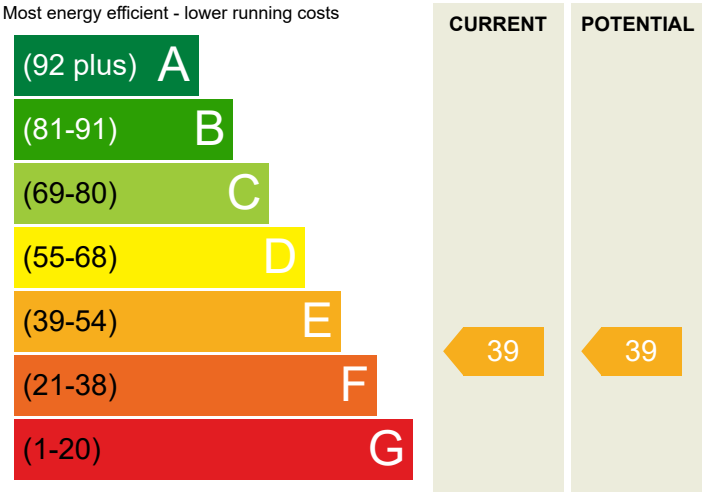
Energy Report

Dwelling Address	
Reference	Flat 3-Be Lean
SAP Version	10.2
Assessment Date	15/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	80

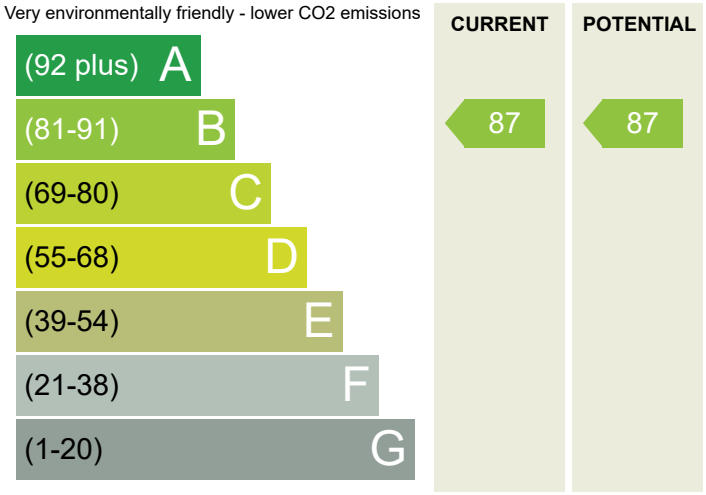
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

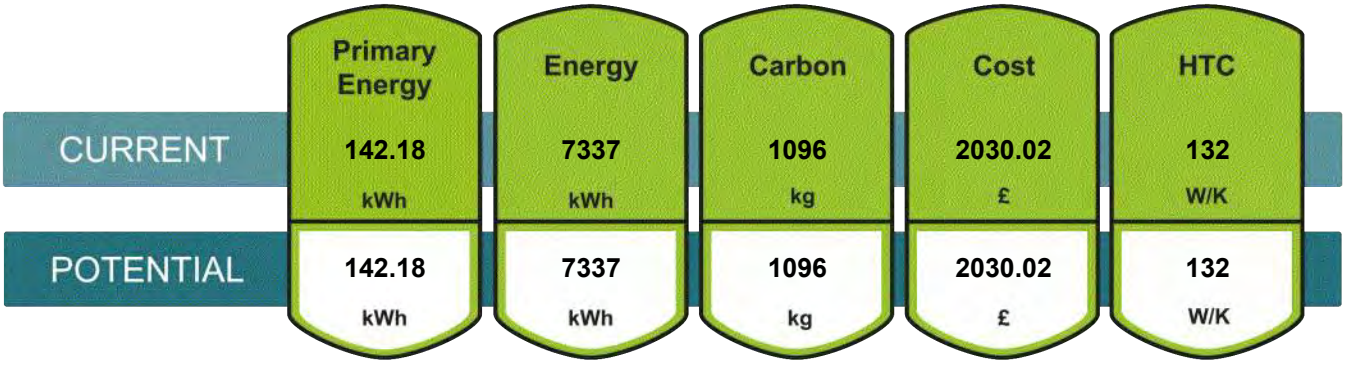


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£63	£63	
Heating	£1223	£1223	
Hot Water	£744	£744	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£2030	£2030	

Estimated energy use and potential savings

Space Heating
4419
kWh per year

Water Heating
2690
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 4	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	40 E	**DER**	15.01	**TER**	
Environmental	87 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.05	**DFEE**	71.66	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	155.81	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	4	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	255.57	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	13.60 m	79.14 m²	2.50 m

8.0 Living Area	40.57	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	34.00	26.95	0.00	None	7.05	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	65.33	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	118.86

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	79.14	77.02	None	0.00	Enter Gross Area	2.12

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	79.14

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Roof Light	Manufacturer	Roof Light	Double glazed			0.65		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SE Windows	Windows	External Wall 1	South East	2.63	
Rooflights	Roof Light	External Roof 1	North East	2.12	0
SW Windows	Windows	External Wall 1	South West	4.42	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	20

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	

Summary for Input Data

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 4	Issued on Date	15/06/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	40 E	DER	15.01	TER	
Environmental	87 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.05	DFEE	71.66	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	155.81	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	79.1400	(1b)	x 2.5000	(2b) =	197.8500	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	197.8500	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8511 (18)
Number of sides sheltered		4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7596	0.7447	0.7298	0.6553	0.6404	0.5660	0.5660	0.5511	0.5958	0.6404	0.6702	0.7000	(22b)
Effective ac	0.7885	0.7773	0.7663	0.7147	0.7051	0.6602	0.6602	0.6518	0.6775	0.7051	0.7246	0.7450	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.1800	14.2452	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.2600	7.0070	190.0000	5120.5000	(29a)
External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800	(30)
Total net area of external elements Aum(A, m2)			192.2800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.9071			(33)
Main dwelling								
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000	(32)
Internal Walls			118.8600			9.0000	1069.7400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		20225.6200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							255.5676	(35)
Thermal bridges (Default value 0.200 * total exposed area)							38.4560	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		83.3631	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	50.7496	50.0327	46.6653	46.0353	43.1023	43.1023	42.5592	44.2321	46.0353	47.3098	48.6423	(38)

Heat transfer coeff

	134.8442	134.1128	133.3958	130.0284	129.3984	126.4655	126.4655	125.9224	127.5952	129.3984	130.6729	132.0054 (39)
Average = Sum(39)m / 12 =												130.0254

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7039	1.6946	1.6856	1.6430	1.6351	1.5980	1.5980	1.5911	1.6123	1.6351	1.6512	1.6680	(40)
HLP (average)												1.6430	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4463 (42)

Hot water usage for mixer showers

	89.7006	88.3526	86.3882	82.6298	79.8562	76.7631	75.0050	76.9545	79.0914	82.4125	86.2516	89.3569 (42a)

Hot water usage for baths

	28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819 (42b)

Hot water usage for other uses

	39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830 (42c)

Average daily hot water use (litres/day) 144.9011 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	157.5608	154.3512	150.3546	144.0666	139.0364	133.5981	131.3527	135.3304	139.5475	145.2769	151.6680	157.1218	(44)
Energy conte	249.5377	219.7941	231.0894	197.2200	187.1697	164.2745	158.8597	167.5673	172.0760	197.1394	216.0789	246.0148	(45)
Energy content (annual)										Total = Sum(45)m =		2406.8214	
Distribution loss (46)m = 0.15 x (45)m													
	37.4307	32.9691	34.6634	29.5830	28.0755	24.6412	23.8290	25.1351	25.8114	29.5709	32.4118	36.9022	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
									Total per year (kWh/year) = Sum(64)m =			2678.3814	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
	101.4225	89.7471	95.2884	83.4316	80.6851	72.4773	71.2721	74.1673	75.0713	84.0000	89.7022	100.2511	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	28.5578	25.3647	20.6280	15.6167	11.6737	9.8554	10.6491	13.8421	18.5789	23.5902	27.5332	29.3515	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)													
	136.3206	133.5523	128.0758	115.8773	108.4478	100.6629	95.7958	99.6872	104.2657	112.9033	124.5864	134.7461	(72)
Total internal gains													
	590.7560	588.1654	569.4582	534.1656	499.9668	468.9103	450.5047	454.2185	472.0277	503.7593	542.2117	575.6431	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Southwest	4.4200	36.7938	0.4600	0.7000	0.7700	36.2900	(79)
Northeast	2.1200	26.0000	0.6500	0.7000	1.0000	22.5716	(82)

Solar gains	80.4549	145.4762	218.2457	297.3739	353.9081	359.4993	343.2782	300.5229	245.9089	166.2676	97.9795	67.7670	(83)
Total gains	671.2109	733.6417	787.7039	831.5396	853.8749	828.4096	793.7829	754.7414	717.9365	670.0269	640.1912	643.4101	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6646	41.8918	42.1170	43.2077	43.4181	44.4250	44.4250	44.6166	44.0317	43.4181	42.9946	42.5606	
alpha	3.7776	3.7928	3.8078	3.8805	3.8945	3.9617	3.9617	3.9744	3.9354	3.8945	3.8663	3.8374	
util living area													
	0.9927	0.9889	0.9804	0.9585	0.9062	0.7891	0.6391	0.6823	0.8697	0.9657	0.9884	0.9938	(86)
MIT	19.0798	19.2611	19.5886	20.0504	20.4738	20.8081	20.9394	20.9207	20.6853	20.1442	19.5543	19.0775	(87)
Th 2	19.5381	19.5447	19.5512	19.5819	19.5877	19.6148	19.6148	19.6198	19.6043	19.5877	19.5760	19.5639	(88)

util rest of house	0.9901	0.9849	0.9727	0.9403	0.8600	0.6807	0.4663	0.5152	0.7885	0.9469	0.9835	0.9916	(89)
MIT 2	17.3777	17.6126	18.0319	18.6291	19.1377	19.5037	19.5972	19.5935	19.3895	18.7571	18.0075	17.3910	(90)
Living area fraction										fLA = Living area / (4) =		0.5126	(91)
MIT	18.2503	18.4577	18.8299	19.3577	19.8226	20.1724	20.2853	20.2739	20.0537	19.4682	18.8004	18.2555	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2503	18.4577	18.8299	19.3577	19.8226	20.1724	20.2853	20.2739	20.0537	19.4682	18.8004	18.2555	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9868	0.9807	0.9675	0.9366	0.8691	0.7294	0.5555	0.6008	0.8193	0.9449	0.9796	0.9887	(94)
Useful gains	662.3464	719.4596	762.0849	778.8536	742.1355	604.2182	440.9309	453.4446	588.1807	633.0754	627.1518	636.1467	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1881.1158	1818.2578	1644.7548	1359.8026	1051.0533	704.7158	466.0585	487.8077	759.6689	1147.5302	1528.9313	1855.4073	(97)
Space heating kWh	906.7644	738.3924	656.7064	418.2833	229.8348	0.0000	0.0000	0.0000	0.0000	382.7543	649.2812	907.1299	(98a)
Space heating requirement - total per year (kWh/year)												4889.1467	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	906.7644	738.3924	656.7064	418.2833	229.8348	0.0000	0.0000	0.0000	0.0000	382.7543	649.2812	907.1299	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4889.1467	
Space heating per m2											(98c) / (4) =	61.7785	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	906.7644	738.3924	656.7064	418.2833	229.8348	0.0000	0.0000	0.0000	0.0000	382.7543	649.2812	907.1299	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	906.7644	738.3924	656.7064	418.2833	229.8348	0.0000	0.0000	0.0000	0.0000	382.7543	649.2812	907.1299	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.9964	20.0531	18.0556	13.2283	10.2179	8.3481	9.3211	12.1159	15.7374	20.6483	23.3222	25.6912	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4889.1467	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2678.3814	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												201.7355	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												7769.2637	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year

Space heating - main system 1	4889.1467	16.4900	806.2203	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	16.4900	441.6651	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	201.7355	16.4900	33.2662	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1281.1516	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.7153	(257)
SAP value		40.1161	
SAP rating (Section 12)		40	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4889.1467	0.1543	754.5324	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2678.3814	0.1413	378.4224	(264)
Space and water heating			1132.9548	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	201.7355	0.1443	29.1167	(268)
Total CO2, kg/year			1162.0715	(272)
CO2 emissions per m2			14.6800	(273)
EI value			87.4563	
EI rating			87	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	79.1400	(1b) x	2.5000	(2b) =	197.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		197.8500	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8511	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7596	0.7000	0.6851	0.6404	0.6404	0.5958	0.5958	0.5809	0.5958	0.6702	0.6553	0.7000	(22b)
Effective ac	0.7885	0.7450	0.7347	0.7051	0.7051	0.6775	0.6775	0.6687	0.6775	0.7246	0.7147	0.7450	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.1800	14.2452	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.2600	7.0070	190.0000	5120.5000	(29a)

External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800 (30)
Total net area of external elements Aum(A, m2)			192.2800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.9071		(33)
Main dwelling							
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000 (32)
Internal Walls			118.8600			9.0000	1069.7400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 20225.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	255.5676 (35)
Thermal bridges (Default value 0.200 * total exposed area)	38.4560 (36)
Point Thermal bridges	(36a) = 0.0000
Total fabric heat loss	(33) + (36) + (36a) = 83.3631 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	48.6423	47.9688	46.0353	46.0353	44.2321	44.2321	43.6600	44.2321	47.3098	46.6653	48.6423	(38)
Heat transfer coeff	134.8442	132.0054	131.3319	129.3984	129.3984	127.5952	127.5952	127.0231	127.5952	130.6729	130.0284	132.0054	(39)
Average = Sum(39)m / 12 =												129.9578	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7039	1.6680	1.6595	1.6351	1.6351	1.6123	1.6123	1.6050	1.6123	1.6512	1.6430	1.6680	(40)
HLP (average)												1.6421	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4463	(42)
Hot water usage for mixer showers	89.7006	88.3526	86.3882	82.6298	79.8562	76.7631	75.0050	76.9545	79.0914	82.4125	86.2516	89.3569	(42a)
Hot water usage for baths	28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819	(42b)
Hot water usage for other uses	39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830	(42c)
Average daily hot water use (litres/day)												144.9011	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	157.5608	154.3512	150.3546	144.0666	139.0364	133.5981	131.3527	135.3304	139.5475	145.2769	151.6680	157.1218	(44)
Energy conte	249.5377	219.7941	231.0894	197.2200	187.1697	164.2745	158.8597	167.5673	172.0760	197.1394	216.0789	246.0148	(45)
Energy content (annual)										Total = Sum(45)m =		2406.8214	
Distribution loss (46)m = 0.15 x (45)m	37.4307	32.9691	34.6634	29.5830	28.0755	24.6412	23.8290	25.1351	25.8114	29.5709	32.4118	36.9022	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
										Total per year (kWh/year) = Sum(64)m =		2678.3814	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	101.4225	89.7471	95.2884	83.4316	80.6851	72.4773	71.2721	74.1673	75.0713	84.0000	89.7022	100.2511	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	28.5578	25.3647	20.6280	15.6167	11.6737	9.8554	10.6491	13.8421	18.5789	23.5902	27.5332	29.3515	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)	136.3206	133.5523	128.0758	115.8773	108.4478	100.6629	95.7958	99.6872	104.2657	112.9033	124.5864	134.7461	(72)
Total internal gains	590.7560	588.1654	569.4582	534.1656	499.9668	468.9103	450.5047	454.2185	472.0277	503.7593	542.2117	575.6431	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)
Southwest	4.4200	46.3896	0.4600	0.7000	0.7700	45.7543	(79)
Northeast	2.1200	35.0000	0.6500	0.7000	1.0000	30.3849	(82)

Solar gains	103.3641	159.9970	239.3210	332.9034	379.1689	417.1577	388.6708	346.9830	286.2118	193.5711	124.7874	83.0968	(83)
Total gains	694.1201	748.1625	808.7792	867.0690	879.1358	886.0680	839.1754	801.2014	758.2394	697.3304	666.9991	658.7399	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6646	42.5606	42.7788	43.4181	43.4181	44.0317	44.0317	44.2300	44.0317	42.9946	43.2077	42.5606	
alpha	3.7776	3.8374	3.8519	3.8945	3.8945	3.9354	3.9354	3.9487	3.9354	3.8663	3.8805	3.8374	
util living area	0.9898	0.9860	0.9742	0.9438	0.8705	0.7041	0.5354	0.5548	0.8012	0.9450	0.9816	0.9912	(86)
MIT	19.2845	19.4383	19.7663	20.1956	20.6060	20.8885	20.9720	20.9687	20.8057	20.3364	19.7969	19.3030	(87)
Th 2	19.5381	19.5639	19.5700	19.5877	19.5877	19.6043	19.6043	19.6096	19.6043	19.5760	19.5819	19.5639	(88)
util rest of house	0.9859	0.9806	0.9637	0.9190	0.8067	0.5692	0.3467	0.3617	0.6855	0.9129	0.9731	0.9878	(89)
MIT 2	17.6389	17.8500	18.2677	18.8089	19.2813	19.5538	19.5995	19.6040	19.4976	18.9811	18.3186	17.6791	(90)
Living area fraction									fLA = Living area / (4) =			0.5126	(91)
MIT	18.4825	18.6642	19.0359	19.5197	19.9604	20.2380	20.3031	20.3036	20.1682	19.6759	19.0764	18.5115	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4825	18.6642	19.0359	19.5197	19.9604	20.2380	20.3031	20.3036	20.1682	19.6759	19.0764	18.5115	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9819	0.9760	0.9585	0.9175	0.8263	0.6354	0.4450	0.4625	0.7383	0.9157	0.9689	0.9843	(94)
Useful gains	681.5576	730.2381	775.2486	795.5245	726.3900	563.0389	373.4519	370.5722	559.8173	638.5688	646.2628	648.3712	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1764.1024	1711.3489	1541.3005	1283.5986	952.4242	617.3073	383.1756	381.5257	659.4315	1029.1681	1388.2389	1717.5924	(97)
Space heating kWh	805.4133	659.3064	569.9427	351.4133	168.1694	0.0000	0.0000	0.0000	0.0000	290.6059	534.2228	795.5006	(98a)
Space heating requirement - total per year (kWh/year)												4174.5745	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	805.4133	659.3064	569.9427	351.4133	168.1694	0.0000	0.0000	0.0000	0.0000	290.6059	534.2228	795.5006	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4174.5745	
Space heating per m2											(98c) / (4) =	52.7492	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	805.4133	659.3064	569.9427	351.4133	168.1694	0.0000	0.0000	0.0000	0.0000	290.6059	534.2228	795.5006	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	805.4133	659.3064	569.9427	351.4133	168.1694	0.0000	0.0000	0.0000	0.0000	290.6059	534.2228	795.5006	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.9964	20.0531	18.0556	13.2283	10.2179	8.3481	9.3211	12.1159	15.7374	20.6483	23.3222	25.6912	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 4174.5745 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2678.3814 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 201.7355 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7054.6915	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4174.5745	27.6700	1155.1048	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	27.6700	741.1081	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	201.7355	27.6700	55.8202	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1952.0331	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4174.5745	0.1548	646.2797	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2678.3814	0.1413	378.4224	(264)
Space and water heating			1024.7022	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	201.7355	0.1443	29.1167	(268)
Total CO2, kg/year			1053.8188	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4174.5745	1.5732	6567.3211	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	1.5225	4077.7022	(278)
Space and water heating			10645.0233	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	201.7355	1.5338	309.4287	(282)
Total Primary energy kWh/year			10954.4520	(286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: E 40
Current environmental impact rating: B 87

N	Solar water heating	Not applicable
U	Solar photovoltaic panels	Not applicable
V2	Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 40
Potential environmental impact rating: B 87

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1952	£1952	£0
Space heating	£1155	£1155	£0
Water heating	£741	£741	£0
Lighting	£56	£56	£0
Total cost of fuels	£1952	£1952	£0
Total cost of uses	£1952	£1952	£0
Delivered energy	89 kWh/m²	89 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m²	13 kg/m²	13 kg/m²	0 kg/m²
Primary energy	138 kWh/m²	138 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	79.1400	(1b)	x 2.5000	(2b) =	197.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	197.8500	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8511 (18)
Number of sides sheltered		4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7596	0.7447	0.7298	0.6553	0.6404	0.5660	0.5660	0.5511	0.5958	0.6404	0.6702	0.7000	(22b)
Effective ac	0.7885	0.7773	0.7663	0.7147	0.7051	0.6602	0.6602	0.6518	0.6775	0.7051	0.7246	0.7450	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.1800	14.2452	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.2600	7.0070	190.0000	5120.5000	(29a)
External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800	(30)
Total net area of external elements Aum(A, m2)			192.2800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.9071			(33)
Main dwelling								
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000	(32)
Internal Walls			118.8600			9.0000	1069.7400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	20225.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		255.5676 (35)
Thermal bridges (Default value 0.200 * total exposed area)		38.4560 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	83.3631 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	50.7496	50.0327	46.6653	46.0353	43.1023	43.1023	42.5592	44.2321	46.0353	47.3098	48.6423	(38)
Heat transfer coeff	134.8442	134.1128	133.3958	130.0284	129.3984	126.4655	126.4655	125.9224	127.5952	129.3984	130.6729	132.0054	(39)
Average = Sum(39)m / 12 =												130.0254	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7039	1.6946	1.6856	1.6430	1.6351	1.5980	1.5980	1.5911	1.6123	1.6351	1.6512	1.6680	(40)
HLP (average)												1.6430	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.4463 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
89.7006	88.3526	86.3882	82.6298	79.8562	76.7631	75.0050	76.9545	79.0914	82.4125	86.2516	89.3569	(42a)

Hot water usage for baths

28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819	(42b)

Hot water usage for other uses

39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830	(42c)

Average daily hot water use (litres/day)		144.9011 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	157.5608	154.3512	150.3546	144.0666	139.0364	133.5981	131.3527	135.3304	139.5475	145.2769	151.6680	157.1218	(44)
Energy conte	249.5377	219.7941	231.0894	197.2200	187.1697	164.2745	158.8597	167.5673	172.0760	197.1394	216.0789	246.0148	(45)
Energy content (annual)										Total = Sum(45)m =		2406.8214	
Distribution loss (46)m = 0.15 x (45)m													

	37.4307	32.9691	34.6634	29.5830	28.0755	24.6412	23.8290	25.1351	25.8114	29.5709	32.4118	36.9022	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
										Total per year (kWh/year) = Sum(64)m =		2678.3814	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	101.4225	89.7471	95.2884	83.4316	80.6851	72.4773	71.2721	74.1673	75.0713	84.0000	89.7022	100.2511	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	28.5578	25.3647	20.6280	15.6167	11.6737	9.8554	10.6491	13.8421	18.5789	23.5902	27.5332	29.3515	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)													
	136.3206	133.5523	128.0758	115.8773	108.4478	100.6629	95.7958	99.6872	104.2657	112.9033	124.5864	134.7461	(72)
Total internal gains													
	590.7560	588.1654	569.4582	534.1656	499.9668	468.9103	450.5047	454.2185	472.0277	503.7593	542.2117	575.6431	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Southwest	4.4200	36.7938	0.4600	0.7000	0.7700	36.2900	(79)
Northeast	2.1200	26.0000	0.6500	0.7000	1.0000	22.5716	(82)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	80.4549	145.4762	218.2457	297.3739	353.9081	359.4993	343.2782	300.5229	245.9089	166.2676	97.9795	67.7670	(83)
Total gains	671.2109	733.6417	787.7039	831.5396	853.8749	828.4096	793.7829	754.7414	717.9365	670.0269	640.1912	643.4101	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6646	41.8918	42.1170	43.2077	43.4181	44.4250	44.4250	44.6166	44.0317	43.4181	42.9946	42.5606	
alpha	3.7776	3.7928	3.8078	3.8805	3.8945	3.9617	3.9617	3.9744	3.9354	3.8945	3.8663	3.8374	
util living area													
	0.9927	0.9889	0.9804	0.9585	0.9062	0.7891	0.6391	0.6823	0.8697	0.9657	0.9884	0.9938	(86)
MIT	19.0798	19.2611	19.5886	20.0504	20.4738	20.8081	20.9394	20.9207	20.6853	20.1442	19.5543	19.0775	(87)
Th 2	19.5381	19.5447	19.5512	19.5819	19.5877	19.6148	19.6148	19.6198	19.6043	19.5877	19.5760	19.5639	(88)
util rest of house													
	0.9901	0.9849	0.9727	0.9403	0.8600	0.6807	0.4663	0.5152	0.7885	0.9469	0.9835	0.9916	(89)
MIT 2	17.3777	17.6126	18.0319	18.6291	19.1377	19.5037	19.5972	19.5935	19.3895	18.7571	18.0075	17.3910	(90)
Living area fraction										fLA = Living area / (4) =		0.5126	(91)
MIT	18.2503	18.4577	18.8299	19.3577	19.8226	20.1724	20.2853	20.2739	20.0537	19.4682	18.8004	18.2555	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2503	18.4577	18.8299	19.3577	19.8226	20.1724	20.2853	20.2739	20.0537	19.4682	18.8004	18.2555	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9868	0.9807	0.9675	0.9366	0.8691	0.7294	0.5555	0.6008	0.8193	0.9449	0.9796	0.9887	(94)
Useful gains	662.3464	719.4596	762.0849	778.8536	742.1355	604.2182	440.9309	453.4446	588.1807	633.0754	627.1518	636.1467	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1881.1158	1818.2578	1644.7548	1359.8026	1051.0533	704.7158	466.0585	487.8077	759.6689	1147.5302	1528.9313	1855.4073	(97)
Space heating kWh													
	906.7644	738.3924	656.7064	418.2833	229.8348	0.0000	0.0000	0.0000	0.0000	382.7543	649.2812	907.1299	(98a)
Space heating requirement - total per year (kWh/year)												4889.1467	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	906.7644	738.3924	656.7064	418.2833	229.8348	0.0000	0.0000	0.0000	0.0000	382.7543	649.2812	907.1299	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4889.1467	
Space heating per m2											(98c) / (4) =	61.7785	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	906.7644	738.3924	656.7064	418.2833	229.8348	0.0000	0.0000	0.0000	0.0000	382.7543	649.2812	907.1299	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	906.7644	738.3924	656.7064	418.2833	229.8348	0.0000	0.0000	0.0000	0.0000	382.7543	649.2812	907.1299	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.9964	20.0531	18.0556	13.2283	10.2179	8.3481	9.3211	12.1159	15.7374	20.6483	23.3222	25.6912	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 4889.1467 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 2678.3814 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 201.7355 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation 0.0000 (233)
Wind generation 0.0000 (234)
Hydro-electric generation (Appendix N) 0.0000 (235a)
Electricity generated - Micro CHP (Appendix N) 0.0000 (235)
Appendix Q - special features
Energy saved or generated -0.0000 (236)
Energy used 0.0000 (237)
Total delivered energy for all uses 7769.2637 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4889.1467	16.4900	806.2203	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	16.4900	441.6651	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	201.7355	16.4900	33.2662	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1281.1516	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12): 0.3600 (256)
Energy cost factor (ECF) [(255) x (256)] / [(4) + 45.0] = 3.7153 (257)
SAP value 40.1161
SAP rating (Section 12) 40 (258)
SAP band E

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4889.1467	0.1543	754.5324	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2678.3814	0.1413	378.4224	(264)
Space and water heating			1132.9548	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	201.7355	0.1443	29.1167	(268)
Total CO2, kg/year			1162.0715	(272)
CO2 emissions per m2			14.6800	(273)
EI value			87.4563	
EI rating			87	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	79.1400	(1b)	x 2.5000	(2b) =	197.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		197.8500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8511	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7596	0.7000	0.6851	0.6404	0.6404	0.5958	0.5958	0.5809	0.5958	0.6702	0.6553	0.7000	(22b)
Effective ac	0.7885	0.7450	0.7347	0.7051	0.7051	0.6775	0.6775	0.6687	0.6775	0.7246	0.7147	0.7450	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.1800	14.2452	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.2600	7.0070	190.0000	5120.5000	(29a)
External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800	(30)
Total net area of external elements Aum(A, m2)			192.2800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.9071			(33)
Main dwelling								
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000	(32)
Internal Walls			118.8600			9.0000	1069.7400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	20225.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		255.5676 (35)
Thermal bridges (Default value 0.200 * total exposed area)		38.4560 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	83.3631 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	48.6423	47.9688	46.0353	46.0353	44.2321	44.2321	43.6600	44.2321	47.3098	46.6653	48.6423	(38)
Heat transfer coeff	134.8442	132.0054	131.3319	129.3984	129.3984	127.5952	127.5952	127.0231	127.5952	130.6729	130.0284	132.0054	(39)
Average = Sum(39)m / 12 =												129.9578	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7039	1.6680	1.6595	1.6351	1.6351	1.6123	1.6123	1.6050	1.6123	1.6512	1.6430	1.6680	(40)
HLP (average)												1.6421	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4463 (42)

Hot water usage for mixer showers

89.7006	88.3526	86.3882	82.6298	79.8562	76.7631	75.0050	76.9545	79.0914	82.4125	86.2516	89.3569 (42a)

Hot water usage for baths

28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819 (42b)

Hot water usage for other uses

39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830 (42c)

Average daily hot water use (litres/day) 144.9011 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	157.5608	154.3512	150.3546	144.0666	139.0364	133.5981	131.3527	135.3304	139.5475	145.2769	151.6680	157.1218	(44)
Energy conte	249.5377	219.7941	231.0894	197.2200	187.1697	164.2745	158.8597	167.5673	172.0760	197.1394	216.0789	246.0148	(45)

Energy content (annual) Total = Sum(45)m = 2406.8214

Distribution loss (46)m = 0.15 x (45)m

37.4307	32.9691	34.6634	29.5830	28.0755	24.6412	23.8290	25.1351	25.8114	29.5709	32.4118	36.9022 (46)

Water storage loss (or HIU loss):

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.2400 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.7440 (55)

Total storage loss

23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (56)

If cylinder contains dedicated solar storage

23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)

Total heat required for water heating calculated for each month

272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788 (62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)

Output from w/h

272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788 (64)

Total per year (kWh/year) = Sum(64)m = 2678.3814 (64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

101.4225	89.7471	95.2884	83.4316	80.6851	72.4773	71.2721	74.1673	75.0713	84.0000	89.7022	100.2511 (65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	28.5578	25.3647	20.6280	15.6167	11.6737	9.8554	10.6491	13.8421	18.5789	23.5902	27.5332	29.3515	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)													
	136.3206	133.5523	128.0758	115.8773	108.4478	100.6629	95.7958	99.6872	104.2657	112.9033	124.5864	134.7461	(72)
Total internal gains													
	590.7560	588.1654	569.4582	534.1656	499.9668	468.9103	450.5047	454.2185	472.0277	503.7593	542.2117	575.6431	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)
Southwest	4.4200	46.3896	0.4600	0.7000	0.7700	45.7543	(79)
Northeast	2.1200	35.0000	0.6500	0.7000	1.0000	30.3849	(82)

Solar gains	103.3641	159.9970	239.3210	332.9034	379.1689	417.1577	388.6708	346.9830	286.2118	193.5711	124.7874	83.0968	(83)
Total gains	694.1201	748.1625	808.7792	867.0690	879.1358	886.0680	839.1754	801.2014	758.2394	697.3304	666.9991	658.7399	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6646	42.5606	42.7788	43.4181	43.4181	44.0317	44.0317	44.2300	44.0317	42.9946	43.2077	42.5606	
alpha	3.7776	3.8374	3.8519	3.8945	3.8945	3.9354	3.9354	3.9487	3.9354	3.8663	3.8805	3.8374	
util living area													
	0.9898	0.9860	0.9742	0.9438	0.8705	0.7041	0.5354	0.5548	0.8012	0.9450	0.9816	0.9912	(86)
MIT	19.2845	19.4383	19.7663	20.1956	20.6060	20.8885	20.9720	20.9687	20.8057	20.3364	19.7969	19.3030	(87)
Th 2	19.5381	19.5639	19.5700	19.5877	19.5877	19.6043	19.6043	19.6096	19.6043	19.5760	19.5819	19.5639	(88)
util rest of house													
	0.9859	0.9806	0.9637	0.9190	0.8067	0.5692	0.3467	0.3617	0.6855	0.9129	0.9731	0.9878	(89)
MIT 2	17.6389	17.8500	18.2677	18.8089	19.2813	19.5538	19.5995	19.6040	19.4976	18.9811	18.3186	17.6791	(90)
Living area fraction									fLA = Living area / (4) =			0.5126	(91)
MIT	18.4825	18.6642	19.0359	19.5197	19.9604	20.2380	20.3031	20.3036	20.1682	19.6759	19.0764	18.5115	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4825	18.6642	19.0359	19.5197	19.9604	20.2380	20.3031	20.3036	20.1682	19.6759	19.0764	18.5115	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9819	0.9760	0.9585	0.9175	0.8263	0.6354	0.4450	0.4625	0.7383	0.9157	0.9689	0.9843	(94)
Useful gains	681.5576	730.2381	775.2486	795.5245	726.3900	563.0389	373.4519	370.5722	559.8173	638.5688	646.2628	648.3712	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1764.1024	1711.3489	1541.3005	1283.5986	952.4242	617.3073	383.1756	381.5257	659.4315	1029.1681	1388.2389	1717.5924	(97)
Space heating kWh													
	805.4133	659.3064	569.9427	351.4133	168.1694	0.0000	0.0000	0.0000	0.0000	290.6059	534.2228	795.5006	(98a)
Space heating requirement - total per year (kWh/year)												4174.5745	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	805.4133	659.3064	569.9427	351.4133	168.1694	0.0000	0.0000	0.0000	0.0000	290.6059	534.2228	795.5006	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4174.5745	
Space heating per m2											(98c) / (4) =	52.7492	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	805.4133	659.3064	569.9427	351.4133	168.1694	0.0000	0.0000	0.0000	0.0000	290.6059	534.2228	795.5006	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	805.4133	659.3064	569.9427	351.4133	168.1694	0.0000	0.0000	0.0000	0.0000	290.6059	534.2228	795.5006	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	272.6017	240.6261	254.1534	219.5400	210.2337	186.5945	181.9237	190.6313	194.3960	220.2034	238.3989	269.0788	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.9964	20.0531	18.0556	13.2283	10.2179	8.3481	9.3211	12.1159	15.7374	20.6483	23.3222	25.6912	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4174.5745	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2678.3814	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	201.7355	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7054.6915	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4174.5745	27.6700	1155.1048	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	27.6700	741.1081	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	201.7355	27.6700	55.8202	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1952.0331	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4174.5745	0.1548	646.2797	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2678.3814	0.1413	378.4224	(264)
Space and water heating			1024.7022	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	201.7355	0.1443	29.1167	(268)
Total CO2, kg/year			1053.8188	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4174.5745	1.5732	6567.3211	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2678.3814	1.5225	4077.7022	(278)
Space and water heating			10645.0233	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	201.7355	1.5338	309.4287	(282)
Total Primary energy kWh/year			10954.4520	(286)

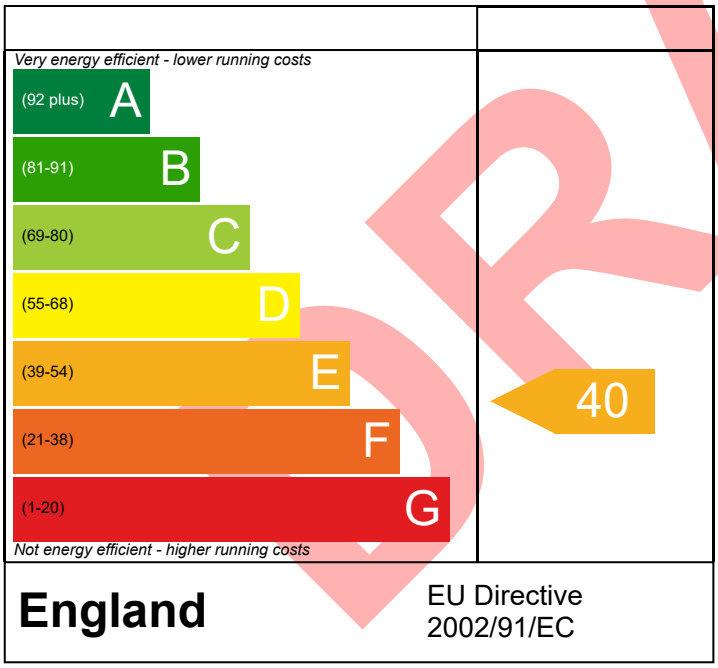
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	79.14 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

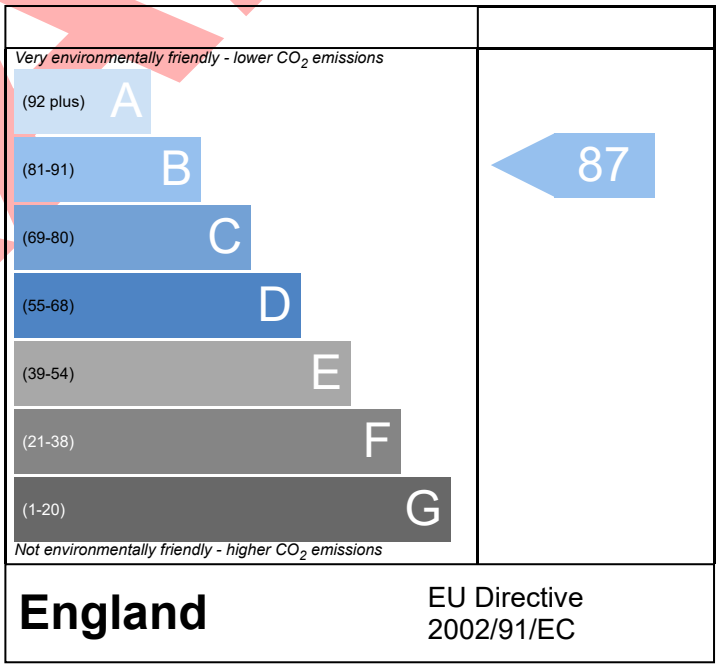
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

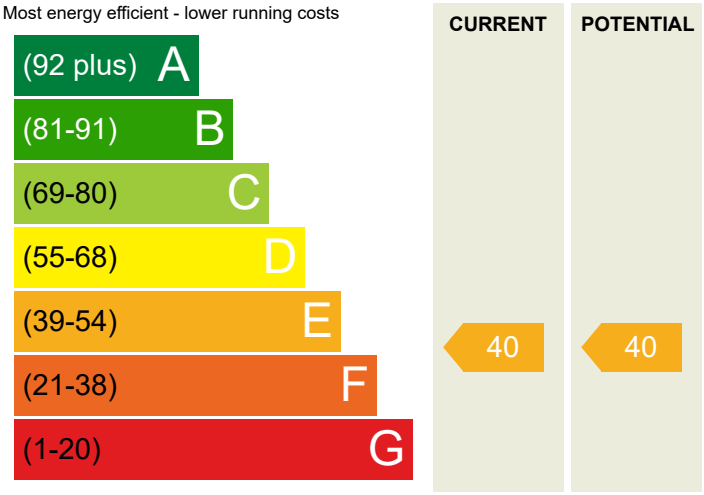
Energy Report

Dwelling Address	
Reference	Flat 4-Be Lean
SAP Version	10.2
Assessment Date	15/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	79

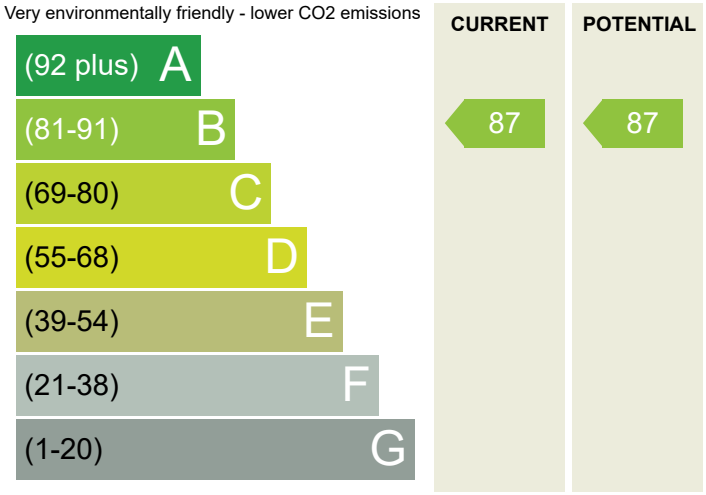
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

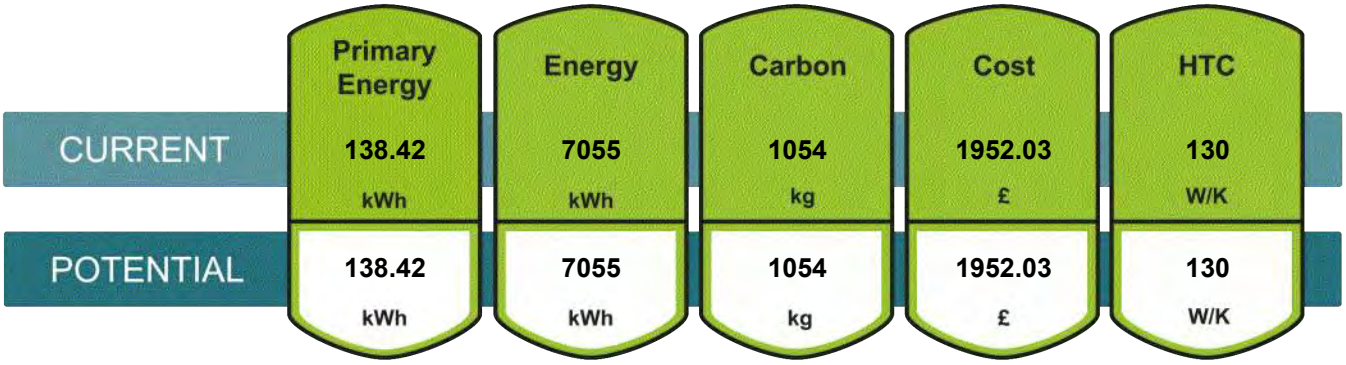


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£56	£56	
Heating	£1155	£1155	
Hot Water	£741	£741	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1952	£1952	

Estimated energy use and potential savings

Space Heating
4175
kWh per year

Water Heating
2678
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 5	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	44 E	**DER**	16.10	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.78	**DFEE**	70.92	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	167.80	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	245.46	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	6.21 m	53.92 m²	2.50 m

8.0 Living Area	24.65	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	15.53	11.43	0.00	None	4.10	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Single plasterboard on both sides, dense cellular blocks, cavity	0.00	70.00	23.48	0.00	None
Party Wall to Adj Flat	Filled Cavity with Edge Sealing	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	38.80	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	98.00

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	53.92	52.86	None	0.00	Enter Gross Area	1.06

11.0 Heat Loss Floors

Summary for Input Data

elmhurst energy

Description	Type	Storey Index	Construction	U-Value (W/m^2K)	Shelter Code	Shelter Factor	Kappa (kJ/m^2K)	Area (m^2)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	53.92

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m^2K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Roof light	Manufacturer	Roof Light	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m^2)	Pitch
NE Windows	Windows	External Wall 1	North East	4.10	
Rooflights	Roof light	External Roof 1	North East	1.06	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	

Summary for Input Data

SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 5	Issued on Date	15/06/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	44 E	DER	16.10	TER	
Environmental	88 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.78	DFEE	70.92	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	167.80	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area		Storey height		Volume	
Main dwelling		(m2)		(m)		(m3)	
Ground floor		53.9200	(1b)	x 2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	134.8000	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8984	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8877	0.8703	0.8529	0.7659	0.7485	0.6614	0.6614	0.6440	0.6962	0.7485	0.7833	0.8181	(22b)
Effective ac	0.8940	0.8787	0.8637	0.7933	0.7801	0.7187	0.7187	0.7074	0.7424	0.7801	0.8068	0.8346	(25)

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3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.1800	9.7056	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.2600	2.9718	190.0000	2171.7000	(29a)
External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400	(30)
Total net area of external elements Aum(A, m2)			123.3700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.5114			(33)
Main dwelling								
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000	(32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000	(32)
Internal Walls			98.0000			9.0000	882.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644	(35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	52.1854	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

(38)m	39.7689	39.0883	38.4212	35.2878	34.7016	31.9725	31.9725	31.4671	33.0237	34.7016	35.8875	37.1274	(38)
Heat transfer coeff													
	91.9544	91.2738	90.6067	87.4732	86.8870	84.1579	84.1579	83.6525	85.2091	86.8870	88.0730	89.3129	(39)
Average = Sum(39)m / 12 =												87.4704	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7054	1.6928	1.6804	1.6223	1.6114	1.5608	1.5608	1.5514	1.5803	1.6114	1.6334	1.6564	(40)
HLP (average)												1.6222	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8057	(42)
Hot water usage for mixer showers													
	74.9297	73.8037	72.1628	69.0233	66.7064	64.1226	62.6540	64.2825	66.0676	68.8417	72.0487	74.6426	(42a)
Hot water usage for baths													
	23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779	(42b)
Hot water usage for other uses													
	33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217	(42c)
Average daily hot water use (litres/day)												121.0349	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	131.6090	128.9286	125.5907	120.3383	116.1368	111.5943	109.7183	113.0404	116.5626	121.3483	126.6868	131.2422	(44)
Energy conte	208.4364	183.5927	193.0282	164.7371	156.3424	137.2183	132.6948	139.9677	143.7334	164.6685	180.4886	205.4936	(45)
Energy content (annual)										Total = Sum(45)m =		2010.4017	
Distribution loss (46)m = 0.15 x (45)m													
	31.2655	27.5389	28.9542	24.7106	23.4514	20.5827	19.9042	20.9952	21.5600	24.7003	27.0733	30.8240	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
										Total per year (kWh/year) = Sum(64)m =		2281.9617	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	87.7563	77.7102	82.6331	72.6311	70.4351	63.4811	62.5722	64.9905	65.6474	73.2035	77.8685	86.7778	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3292	18.9444	15.4066	11.6638	8.7188	7.3608	7.9536	10.3384	13.8762	17.6190	20.5640	21.9220	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)													
	117.9520	115.6401	111.0659	100.8765	94.6708	88.1682	84.1025	87.3528	91.1769	98.3918	108.1506	116.6369	(72)
Total internal gains													
	457.9563	455.6974	441.4423	414.4322	388.7730	365.3967	351.5584	354.7558	368.2607	392.2963	421.5086	446.8685	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	476.2659	493.2978	508.7898	522.6831	531.3254	515.9313	492.9653	469.4306	449.7172	438.2494	444.6345	461.7496	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.9819	40.2800	40.5766	42.0301	42.3137	43.6859	43.6859	43.9498	43.1469	42.3137	41.7439	41.1644	
alpha	3.6655	3.6853	3.7051	3.8020	3.8209	3.9124	3.9124	3.9300	3.8765	3.8209	3.7829	3.7443	
util living area													
	0.9905	0.9880	0.9816	0.9642	0.9205	0.8132	0.6703	0.7114	0.8859	0.9665	0.9861	0.9916	(86)
MIT	19.0539	19.1996	19.5040	19.9714	20.4071	20.7768	20.9253	20.9045	20.6459	20.1078	19.5451	19.0770	(87)
Th 2	19.5370	19.5460	19.5549	19.5970	19.6050	19.6422	19.6422	19.6492	19.6278	19.6050	19.5889	19.5722	(88)

util rest of house													
	0.9873	0.9838	0.9745	0.9486	0.8804	0.7123	0.4993	0.5485	0.8129	0.9488	0.9804	0.9887	(89)
MIT 2	17.3519	17.5431	17.9354	18.5500	19.0826	19.5055	19.6185	19.6146	19.3750	18.7307	18.0112	17.4034	(90)
Living area fraction										fLA = Living area / (4) =		0.4572	(91)
MIT	18.1300	18.3004	18.6525	19.1998	19.6881	20.0867	20.2159	20.2043	19.9560	19.3603	18.7124	18.1685	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1300	18.3004	18.6525	19.1998	19.6881	20.0867	20.2159	20.2043	19.9560	19.3603	18.7124	18.1685	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9827	0.9787	0.9684	0.9428	0.8834	0.7501	0.5778	0.6224	0.8341	0.9447	0.9753	0.9846	(94)
Useful gains	468.0423	482.7846	492.6972	492.8079	469.3504	386.9816	284.8456	292.1560	375.0927	413.9999	433.6728	454.6486	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1271.7249	1223.1071	1101.0991	900.9553	694.0628	461.7490	304.3052	318.2408	498.9855	761.1542	1022.7421	1247.5668	(97)
Space heating kWh	597.9398	497.4967	452.6510	293.8661	167.1861	0.0000	0.0000	0.0000	0.0000	258.2828	424.1299	589.9311	(98a)
Space heating requirement - total per year (kWh/year)												3281.4836	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	597.9398	497.4967	452.6510	293.8661	167.1861	0.0000	0.0000	0.0000	0.0000	258.2828	424.1299	589.9311	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3281.4836	
Space heating per m2											(98c) / (4) =	60.8584	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	597.9398	497.4967	452.6510	293.8661	167.1861	0.0000	0.0000	0.0000	0.0000	258.2828	424.1299	589.9311	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	597.9398	497.4967	452.6510	293.8661	167.1861	0.0000	0.0000	0.0000	0.0000	258.2828	424.1299	589.9311	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6693	14.9772	13.4853	9.8799	7.6315	6.2350	6.9617	9.0491	11.7539	15.4218	17.4189	19.1882	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3281.4836	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2281.9617	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												150.6720	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5714.1172	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	

Space heating - main system 1	3281.4836	16.4900	541.1166	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	16.4900	376.2955	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6720	16.4900	24.8458	(250)
Additional standing charges			0.0000	(251)
Total energy cost			942.2579	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.4292	(257)
SAP value		44.4133	
SAP rating (Section 12)		44	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3281.4836	0.1541	505.7395	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2281.9617	0.1412	322.2979	(264)
Space and water heating			828.0375	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6720	0.1443	21.7466	(268)
Total CO2, kg/year			849.7841	(272)
CO2 emissions per m2			15.7600	(273)
EI value			88.4886	
EI rating			88	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.9200	(1b) x	2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		134.8000	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8984	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8877	0.8181	0.8007	0.7485	0.7485	0.6962	0.6962	0.6788	0.6962	0.7833	0.7659	0.8181	(22b)
Effective ac	0.8940	0.8346	0.8205	0.7801	0.7801	0.7424	0.7424	0.7304	0.7424	0.8068	0.7933	0.8346	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.1800	9.7056	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.2600	2.9718	190.0000	2171.7000	(29a)

External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400 (30)
Total net area of external elements Aum(A, m2)			123.3700				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.5114		(33)
Main dwelling							
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000 (32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000 (32)
Internal Walls			98.0000			9.0000	882.0000 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	52.1854 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.7689	37.1274	36.5007	34.7016	34.7016	33.0237	33.0237	32.4913	33.0237	35.8875	35.2878	37.1274	(38)
Heat transfer coeff	91.9544	89.3129	88.6862	86.8870	86.8870	85.2091	85.2091	84.6767	85.2091	88.0730	87.4732	89.3129	(39)
Average = Sum(39)m / 12 =												87.4075	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7054	1.6564	1.6448	1.6114	1.6114	1.5803	1.5803	1.5704	1.5803	1.6334	1.6223	1.6564	(40)
HLP (average)												1.6211	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8057 (42)
Hot water usage for mixer showers												
	74.9297	73.8037	72.1628	69.0233	66.7064	64.1226	62.6540	64.2825	66.0676	68.8417	72.0487	74.6426 (42a)
Hot water usage for baths												
	23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779 (42b)
Hot water usage for other uses												
	33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217 (42c)
Average daily hot water use (litres/day)												121.0349 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	131.6090	128.9286	125.5907	120.3383	116.1368	111.5943	109.7183	113.0404	116.5626	121.3483	126.6868	131.2422	(44)
Energy conte	208.4364	183.5927	193.0282	164.7371	156.3424	137.2183	132.6948	139.9677	143.7334	164.6685	180.4886	205.4936	(45)
Energy content (annual)										Total = Sum(45)m =		2010.4017	
Distribution loss (46)m = 0.15 x (45)m													
	31.2655	27.5389	28.9542	24.7106	23.4514	20.5827	19.9042	20.9952	21.5600	24.7003	27.0733	30.8240	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
										Total per year (kWh/year) = Sum(64)m =		2281.9617	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	87.7563	77.7102	82.6331	72.6311	70.4351	63.4811	62.5722	64.9905	65.6474	73.2035	77.8685	86.7778	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3292	18.9444	15.4066	11.6638	8.7188	7.3608	7.9536	10.3384	13.8762	17.6190	20.5640	21.9220	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)													
	117.9520	115.6401	111.0659	100.8765	94.6708	88.1682	84.1025	87.3528	91.1769	98.3918	108.1506	116.6369	(72)
Total internal gains													
	457.9563	455.6974	441.4423	414.4322	388.7730	365.3967	351.5584	354.7558	368.2607	392.2963	421.5086	446.8685	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	15.0428	0.4600	0.7000	0.7700	13.7627	(75)
Northeast	1.0600	35.0000	0.4600	0.7000	1.0000	10.7516	(82)

Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	482.4706	498.8479	518.2886	539.5508	545.2429	543.6873	515.2434	491.0094	466.6476	448.0973	452.2223	465.8688	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.9819	41.1644	41.4553	42.3137	42.3137	43.1469	43.1469	43.4182	43.1469	41.7439	42.0301	41.1644	
alpha	3.6655	3.7443	3.7637	3.8209	3.8209	3.8765	3.8765	3.8945	3.8765	3.7829	3.8020	3.7443	
util living area	0.9877	0.9853	0.9764	0.9528	0.8900	0.7401	0.5730	0.5929	0.8295	0.9495	0.9798	0.9887	(86)
MIT	19.2476	19.3862	19.6898	20.1145	20.5455	20.8603	20.9625	20.9585	20.7680	20.2875	19.7773	19.2962	(87)
Th 2	19.5370	19.5722	19.5807	19.6050	19.6050	19.6278	19.6278	19.6351	19.6278	19.5889	19.5970	19.5722	(88)
util rest of house	0.9832	0.9799	0.9670	0.9318	0.8338	0.6102	0.3791	0.3957	0.7233	0.9204	0.9708	0.9845	(89)
MIT 2	17.5991	17.7969	18.1864	18.7309	19.2376	19.5595	19.6205	19.6268	19.4916	18.9389	18.3106	17.6832	(90)
Living area fraction										fLA = Living area / (4) =		0.4572	(91)
MIT	18.3527	18.5234	18.8737	19.3634	19.8355	20.1542	20.2340	20.2356	20.0751	19.5554	18.9811	18.4206	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3527	18.5234	18.8737	19.3634	19.8355	20.1542	20.2340	20.2356	20.0751	19.5554	18.9811	18.4206	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9780	0.9744	0.9607	0.9272	0.8449	0.6654	0.4696	0.4880	0.7636	0.9195	0.9653	0.9798	(94)
Useful gains	471.8578	486.0664	497.8989	500.2673	460.6752	361.7786	241.9695	239.5941	356.3498	412.0072	436.5313	456.4362	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1191.0610	1145.2980	1026.4293	848.3145	628.6714	405.1006	250.0064	248.5772	432.4485	683.0432	925.5640	1153.9775	(97)
Space heating kWh	535.0872	443.0037	393.2266	250.5940	124.9892	0.0000	0.0000	0.0000	0.0000	201.6508	352.1035	518.9707	(98a)
Space heating requirement - total per year (kWh/year)												2819.6257	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	535.0872	443.0037	393.2266	250.5940	124.9892	0.0000	0.0000	0.0000	0.0000	201.6508	352.1035	518.9707	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2819.6257	
Space heating per m2											(98c) / (4) =	52.2928	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	535.0872	443.0037	393.2266	250.5940	124.9892	0.0000	0.0000	0.0000	0.0000	201.6508	352.1035	518.9707	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	535.0872	443.0037	393.2266	250.5940	124.9892	0.0000	0.0000	0.0000	0.0000	201.6508	352.1035	518.9707	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6693	14.9772	13.4853	9.8799	7.6315	6.2350	6.9617	9.0491	11.7539	15.4218	17.4189	19.1882	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 2819.6257 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 2281.9617 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 150.6720 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5252.2594	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2819.6257	27.6700	780.1904	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	27.6700	631.4188	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6720	27.6700	41.6909	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1453.3002	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2819.6257	0.1546	435.7814	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2281.9617	0.1412	322.2979	(264)
Space and water heating			758.0793	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6720	0.1443	21.7466	(268)
Total CO2, kg/year			779.8259	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2819.6257	1.5722	4433.0507	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	1.5223	3473.7410	(278)
Space and water heating			7906.7918	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	150.6720	1.5338	231.1057	(282)
Total Primary energy kWh/year			8137.8975	(286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: E 44
Current environmental impact rating: B 88

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 44
Potential environmental impact rating: B 88

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1453	£1453	£0
Space heating	£780	£780	£0
Water heating	£631	£631	£0
Lighting	£42	£42	£0
Total cost of fuels	£1453	£1453	£0
Total cost of uses	£1453	£1453	£0
Delivered energy	97 kWh/m²	97 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m²	14 kg/m²	14 kg/m²	0 kg/m²
Primary energy	151 kWh/m²	151 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.9200	(1b)	x 2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	134.8000	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8984 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8877	0.8703	0.8529	0.7659	0.7485	0.6614	0.6614	0.6440	0.6962	0.7485	0.7833	0.8181	(22b)
Effective ac	0.8940	0.8787	0.8637	0.7933	0.7801	0.7187	0.7187	0.7074	0.7424	0.7801	0.8068	0.8346	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.1800	9.7056	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.2600	2.9718	190.0000	2171.7000	(29a)
External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400	(30)
Total net area of external elements Aum(A, m2)			123.3700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.5114			(33)
Main dwelling								
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000	(32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000	(32)
Internal Walls			98.0000			9.0000	882.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	52.1854 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.7689	39.0883	38.4212	35.2878	34.7016	31.9725	31.9725	31.4671	33.0237	34.7016	35.8875	37.1274	(38)
Heat transfer coeff	91.9544	91.2738	90.6067	87.4732	86.8870	84.1579	84.1579	83.6525	85.2091	86.8870	88.0730	89.3129	(39)
Average = Sum(39)m / 12 =												87.4704	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7054	1.6928	1.6804	1.6223	1.6114	1.5608	1.5608	1.5514	1.5803	1.6114	1.6334	1.6564	(40)
HLP (average)												1.6222	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.8057 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
74.9297	73.8037	72.1628	69.0233	66.7064	64.1226	62.6540	64.2825	66.0676	68.8417	72.0487	74.6426	(42a)

Hot water usage for baths

23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779	(42b)

Hot water usage for other uses

33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217	(42c)

Average daily hot water use (litres/day)		121.0349 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	131.6090	128.9286	125.5907	120.3383	116.1368	111.5943	109.7183	113.0404	116.5626	121.3483	126.6868	131.2422	(44)
Energy conte	208.4364	183.5927	193.0282	164.7371	156.3424	137.2183	132.6948	139.9677	143.7334	164.6685	180.4886	205.4936	(45)
Energy content (annual)										Total = Sum(45)m =		2010.4017	

Distribution loss (46)m = 0.15 x (45)m

	31.2655	27.5389	28.9542	24.7106	23.4514	20.5827	19.9042	20.9952	21.5600	24.7003	27.0733	30.8240 (46)

Water storage loss (or HIU loss):

Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												0.7440 (55)
Total storage loss												
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (56)
If cylinder contains dedicated solar storage												
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576 (64)
Total per year (kWh/year) = Sum(64)m =												2281.9617 (64)
Electric shower(s)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
	87.7563	77.7102	82.6331	72.6311	70.4351	63.4811	62.5722	64.9905	65.6474	73.2035	77.8685	86.7778 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.3292	18.9444	15.4066	11.6638	8.7188	7.3608	7.9536	10.3384	13.8762	17.6190	20.5640	21.9220	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)													
	117.9520	115.6401	111.0659	100.8765	94.6708	88.1682	84.1025	87.3528	91.1769	98.3918	108.1506	116.6369	(72)
Total internal gains													
	457.9563	455.6974	441.4423	414.4322	388.7730	365.3967	351.5584	354.7558	368.2607	392.2963	421.5086	446.8685	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	476.2659	493.2978	508.7898	522.6831	531.3254	515.9313	492.9653	469.4306	449.7172	438.2494	444.6345	461.7496	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.9819	40.2800	40.5766	42.0301	42.3137	43.6859	43.6859	43.9498	43.1469	42.3137	41.7439	41.1644	
alpha	3.6655	3.6853	3.7051	3.8020	3.8209	3.9124	3.9124	3.9300	3.8765	3.8209	3.7829	3.7443	
util living area													
	0.9905	0.9880	0.9816	0.9642	0.9205	0.8132	0.6703	0.7114	0.8859	0.9665	0.9861	0.9916	(86)
MIT	19.0539	19.1996	19.5040	19.9714	20.4071	20.7768	20.9253	20.9045	20.6459	20.1078	19.5451	19.0770	(87)
Th 2	19.5370	19.5460	19.5549	19.5970	19.6050	19.6422	19.6422	19.6492	19.6278	19.6050	19.5889	19.5722	(88)
util rest of house													
	0.9873	0.9838	0.9745	0.9486	0.8804	0.7123	0.4993	0.5485	0.8129	0.9488	0.9804	0.9887	(89)
MIT 2	17.3519	17.5431	17.9354	18.5500	19.0826	19.5055	19.6185	19.6146	19.3750	18.7307	18.0112	17.4034	(90)
Living area fraction									fLA = Living area / (4) =			0.4572	(91)
MIT	18.1300	18.3004	18.6525	19.1998	19.6881	20.0867	20.2159	20.2043	19.9560	19.3603	18.7124	18.1685	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1300	18.3004	18.6525	19.1998	19.6881	20.0867	20.2159	20.2043	19.9560	19.3603	18.7124	18.1685	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9827	0.9787	0.9684	0.9428	0.8834	0.7501	0.5778	0.6224	0.8341	0.9447	0.9753	0.9846	(94)
Useful gains	468.0423	482.7846	492.6972	492.8079	469.3504	386.9816	284.8456	292.1560	375.0927	413.9999	433.6728	454.6486	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1271.7249	1223.1071	1101.0991	900.9553	694.0628	461.7490	304.3052	318.2408	498.9855	761.1542	1022.7421	1247.5668	(97)
Space heating kWh													
	597.9398	497.4967	452.6510	293.8661	167.1861	0.0000	0.0000	0.0000	0.0000	258.2828	424.1299	589.9311	(98a)
Space heating requirement - total per year (kWh/year)												3281.4836	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	597.9398	497.4967	452.6510	293.8661	167.1861	0.0000	0.0000	0.0000	0.0000	258.2828	424.1299	589.9311	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3281.4836	
Space heating per m2											(98c) / (4) =	60.8584	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	597.9398	497.4967	452.6510	293.8661	167.1861	0.0000	0.0000	0.0000	0.0000	258.2828	424.1299	589.9311	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	597.9398	497.4967	452.6510	293.8661	167.1861	0.0000	0.0000	0.0000	0.0000	258.2828	424.1299	589.9311	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6693	14.9772	13.4853	9.8799	7.6315	6.2350	6.9617	9.0491	11.7539	15.4218	17.4189	19.1882	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3281.4836	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2281.9617	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	150.6720	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5714.1172	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3281.4836	16.4900	541.1166	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	16.4900	376.2955	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6720	16.4900	24.8458	(250)
Additional standing charges			0.0000	(251)
Total energy cost			942.2579	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.4292	(257)
SAP value		44.4133	
SAP rating (Section 12)		44	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3281.4836	0.1541	505.7395	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2281.9617	0.1412	322.2979 (264)
Space and water heating			828.0375 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	150.6720	0.1443	21.7466 (268)
Total CO2, kg/year			849.7841 (272)
CO2 emissions per m2			15.7600 (273)
EI value			88.4886
EI rating			88 (274)
EI band			B

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.9200	(1b) x	2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		134.8000	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8984	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8877	0.8181	0.8007	0.7485	0.7485	0.6962	0.6962	0.6788	0.6962	0.7833	0.7659	0.8181	(22b)
Effective ac	0.8940	0.8346	0.8205	0.7801	0.7801	0.7424	0.7424	0.7304	0.7424	0.8068	0.7933	0.8346	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.1800	9.7056	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.2600	2.9718	190.0000	2171.7000	(29a)
External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400	(30)
Total net area of external elements Aum(A, m2)			123.3700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.5114			(33)
Main dwelling								
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000	(32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000	(32)
Internal Walls			98.0000			9.0000	882.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	52.1854 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.7689	37.1274	36.5007	34.7016	34.7016	33.0237	33.0237	32.4913	33.0237	35.8875	35.2878	37.1274	(38)
Heat transfer coeff	91.9544	89.3129	88.6862	86.8870	86.8870	85.2091	85.2091	84.6767	85.2091	88.0730	87.4732	89.3129	(39)
Average = Sum(39)m / 12 =												87.4075	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7054	1.6564	1.6448	1.6114	1.6114	1.5803	1.5803	1.5704	1.5803	1.6334	1.6223	1.6564	(40)
HLP (average)												1.6211	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8057 (42)

Hot water usage for mixer showers

	74.9297	73.8037	72.1628	69.0233	66.7064	64.1226	62.6540	64.2825	66.0676	68.8417	72.0487	74.6426 (42a)

Hot water usage for baths

	23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779 (42b)

Hot water usage for other uses

	33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217 (42c)

Average daily hot water use (litres/day) 121.0349 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	131.6090	128.9286	125.5907	120.3383	116.1368	111.5943	109.7183	113.0404	116.5626	121.3483	126.6868	131.2422	(44)
Energy conte	208.4364	183.5927	193.0282	164.7371	156.3424	137.2183	132.6948	139.9677	143.7334	164.6685	180.4886	205.4936	(45)

Energy content (annual) Total = Sum(45)m = 2010.4017

Distribution loss (46)m = 0.15 x (45)m

	31.2655	27.5389	28.9542	24.7106	23.4514	20.5827	19.9042	20.9952	21.5600	24.7003	27.0733	30.8240 (46)

Water storage loss (or HIU loss):

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.2400 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.7440 (55)

Total storage loss

	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (56)

If cylinder contains dedicated solar storage

	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)

Total heat required for water heating calculated for each month

	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)

Output from w/h

	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576 (64)

Total per year (kWh/year) = Sum(64)m = 2281.9617 (64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

	87.7563	77.7102	82.6331	72.6311	70.4351	63.4811	62.5722	64.9905	65.6474	73.2035	77.8685	86.7778 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	21.3292	18.9444	15.4066	11.6638	8.7188	7.3608	7.9536	10.3384	13.8762	17.6190	20.5640	21.9220 (67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571 (68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)

Losses e.g. evaporation (negative values) (Table 5)

	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260 (71)

Water heating gains (Table 5)

	117.9520	115.6401	111.0659	100.8765	94.6708	88.1682	84.1025	87.3528	91.1769	98.3918	108.1506	116.6369 (72)

Total internal gains

	457.9563	455.6974	441.4423	414.4322	388.7730	365.3967	351.5584	354.7558	368.2607	392.2963	421.5086	446.8685 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	15.0428	0.4600	0.7000	0.7700	13.7627	(75)
Northeast	1.0600	35.0000	0.4600	0.7000	1.0000	10.7516	(82)

Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	482.4706	498.8479	518.2886	539.5508	545.2429	543.6873	515.2434	491.0094	466.6476	448.0973	452.2223	465.8688	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.9819	41.1644	41.4553	42.3137	42.3137	43.1469	43.1469	43.4182	43.1469	41.7439	42.0301	41.1644	
alpha	3.6655	3.7443	3.7637	3.8209	3.8209	3.8765	3.8765	3.8945	3.8765	3.7829	3.8020	3.7443	
util living area													
	0.9877	0.9853	0.9764	0.9528	0.8900	0.7401	0.5730	0.5929	0.8295	0.9495	0.9798	0.9887	(86)
MIT	19.2476	19.3862	19.6898	20.1145	20.5455	20.8603	20.9625	20.9585	20.7680	20.2875	19.7773	19.2962	(87)
Th 2	19.5370	19.5722	19.5807	19.6050	19.6050	19.6278	19.6278	19.6351	19.6278	19.5889	19.5970	19.5722	(88)
util rest of house													
	0.9832	0.9799	0.9670	0.9318	0.8338	0.6102	0.3791	0.3957	0.7233	0.9204	0.9708	0.9845	(89)
MIT 2	17.5991	17.7969	18.1864	18.7309	19.2376	19.5595	19.6205	19.6268	19.4916	18.9389	18.3106	17.6832	(90)

Living area fraction fLA = Living area / (4) = 0.4572 (91)

MIT	18.3527	18.5234	18.8737	19.3634	19.8355	20.1542	20.2340	20.2356	20.0751	19.5554	18.9811	18.4206	(92)

Temperature adjustment 0.0000

adjusted MIT	18.3527	18.5234	18.8737	19.3634	19.8355	20.1542	20.2340	20.2356	20.0751	19.5554	18.9811	18.4206	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9780	0.9744	0.9607	0.9272	0.8449	0.6654	0.4696	0.4880	0.7636	0.9195	0.9653	0.9798	(94)
Useful gains	471.8578	486.0664	497.8989	500.2673	460.6752	361.7786	241.9695	239.5941	356.3498	412.0072	436.5313	456.4362	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1191.0610	1145.2980	1026.4293	848.3145	628.6714	405.1006	250.0064	248.5772	432.4485	683.0432	925.5640	1153.9775	(97)
Space heating kWh													
	535.0872	443.0037	393.2266	250.5940	124.9892	0.0000	0.0000	0.0000	0.0000	201.6508	352.1035	518.9707	(98a)
Space heating requirement - total per year (kWh/year)												2819.6257	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	535.0872	443.0037	393.2266	250.5940	124.9892	0.0000	0.0000	0.0000	0.0000	201.6508	352.1035	518.9707	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2819.6257	
Space heating per m2											(98c) / (4) =	52.2928	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	535.0872	443.0037	393.2266	250.5940	124.9892	0.0000	0.0000	0.0000	0.0000	201.6508	352.1035	518.9707	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	535.0872	443.0037	393.2266	250.5940	124.9892	0.0000	0.0000	0.0000	0.0000	201.6508	352.1035	518.9707	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	231.5004	204.4247	216.0922	187.0571	179.4064	159.5383	155.7588	163.0317	166.0534	187.7325	202.8086	228.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.6693	14.9772	13.4853	9.8799	7.6315	6.2350	6.9617	9.0491	11.7539	15.4218	17.4189	19.1882	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2819.6257	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2281.9617	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	150.6720	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5252.2594	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2819.6257	27.6700	780.1904	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	27.6700	631.4188	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	150.6720	27.6700	41.6909	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1453.3002	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2819.6257	0.1546	435.7814	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2281.9617	0.1412	322.2979	(264)
Space and water heating			758.0793	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	150.6720	0.1443	21.7466	(268)
Total CO2, kg/year			779.8259	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2819.6257	1.5722	4433.0507	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2281.9617	1.5223	3473.7410	(278)
Space and water heating			7906.7918	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	150.6720	1.5338	231.1057	(282)
Total Primary energy kWh/year			8137.8975	(286)

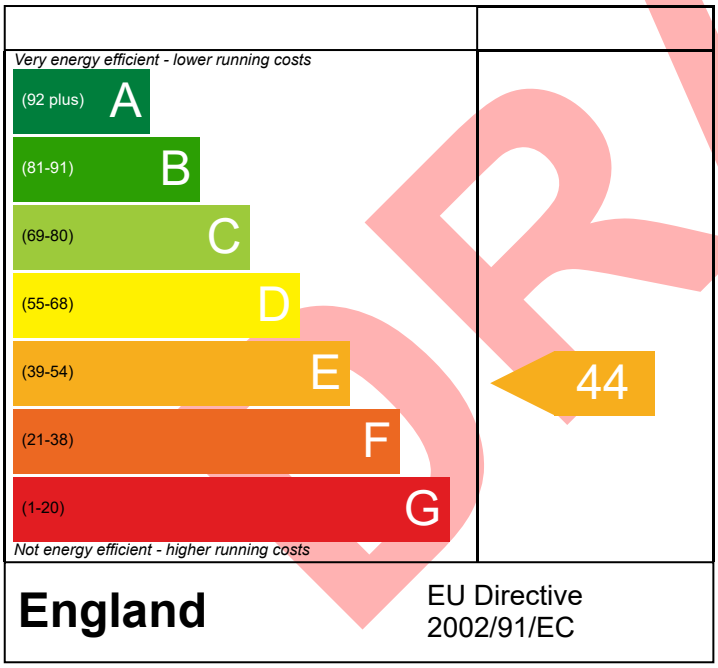
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	53.92 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

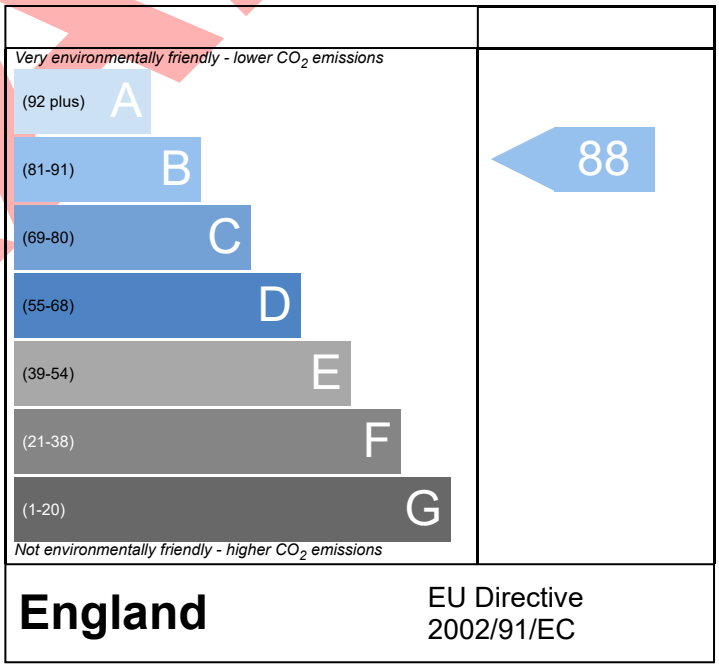
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

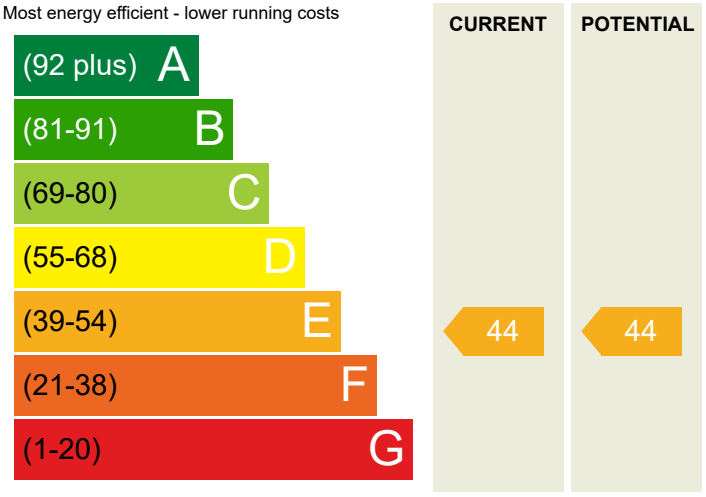
Energy Report

Dwelling Address	
Reference	Flat 5-Be Lean
SAP Version	10.2
Assessment Date	15/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	54

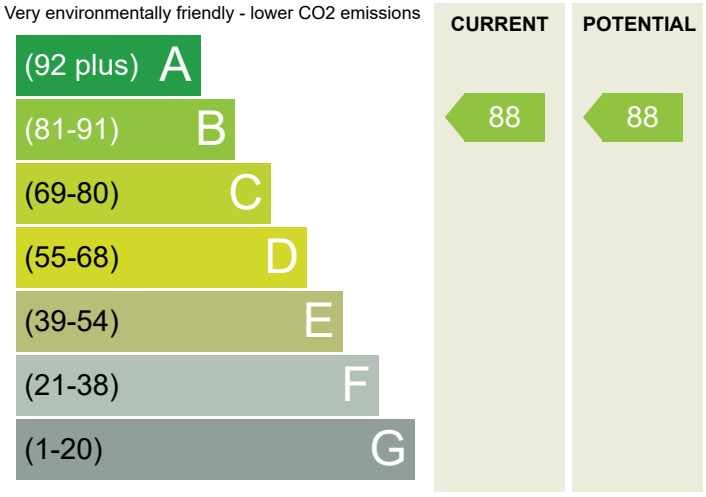
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

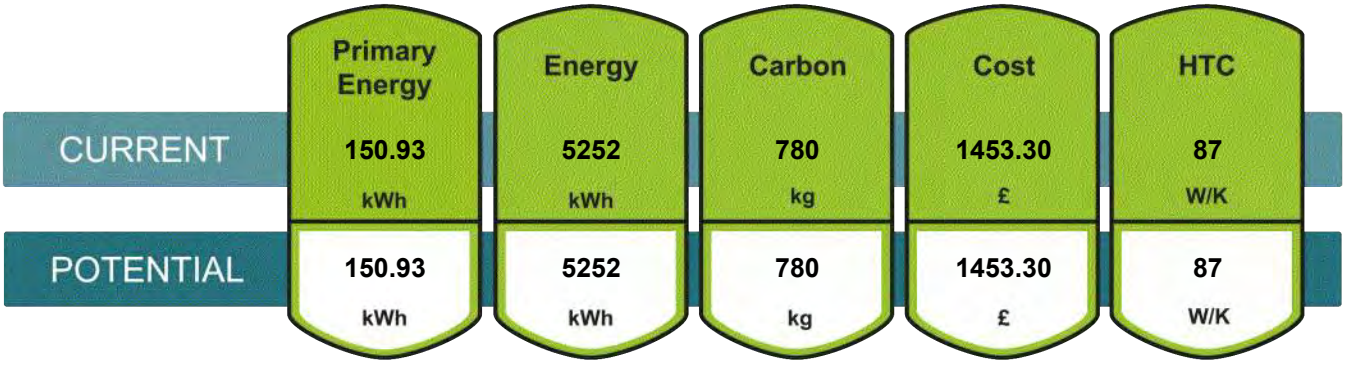


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£42	£42	
Heating	£780	£780	
Hot Water	£631	£631	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1453	£1453	

Estimated energy use and potential savings

Space Heating
2820
kWh per year

Water Heating
2282
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 6	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	36 F	**DER**	17.47	**TER**	
Environmental	86 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.02	**DFEE**	83.19	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	181.49	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	300.66	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	15.42 m	65.07 m²	2.50 m

8.0 Living Area	31.33	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	38.55	34.45	0.00	None	4.10	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	56.90	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	99.90

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	65.07	64.01	None	0.00	Enter Gross Area	1.06

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	65.07

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Roof Light	Manufacturer	Roof Light	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
NE Windows	Windows	External Wall 1	North East	4.10	
Rooflights	Roof Light	External Roof 1	North East	1.06	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	

Summary for Input Data

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 6	Issued on Date	15/06/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	36 F	DER	17.47	TER	
Environmental	86 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.02	DFEE	83.19	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	181.49	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700	(1b)	x 2.5000	(2b) =	162.6750	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	162.6750	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8729	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9461	0.9275	0.9090	0.8162	0.7977	0.7049	0.7049	0.6864	0.7420	0.7977	0.8348	0.8719	(22b)
Effective ac	0.9475	0.9301	0.9131	0.8331	0.8181	0.7484	0.7484	0.7355	0.7753	0.8181	0.8484	0.8801	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.1800	11.7126	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.2600	8.9570	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)
Total net area of external elements Aum(A, m2)			168.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		37.2876			(33)
Main dwelling								
Party Wall 1			56.9000	0.0000	0.0000	180.0000	10242.0000	(32)
Internal Wall 1			99.9000			9.0000	899.1000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19564.0900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		300.6622 (35)
Thermal bridges (Default value 0.200 * total exposed area)		33.7380 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	71.0256 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	49.9320	49.0176	44.7228	43.9192	40.1785	40.1785	39.4858	41.6194	43.9192	45.5448	47.2443	(38)

Heat transfer coeff

	121.8905	120.9576	120.0432	115.7484	114.9448	111.2042	111.2042	110.5114	112.6450	114.9448	116.5704	118.2699 (39)
Average = Sum(39)m / 12 =												115.7445

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8732	1.8589	1.8448	1.7788	1.7665	1.7090	1.7090	1.6983	1.7311	1.7665	1.7915	1.8176	(40)
HLP (average)												1.7788	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.1208 (42)

Hot water usage for mixer showers

	82.1947	80.9595	79.1596	75.7156	73.1741	70.3398	68.7288	70.5152	72.4733	75.5165	79.0344	81.8798 (42a)

Hot water usage for baths

	25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424 (42b)

Hot water usage for other uses

	36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488 (42c)

Average daily hot water use (litres/day) 132.7734 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	144.3733	141.4327	137.7707	132.0090	127.3999	122.4169	120.3592	124.0037	127.8677	133.1176	138.9738	143.9711	(44)
Energy conte	228.6520	201.3983	211.7485	180.7138	171.5048	150.5258	145.5640	153.5425	157.6737	180.6393	197.9936	225.4239	(45)
Energy content (annual)										Total = Sum(45)m =		2205.3801	
Distribution loss (46)m = 0.15 x (45)m													
	34.2978	30.2097	31.7623	27.1071	25.7257	22.5789	21.8346	23.0314	23.6511	27.0959	29.6990	33.8136	(46)

Water storage loss (or HIU loss):

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.2400 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.7440 (55)

Total storage loss

	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (56)

If cylinder contains dedicated solar storage

	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)

Total heat required for water heating calculated for each month

	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879 (64)
									Total per year (kWh/year) = Sum(64)m =			2476.9401 (64)
Electric shower(s)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000 (64a)

Heat gains from water heating, kWh/month

	94.4780	83.6305	88.8576	77.9433	75.4765	67.9058	66.8512	69.5041	70.2825	78.5138	83.6889	93.4046 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	27.3744	24.3137	19.7732	14.9696	11.1900	9.4470	10.2079	13.2686	17.8090	22.6127	26.3923	28.1352 (67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914 (68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)

Losses e.g. evaporation (negative values) (Table 5)

	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309 (71)

Water heating gains (Table 5)

	126.9866	124.4502	119.4322	108.2546	101.4470	94.3137	89.8538	93.4195	97.6146	105.5292	116.2345	125.5439 (72)

Total internal gains

	523.5313	520.8076	504.0082	472.6117	442.5654	415.4005	399.4835	403.2364	419.2130	447.3465	481.2905	510.6314 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	541.8409	558.4080	571.3556	580.8626	585.1178	565.9350	540.8904	517.9112	500.6694	493.2996	504.4163	525.5124	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.5848	44.9287	45.2709	46.9507	47.2789	48.8693	48.8693	49.1756	48.2442	47.2789	46.6196	45.9497	
alpha	3.9723	3.9952	4.0181	4.1300	4.1519	4.2580	4.2580	4.2784	4.2163	4.1519	4.1080	4.0633	
util living area													
	0.9962	0.9951	0.9923	0.9844	0.9612	0.8898	0.7672	0.8029	0.9380	0.9850	0.9943	0.9967	(86)
MIT	19.0926	19.2217	19.4974	19.9289	20.3442	20.7283	20.9030	20.8791	20.5997	20.0814	19.5567	19.1195	(87)
Th 2	19.4192	19.4291	19.4388	19.4849	19.4936	19.5344	19.5344	19.5420	19.5186	19.4936	19.4760	19.4577	(88)
util rest of house													

	0.9945	0.9930	0.9886	0.9754	0.9334	0.7971	0.5734	0.6250	0.8790	0.9743	0.9913	0.9953	(89)
MIT 2	17.2855	17.4568	17.8150	18.3926	18.9127	19.3709	19.5073	19.5025	19.2343	18.5937	17.9156	17.3443	(90)
Living area fraction										fLA = Living area / (4) =		0.4815	(91)
MIT	18.1556	18.3066	18.6250	19.1323	19.6019	20.0244	20.1793	20.1653	19.8917	19.3100	18.7058	18.1990	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1556	18.3066	18.6250	19.1323	19.6019	20.0244	20.1793	20.1653	19.8917	19.3100	18.7058	18.1990	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9925	0.9907	0.9857	0.9724	0.9360	0.8347	0.6701	0.7130	0.8982	0.9724	0.9890	0.9935	(94)
Useful gains	537.8031	553.2088	563.1780	564.8395	547.6978	472.3955	362.4537	369.2964	449.7228	479.6995	498.8850	522.1167	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1688.8647	1621.6293	1455.5300	1184.3761	908.2826	603.2211	398.0298	416.1088	652.4081	1001.1705	1352.8875	1655.6609	(97)
Space heating kWh	856.3898	717.9786	663.9099	446.0664	268.2751	0.0000	0.0000	0.0000	0.0000	387.9744	614.8818	843.3569	(98a)
Space heating requirement - total per year (kWh/year)												4798.8330	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	856.3898	717.9786	663.9099	446.0664	268.2751	0.0000	0.0000	0.0000	0.0000	387.9744	614.8818	843.3569	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4798.8330	
Space heating per m2											(98c) / (4) =	73.7488	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	856.3898	717.9786	663.9099	446.0664	268.2751	0.0000	0.0000	0.0000	0.0000	387.9744	614.8818	843.3569	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	856.3898	717.9786	663.9099	446.0664	268.2751	0.0000	0.0000	0.0000	0.0000	387.9744	614.8818	843.3569	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.9607	19.2221	17.3074	12.6801	9.7945	8.0022	8.9349	11.6139	15.0853	19.7927	22.3558	24.6266	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4798.8330	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2476.9401	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												193.3763	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												7469.1493	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4798.8330	16.4900	791.3276	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	16.4900	408.4474	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	193.3763	16.4900	31.8877	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1231.6627	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	4.0283	(257)
SAP value		35.8824	
SAP rating (Section 12)		36	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4798.8330	0.1539	738.3250	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2476.9401	0.1413	349.9027	(264)
Space and water heating			1088.2277	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	193.3763	0.1443	27.9102	(268)
Total CO2, kg/year			1116.1378	(272)
CO2 emissions per m2			17.1500	(273)
EI value			86.4121	
EI rating			86	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700	(1b) x	2.5000	(2b) =	162.6750	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	162.6750	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8729	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9461	0.8719	0.8533	0.7977	0.7977	0.7420	0.7420	0.7235	0.7420	0.8348	0.8162	0.8719	(22b)
Effective ac	0.9475	0.8801	0.8641	0.8181	0.8181	0.7753	0.7753	0.7617	0.7753	0.8484	0.8331	0.8801	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.1800	11.7126	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.2600	8.9570	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)

Total net area of external elements Aum(A, m2)						168.6900							(31)
Fabric heat loss, W/K = Sum (A x U)						(26)...(30) + (32) =						37.2876	(33)
Main dwelling													
Party Wall 1						56.9000	0.0000	0.0000	180.0000			10242.0000	(32)
Internal Wall 1						99.9000			9.0000			899.1000	(32c)
Heat capacity Cm = Sum(A x k)								(28)...(30) + (32) + (32a)...(32e) =				19564.0900	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K												300.6622	(35)
Thermal bridges (Default value 0.200 * total exposed area)												33.7380	(36)
Point Thermal bridges										(36a) =		0.0000	
Total fabric heat loss									(33) + (36) + (36a) =			71.0256	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	47.2443	46.3853	43.9192	43.9192	41.6194	41.6194	40.8897	41.6194	45.5448	44.7228	47.2443	(38)
Heat transfer coeff	121.8905	118.2699	117.4109	114.9448	114.9448	112.6450	112.6450	111.9153	112.6450	116.5704	115.7484	118.2699	(39)
Average = Sum(39)m / 12 =												115.6583	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8732	1.8176	1.8044	1.7665	1.7665	1.7311	1.7311	1.7199	1.7311	1.7915	1.7788	1.8176	(40)
HLP (average)												1.7774	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1208	(42)
Hot water usage for mixer showers	82.1947	80.9595	79.1596	75.7156	73.1741	70.3398	68.7288	70.5152	72.4733	75.5165	79.0344	81.8798	(42a)
Hot water usage for baths	25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424	(42b)
Hot water usage for other uses	36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488	(42c)
Average daily hot water use (litres/day)												132.7734	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	144.3733	141.4327	137.7707	132.0090	127.3999	122.4169	120.3592	124.0037	127.8677	133.1176	138.9738	143.9711	(44)
Energy conte	228.6520	201.3983	211.7485	180.7138	171.5048	150.5258	145.5640	153.5425	157.6737	180.6393	197.9936	225.4239	(45)
Energy content (annual)										Total = Sum(45)m =		2205.3801	
Distribution loss (46)m = 0.15 x (45)m	34.2978	30.2097	31.7623	27.1071	25.7257	22.5789	21.8346	23.0314	23.6511	27.0959	29.6990	33.8136	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
									Total per year (kWh/year) = Sum(64)m =			2476.9401	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	94.4780	83.6305	88.8576	77.9433	75.4765	67.9058	66.8512	69.5041	70.2825	78.5138	83.6889	93.4046	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	27.3744	24.3137	19.7732	14.9696	11.1900	9.4470	10.2079	13.2686	17.8090	22.6127	26.3923	28.1352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)
Water heating gains (Table 5)	126.9866	124.4502	119.4322	108.2546	101.4470	94.3137	89.8538	93.4195	97.6146	105.5292	116.2345	125.5439	(72)
Total internal gains	523.5313	520.8076	504.0082	472.6117	442.5654	415.4005	399.4835	403.2364	419.2130	447.3465	481.2905	510.6314	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	15.0428	0.4600	0.7000	0.7700	13.7627	(75)
Northeast	1.0600	35.0000	0.4600	0.7000	1.0000	10.7516	(82)

Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	548.0455	563.9582	580.8544	597.7303	599.0353	593.6910	563.1685	539.4900	517.5998	503.1475	512.0042	529.6317	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.5848	45.9497	46.2859	47.2789	47.2789	48.2442	48.2442	48.5588	48.2442	46.6196	46.9507	45.9497	
alpha	3.9723	4.0633	4.0857	4.1519	4.1519	4.2163	4.2163	4.2373	4.2163	4.1080	4.1300	4.0633	
util living area	0.9949	0.9940	0.9900	0.9787	0.9428	0.8320	0.6718	0.6900	0.8988	0.9758	0.9914	0.9954	(86)
MIT	19.2706	19.3948	19.6692	20.0609	20.4812	20.8219	20.9500	20.9455	20.7259	20.2499	19.7712	19.3215	(87)
Th 2	19.4192	19.4577	19.4669	19.4936	19.4936	19.5186	19.5186	19.5266	19.5186	19.4760	19.4849	19.4577	(88)
util rest of house	0.9926	0.9911	0.9848	0.9659	0.8999	0.6980	0.4356	0.4523	0.8015	0.9566	0.9864	0.9933	(89)
MIT 2	17.5132	17.6961	18.0518	18.5635	19.0728	19.4359	19.5109	19.5179	19.3614	18.7915	18.1946	17.6029	(90)
Living area fraction									fLA = Living area / (4) =			0.4815	(91)
MIT	18.3594	18.5140	18.8305	19.2845	19.7509	20.1032	20.2038	20.2053	20.0184	19.4937	18.9537	18.4304	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3594	18.5140	18.8305	19.2845	19.7509	20.1032	20.2038	20.2053	20.0184	19.4937	18.9537	18.4304	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9902	0.9886	0.9818	0.9635	0.9093	0.7597	0.5546	0.5725	0.8421	0.9569	0.9838	0.9912	(94)
Useful gains	542.6777	557.5370	570.2592	575.9100	544.7090	451.0248	312.3586	308.8822	435.8937	481.4595	503.7114	524.9526	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1579.6220	1515.5077	1353.8111	1113.1812	821.9574	529.7954	327.0992	325.1437	565.2942	896.8566	1221.5731	1529.2715	(97)
Space heating kWh	771.4865	643.7563	582.9626	386.8353	206.2728	0.0000	0.0000	0.0000	0.0000	309.0555	516.8604	747.2132	(98a)
Space heating requirement - total per year (kWh/year)												4164.4427	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	771.4865	643.7563	582.9626	386.8353	206.2728	0.0000	0.0000	0.0000	0.0000	309.0555	516.8604	747.2132	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4164.4427	
Space heating per m2											(98c) / (4) =	63.9994	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	771.4865	643.7563	582.9626	386.8353	206.2728	0.0000	0.0000	0.0000	0.0000	309.0555	516.8604	747.2132	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	771.4865	643.7563	582.9626	386.8353	206.2728	0.0000	0.0000	0.0000	0.0000	309.0555	516.8604	747.2132	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.9607	19.2221	17.3074	12.6801	9.7945	8.0022	8.9349	11.6139	15.0853	19.7927	22.3558	24.6266	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 4164.4427 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2476.9401 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 193.3763 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	6834.7590 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4164.4427	27.6700	1152.3013	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	27.6700	685.3693	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	193.3763	27.6700	53.5072	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1891.1778	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4164.4427	0.1542	642.3653	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2476.9401	0.1413	349.9027	(264)
Space and water heating			992.2679	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	193.3763	0.1443	27.9102	(268)
Total CO2, kg/year			1020.1781	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4164.4427	1.5711	6542.7143	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	1.5224	3770.7983	(278)
Space and water heating			10313.5125	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	193.3763	1.5338	296.6069	(282)
Total Primary energy kWh/year			10610.1195	(286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: F 36
Current environmental impact rating: B 86

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: F 36
Potential environmental impact rating: B 86

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1891	£1891	£0
Space heating	£1152	£1152	£0
Water heating	£685	£685	£0
Lighting	£54	£54	£0
Total cost of fuels	£1891	£1891	£0
Total cost of uses	£1891	£1891	£0
Delivered energy	105 kWh/m²	105 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.0 tonnes	1.0 tonnes	0.0 tonnes
CO2 emissions per m²	16 kg/m²	16 kg/m²	0 kg/m²
Primary energy	163 kWh/m²	163 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700	(1b)	x 2.5000	(2b) =	162.6750	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		162.6750	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8729 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9461	0.9275	0.9090	0.8162	0.7977	0.7049	0.7049	0.6864	0.7420	0.7977	0.8348	0.8719	(22b)
Effective ac	0.9475	0.9301	0.9131	0.8331	0.8181	0.7484	0.7484	0.7355	0.7753	0.8181	0.8484	0.8801	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.1800	11.7126	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.2600	8.9570	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)
Total net area of external elements Aum(A, m2)			168.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		37.2876			(33)
Main dwelling								
Party Wall 1			56.9000	0.0000	0.0000	180.0000	10242.0000	(32)
Internal Wall 1			99.9000			9.0000	899.1000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 19564.0900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	300.6622 (35)
Thermal bridges (Default value 0.200 * total exposed area)	33.7380 (36)
Point Thermal bridges	(36a) = 0.0000
Total fabric heat loss	(33) + (36) + (36a) = 71.0256 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	49.9320	49.0176	44.7228	43.9192	40.1785	40.1785	39.4858	41.6194	43.9192	45.5448	47.2443	(38)
Heat transfer coeff	121.8905	120.9576	120.0432	115.7484	114.9448	111.2042	111.2042	110.5114	112.6450	114.9448	116.5704	118.2699	(39)
Average = Sum(39)m / 12 =												115.7445	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8732	1.8589	1.8448	1.7788	1.7665	1.7090	1.7090	1.6983	1.7311	1.7665	1.7915	1.8176	(40)
HLP (average)												1.7788	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.1208 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
82.1947	80.9595	79.1596	75.7156	73.1741	70.3398	68.7288	70.5152	72.4733	75.5165	79.0344	81.8798	(42a)

Hot water usage for baths

25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424	(42b)

Hot water usage for other uses

36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488	(42c)
Average daily hot water use (litres/day)												132.7734 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	144.3733	141.4327	137.7707	132.0090	127.3999	122.4169	120.3592	124.0037	127.8677	133.1176	138.9738	143.9711	(44)
Energy conte	228.6520	201.3983	211.7485	180.7138	171.5048	150.5258	145.5640	153.5425	157.6737	180.6393	197.9936	225.4239	(45)
Energy content (annual)										Total = Sum(45)m =		2205.3801	

Distribution loss (46)m = 0.15 x (45)m

34.2978	30.2097	31.7623	27.1071	25.7257	22.5789	21.8346	23.0314	23.6511	27.0959	29.6990	33.8136	(46)

Water storage loss (or HIU loss):

Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
										Total per year (kWh/year) = Sum(64)m =		2476.9401	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	94.4780	83.6305	88.8576	77.9433	75.4765	67.9058	66.8512	69.5041	70.2825	78.5138	83.6889	93.4046	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	27.3744	24.3137	19.7732	14.9696	11.1900	9.4470	10.2079	13.2686	17.8090	22.6127	26.3923	28.1352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)
Water heating gains (Table 5)													
	126.9866	124.4502	119.4322	108.2546	101.4470	94.3137	89.8538	93.4195	97.6146	105.5292	116.2345	125.5439	(72)
Total internal gains													
	523.5313	520.8076	504.0082	472.6117	442.5654	415.4005	399.4835	403.2364	419.2130	447.3465	481.2905	510.6314	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	541.8409	558.4080	571.3556	580.8626	585.1178	565.9350	540.8904	517.9112	500.6694	493.2996	504.4163	525.5124	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.5848	44.9287	45.2709	46.9507	47.2789	48.8693	48.8693	49.1756	48.2442	47.2789	46.6196	45.9497	
alpha	3.9723	3.9952	4.0181	4.1300	4.1519	4.2580	4.2580	4.2784	4.2163	4.1519	4.1080	4.0633	
util living area													
	0.9962	0.9951	0.9923	0.9844	0.9612	0.8898	0.7672	0.8029	0.9380	0.9850	0.9943	0.9967	(86)
MIT	19.0926	19.2217	19.4974	19.9289	20.3442	20.7283	20.9030	20.8791	20.5997	20.0814	19.5567	19.1195	(87)
Th 2	19.4192	19.4291	19.4388	19.4849	19.4936	19.5344	19.5344	19.5420	19.5186	19.4936	19.4760	19.4577	(88)
util rest of house													
	0.9945	0.9930	0.9886	0.9754	0.9334	0.7971	0.5734	0.6250	0.8790	0.9743	0.9913	0.9953	(89)
MIT 2	17.2855	17.4568	17.8150	18.3926	18.9127	19.3709	19.5073	19.5025	19.2343	18.5937	17.9156	17.3443	(90)
Living area fraction										fLA = Living area / (4) =		0.4815	(91)
MIT	18.1556	18.3066	18.6250	19.1323	19.6019	20.0244	20.1793	20.1653	19.8917	19.3100	18.7058	18.1990	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1556	18.3066	18.6250	19.1323	19.6019	20.0244	20.1793	20.1653	19.8917	19.3100	18.7058	18.1990	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9925	0.9907	0.9857	0.9724	0.9360	0.8347	0.6701	0.7130	0.8982	0.9724	0.9890	0.9935	(94)
Useful gains	537.8031	553.2088	563.1780	564.8395	547.6978	472.3955	362.4537	369.2964	449.7228	479.6995	498.8850	522.1167	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1688.8647	1621.6293	1455.5300	1184.3761	908.2826	603.2211	398.0298	416.1088	652.4081	1001.1705	1352.8875	1655.6609	(97)
Space heating kWh													
	856.3898	717.9786	663.9099	446.0664	268.2751	0.0000	0.0000	0.0000	0.0000	387.9744	614.8818	843.3569	(98a)
Space heating requirement - total per year (kWh/year)												4798.8330	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	856.3898	717.9786	663.9099	446.0664	268.2751	0.0000	0.0000	0.0000	0.0000	387.9744	614.8818	843.3569	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4798.8330	
Space heating per m2											(98c) / (4) =	73.7488	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	856.3898	717.9786	663.9099	446.0664	268.2751	0.0000	0.0000	0.0000	0.0000	387.9744	614.8818	843.3569	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	856.3898	717.9786	663.9099	446.0664	268.2751	0.0000	0.0000	0.0000	0.0000	387.9744	614.8818	843.3569	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.9607	19.2221	17.3074	12.6801	9.7945	8.0022	8.9349	11.6139	15.0853	19.7927	22.3558	24.6266	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4798.8330	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2476.9401	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												193.3763	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												7469.1493	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4798.8330	16.4900	791.3276	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	16.4900	408.4474	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	193.3763	16.4900	31.8877	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1231.6627	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	4.0283	(257)
SAP value		35.8824	
SAP rating (Section 12)		36	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4798.8330	0.1539	738.3250	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2476.9401	0.1413	349.9027	(264)
Space and water heating			1088.2277	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	193.3763	0.1443	27.9102 (268)
Total CO2, kg/year			1116.1378 (272)
CO2 emissions per m2			17.1500 (273)
EI value			86.4121
EI rating			86 (274)
EI band			B

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700	(1b)	x 2.5000	(2b) =	162.6750	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		162.6750	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8729 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9461	0.8719	0.8533	0.7977	0.7977	0.7420	0.7420	0.7235	0.7420	0.8348	0.8162	0.8719	(22b)
Effective ac	0.9475	0.8801	0.8641	0.8181	0.8181	0.7753	0.7753	0.7617	0.7753	0.8484	0.8331	0.8801	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.1800	11.7126	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.2600	8.9570	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)
Total net area of external elements Aum(A, m2)			168.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		37.2876			(33)
Main dwelling								
Party Wall 1			56.9000	0.0000	0.0000	180.0000	10242.0000	(32)
Internal Wall 1			99.9000			9.0000	899.1000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 19564.0900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	300.6622 (35)
Thermal bridges (Default value 0.200 * total exposed area)	33.7380 (36)
Point Thermal bridges	(36a) = 0.0000
Total fabric heat loss	(33) + (36) + (36a) = 71.0256 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	47.2443	46.3853	43.9192	43.9192	41.6194	41.6194	40.8897	41.6194	45.5448	44.7228	47.2443	(38)
Heat transfer coeff	121.8905	118.2699	117.4109	114.9448	114.9448	112.6450	112.6450	111.9153	112.6450	116.5704	115.7484	118.2699	(39)
Average = Sum(39)m / 12 =												115.6583	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8732	1.8176	1.8044	1.7665	1.7665	1.7311	1.7311	1.7199	1.7311	1.7915	1.7788	1.8176	(40)
HLP (average)												1.7774	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.1208 (42)
Hot water usage for mixer showers	

	82.1947	80.9595	79.1596	75.7156	73.1741	70.3398	68.7288	70.5152	72.4733	75.5165	79.0344	81.8798	(42a)
Hot water usage for baths													
	25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424	(42b)
Hot water usage for other uses													
	36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488	(42c)
Average daily hot water use (litres/day)												132.7734	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	144.3733	141.4327	137.7707	132.0090	127.3999	122.4169	120.3592	124.0037	127.8677	133.1176	138.9738	143.9711	(44)
Energy conte	228.6520	201.3983	211.7485	180.7138	171.5048	150.5258	145.5640	153.5425	157.6737	180.6393	197.9936	225.4239	(45)
Energy content (annual)										Total = Sum(45)m =		2205.3801	
Distribution loss (46)m = 0.15 x (45)m													
	34.2978	30.2097	31.7623	27.1071	25.7257	22.5789	21.8346	23.0314	23.6511	27.0959	29.6990	33.8136	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
										Total per year (kWh/year) = Sum(64)m =		2476.9401	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	94.4780	83.6305	88.8576	77.9433	75.4765	67.9058	66.8512	69.5041	70.2825	78.5138	83.6889	93.4046	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	27.3744	24.3137	19.7732	14.9696	11.1900	9.4470	10.2079	13.2686	17.8090	22.6127	26.3923	28.1352	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)
Water heating gains (Table 5)													
	126.9866	124.4502	119.4322	108.2546	101.4470	94.3137	89.8538	93.4195	97.6146	105.5292	116.2345	125.5439	(72)
Total internal gains													
	523.5313	520.8076	504.0082	472.6117	442.5654	415.4005	399.4835	403.2364	419.2130	447.3465	481.2905	510.6314	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	15.0428	0.4600	0.7000	0.7700	13.7627	(75)
Northeast	1.0600	35.0000	0.4600	0.7000	1.0000	10.7516	(82)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	548.0455	563.9582	580.8544	597.7303	599.0353	593.6910	563.1685	539.4900	517.5998	503.1475	512.0042	529.6317	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.5848	45.9497	46.2859	47.2789	47.2789	48.2442	48.2442	48.5588	48.2442	46.6196	46.9507	45.9497	
alpha	3.9723	4.0633	4.0857	4.1519	4.1519	4.2163	4.2163	4.2373	4.2163	4.1080	4.1300	4.0633	
util living area													
	0.9949	0.9940	0.9900	0.9787	0.9428	0.8320	0.6718	0.6900	0.8988	0.9758	0.9914	0.9954	(86)
MIT	19.2706	19.3948	19.6692	20.0609	20.4812	20.8219	20.9500	20.9455	20.7259	20.2499	19.7712	19.3215	(87)
Th 2	19.4192	19.4577	19.4669	19.4936	19.4936	19.5186	19.5186	19.5266	19.5186	19.4760	19.4849	19.4577	(88)
util rest of house													
	0.9926	0.9911	0.9848	0.9659	0.8999	0.6980	0.4356	0.4523	0.8015	0.9566	0.9864	0.9933	(89)
MIT 2	17.5132	17.6961	18.0518	18.5635	19.0728	19.4359	19.5109	19.5179	19.3614	18.7915	18.1946	17.6029	(90)
Living area fraction									fLA = Living area / (4) =			0.4815	(91)
MIT	18.3594	18.5140	18.8305	19.2845	19.7509	20.1032	20.2038	20.2053	20.0184	19.4937	18.9537	18.4304	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3594	18.5140	18.8305	19.2845	19.7509	20.1032	20.2038	20.2053	20.0184	19.4937	18.9537	18.4304	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9902	0.9886	0.9818	0.9635	0.9093	0.7597	0.5546	0.5725	0.8421	0.9569	0.9838	0.9912	(94)
Useful gains	542.6777	557.5370	570.2592	575.9100	544.7090	451.0248	312.3586	308.8822	435.8937	481.4595	503.7114	524.9526	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)

Heat loss rate W

1579.6220	1515.5077	1353.8111	1113.1812	821.9574	529.7954	327.0992	325.1437	565.2942	896.8566	1221.5731	1529.2715	(97)

Space heating kWh

771.4865	643.7563	582.9626	386.8353	206.2728	0.0000	0.0000	0.0000	0.0000	309.0555	516.8604	747.2132	(98a)

Space heating requirement - total per year (kWh/year) 4164.4427

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

771.4865	643.7563	582.9626	386.8353	206.2728	0.0000	0.0000	0.0000	0.0000	309.0555	516.8604	747.2132	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 4164.4427

Space heating per m2 (98c) / (4) = 63.9994 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	771.4865	643.7563	582.9626	386.8353	206.2728	0.0000	0.0000	0.0000	0.0000	309.0555	516.8604	747.2132	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	771.4865	643.7563	582.9626	386.8353	206.2728	0.0000	0.0000	0.0000	0.0000	309.0555	516.8604	747.2132	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	251.7160	222.2303	234.8125	203.0338	194.5688	172.8458	168.6280	176.6065	179.9937	203.7033	220.3136	248.4879	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.9607	19.2221	17.3074	12.6801	9.7945	8.0022	8.9349	11.6139	15.0853	19.7927	22.3558	24.6266	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 4164.4427 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2476.9401 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 193.3763 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N) 0.0000 (235a)

Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated -0.0000 (236)

Energy used 0.0000 (237)

Total delivered energy for all uses 6834.7590 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4164.4427	27.6700	1152.3013	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	27.6700	685.3693	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	193.3763	27.6700	53.5072	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1891.1778	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4164.4427	0.1542	642.3653	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2476.9401	0.1413	349.9027	(264)
Space and water heating			992.2679	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	193.3763	0.1443	27.9102	(268)
Total CO2, kg/year			1020.1781	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4164.4427	1.5711	6542.7143	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2476.9401	1.5224	3770.7983	(278)
Space and water heating			10313.5125	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	193.3763	1.5338	296.6069	(282)
Total Primary energy kWh/year			10610.1195	(286)

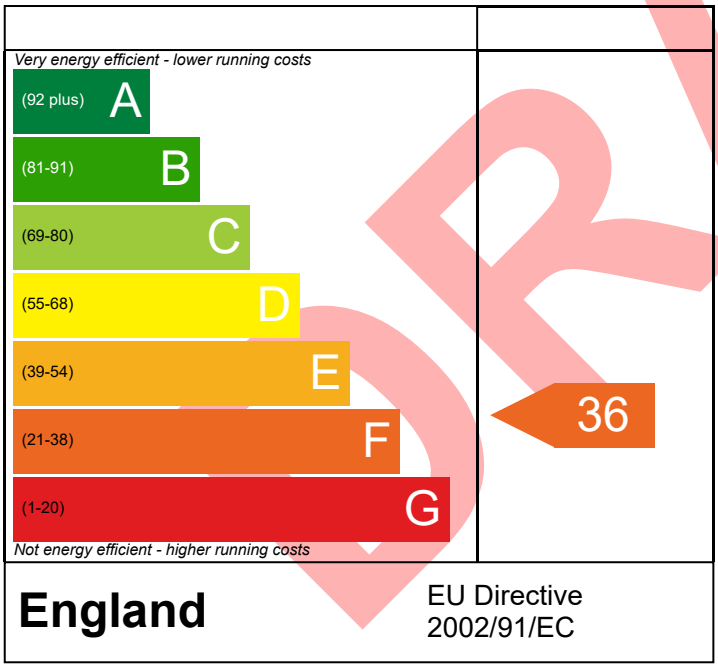
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	65.07 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

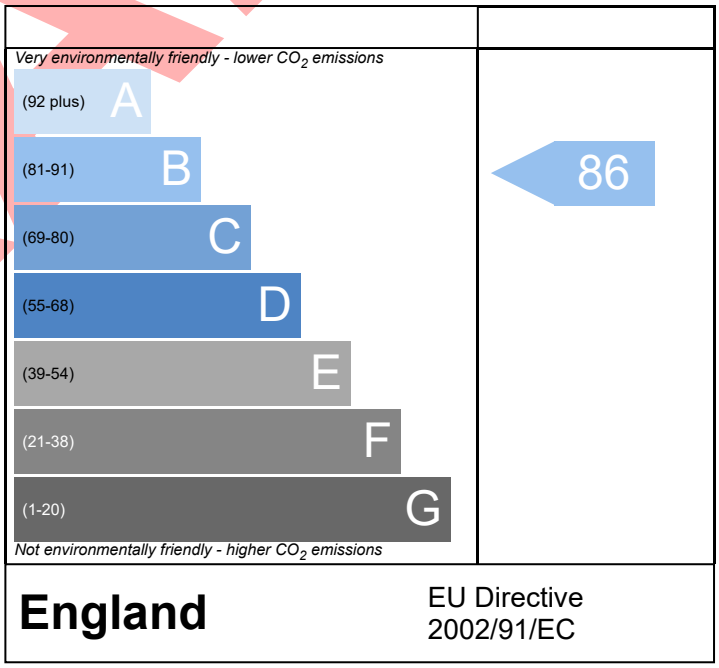
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

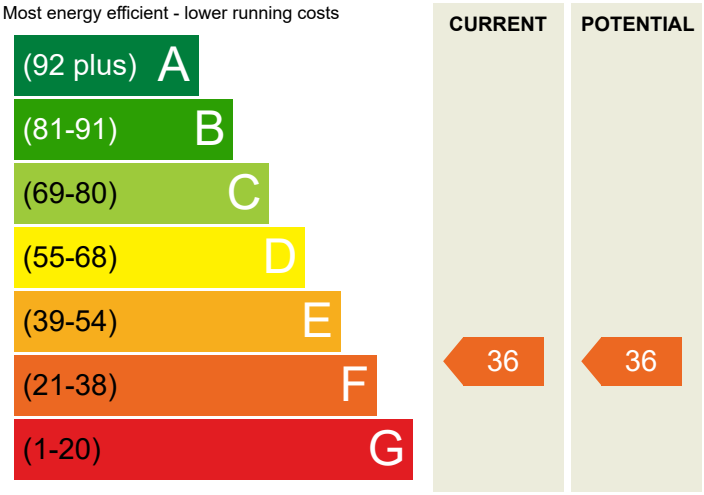
Energy Report

Dwelling Address	
Reference	Flat 6-Be Lean
SAP Version	10.2
Assessment Date	15/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	65

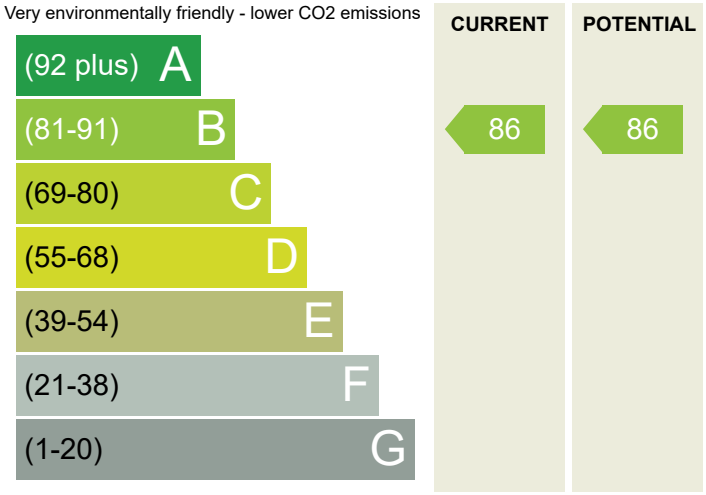
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

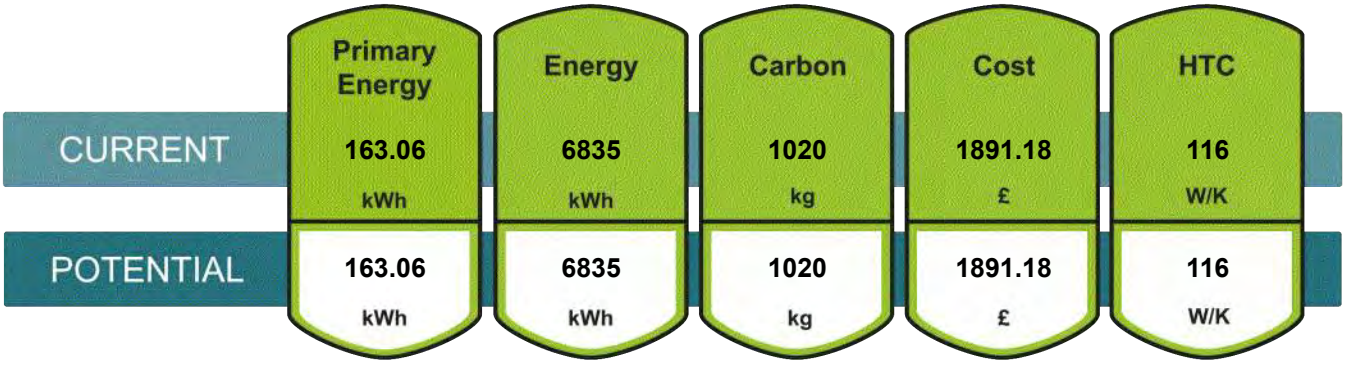
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home


Primary Energy
Energy
Carbon
Cost
HTC
CURRENT
163.06
kWh
6835
kWh
1020
kg
1891.18
£
116
W/K
POTENTIAL
163.06
kWh
6835
kWh
1020
kg
1891.18
£
116
W/K

Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£54	£54	
Heating	£1152	£1152	
Hot Water	£685	£685	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1891	£1891	

Estimated energy use and potential savings

Space Heating
4164
kWh per year

Water Heating
2477
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 7	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	62 D	**DER**	10.74	**TER**	
Environmental	92 A	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.55	**DFEE**	36.40	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	112.60	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	382.71	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	10.07 m	58.22 m²	2.73 m

8.0 Living Area	29.09	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	27.49	21.94	0.00	None	5.55	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	33.47	0.00	None
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	45.43	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	111.06

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling	Timber I-joists, carpeted	20.00	58.22

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)

Summary for Input Data

elmhurst energy

Party Floor 1	Lowest occupied	Timber I-joists, carpeted		30.00	58.22

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	4.45	
NW Windows	Windows	External Wall 1	North East	1.10	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Independent	
SAP Code	903	

Summary for Input Data

Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 7	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	62 D	**DER**	10.74	**TER**	
Environmental	92 A	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.55	**DFEE**	36.40	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	112.60	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8654	0.8485	0.8315	0.7466	0.7297	0.6448	0.6448	0.6279	0.6788	0.7297	0.7636	0.7976	(22b)
Effective ac	0.8745	0.8599	0.8457	0.7787	0.7662	0.7079	0.7079	0.6971	0.7304	0.7662	0.7916	0.8180	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		12.5628			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Party Ceiling			58.2200			20.0000	1164.4000	(32b)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	22281.1400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		382.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)		5.4980 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	18.0608 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	45.1045	44.3568	40.8453	40.1883	37.1299	37.1299	36.5635	38.3079	40.1883	41.5174	42.9069	(38)

Heat transfer coeff

	63.9279	63.1652	62.4176	58.9061	58.2491	55.1906	55.1906	54.6242	56.3687	58.2491	59.5782	60.9677 (39)
Average = Sum(39)m / 12 =												58.9029

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0980	1.0849	1.0721	1.0118	1.0005	0.9480	0.9480	0.9382	0.9682	1.0005	1.0233	1.0472	(40)
HLP (average)												1.0117	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9309 (42)

Hot water usage for mixer showers

	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188 (42a)

Hot water usage for baths

	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)

Hot water usage for other uses

	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)

Average daily hot water use (litres/day) 125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	522.4665	548.6592	560.9425	559.1933	550.3056	526.1062	505.6798	495.0411	492.5073	489.1404	491.7039	504.8733	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	96.8153	97.9844	99.1580	105.0691	106.2542	112.1423	112.1423	113.3051	109.7986	106.2542	103.8838	101.5162	
alpha	7.4544	7.5323	7.6105	8.0046	8.0836	8.4762	8.4762	8.5537	8.3199	8.0836	7.9256	7.7677	
util living area													
	0.9975	0.9956	0.9899	0.9652	0.8828	0.6637	0.4797	0.5068	0.7635	0.9601	0.9934	0.9979	(86)
MIT	20.2865	20.3843	20.5417	20.7715	20.9261	20.9946	20.9997	20.9995	20.9829	20.8199	20.5522	20.3160	(87)
Th 2	20.0024	20.0132	20.0237	20.0735	20.0829	20.1269	20.1269	20.1351	20.1099	20.0829	20.0639	20.0442	(88)
util rest of house													

	0.9963	0.9934	0.9846	0.9470	0.8299	0.5774	0.3849	0.4120	0.6780	0.9359	0.9897	0.9969	(89)
MIT 2	19.1927	19.3257	19.5331	19.8556	20.0293	20.1248	20.1269	20.1350	20.1017	19.9224	19.5805	19.2639	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.7392	19.8547	20.0371	20.3132	20.4774	20.5594	20.5630	20.5670	20.5420	20.3709	20.0660	19.7896	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.7392	19.8547	20.0371	20.3132	20.4774	20.5594	20.5630	20.5670	20.5420	20.3709	20.0660	19.7896	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9959	0.9929	0.9847	0.9524	0.8545	0.6207	0.4323	0.4595	0.7210	0.9447	0.9897	0.9965	(94)
Useful gains	520.3115	544.7807	552.3454	532.5983	470.2245	326.5746	218.6163	227.4572	355.0994	462.1043	486.6336	503.1288	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	986.9993	944.6149	844.9520	672.3087	511.2736	328.9017	218.7183	227.6171	363.1247	569.1449	772.4918	950.4599	(97)
Space heating kWh	347.2157	268.6886	217.6993	100.5915	30.5405	0.0000	0.0000	0.0000	0.0000	79.6382	205.8179	332.8143	(98a)
Space heating requirement - total per year (kWh/year)												1583.0061	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	347.2157	268.6886	217.6993	100.5915	30.5405	0.0000	0.0000	0.0000	0.0000	79.6382	205.8179	332.8143	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1583.0061	
Space heating per m2											(98c) / (4) =	27.1901	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	347.2157	268.6886	217.6993	100.5915	30.5405	0.0000	0.0000	0.0000	0.0000	79.6382	205.8179	332.8143	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	347.2157	268.6886	217.6993	100.5915	30.5405	0.0000	0.0000	0.0000	0.0000	79.6382	205.8179	332.8143	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	1583.0061	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2359.4492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	163.0867	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4105.5419	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1583.0061	16.4900	261.0377	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	16.4900	389.0732	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	16.4900	26.8930	(250)
Additional standing charges			0.0000	(251)
Total energy cost			677.0039	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.3612	(257)
SAP value		61.7252	
SAP rating (Section 12)		62	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1583.0061	0.1563	247.4683	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			580.7368	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	163.0867	0.1443	23.5385	(268)
Total CO2, kg/year			604.2752	(272)
CO2 emissions per m2			10.3800	(273)
EI value			92.1553	
EI rating			92	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b) x	2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8654	0.7976	0.7806	0.7297	0.7297	0.6788	0.6788	0.6618	0.6788	0.7636	0.7466	0.7976	(22b)
Effective ac	0.8745	0.8180	0.8047	0.7662	0.7662	0.7304	0.7304	0.7190	0.7304	0.7916	0.7787	0.8180	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		12.5628			(33)
Main dwelling								

Party Wall to Adj Property	33.4700	0.0000	0.0000	180.0000	6024.6000 (32)
Party Wall to Adj Flat	45.4300	0.0000	0.0000	180.0000	8177.4000 (32)
Party Floor 1	58.2200			30.0000	1746.6000 (32d)
Party Ceiling	58.2200			20.0000	1164.4000 (32b)
Internal Walls	111.0600			9.0000	999.5400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 22281.1400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	382.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)	5.4980 (36)
Point Thermal bridges	(36a) = 0.0000
Total fabric heat loss	(33) + (36) + (36a) = 18.0608 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	42.9069	42.2046	40.1883	40.1883	38.3079	38.3079	37.7113	38.3079	41.5174	40.8453	42.9069	(38)
Heat transfer coeff	63.9279	60.9677	60.2654	58.2491	58.2491	56.3687	56.3687	55.7721	56.3687	59.5782	58.9061	60.9677	(39)
Average = Sum(39)m / 12 =												58.8324	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0980	1.0472	1.0351	1.0005	1.0005	0.9682	0.9682	0.9580	0.9682	1.0233	1.0118	1.0472	(40)
HLP (average)												1.0105	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309	(42)
Hot water usage for mixer showers	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)
Hot water usage for baths	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												125.7000	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
									Total per year (kWh/year) = Sum(64)m =			2359.4492	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	15.0428	0.4600	0.7000	0.7700	3.6924	(75)
Southwest	4.4500	46.3896	0.4600	0.7000	0.7700	46.0649	(79)

Solar gains	49.7573	73.4838	102.9654	135.2716	149.5616	163.0044	152.4518	138.9511	120.0610	86.7229	59.2696	40.5283	(83)
Total gains	532.9180	554.2708	568.5987	572.2765	559.2677	547.8836	522.6579	512.5054	507.9900	500.1912	503.7267	511.8724	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	96.8153	101.5162	102.6992	106.2542	106.2542	109.7986	109.7986	110.9731	109.7986	103.8838	105.0691	101.5162	
alpha	7.4544	7.7677	7.8466	8.0836	8.0836	8.3199	8.3199	8.3982	8.3199	7.9256	8.0046	7.7677	
util living area													
	0.9956	0.9928	0.9827	0.9440	0.8220	0.5737	0.3989	0.4025	0.6581	0.9241	0.9851	0.9961	(86)
MIT	20.3906	20.4972	20.6487	20.8362	20.9609	20.9982	20.9999	20.9999	20.9948	20.8868	20.6752	20.4281	(87)
Th 2	20.0024	20.0442	20.0542	20.0829	20.0829	20.1099	20.1099	20.1185	20.1099	20.0639	20.0735	20.0442	(88)
util rest of house													
	0.9934	0.9892	0.9737	0.9165	0.7538	0.4840	0.3030	0.3067	0.5648	0.8808	0.9764	0.9940	(89)
MIT 2	19.3254	19.4940	19.6910	19.9368	20.0586	20.1094	20.1099	20.1185	20.1080	19.9764	19.7418	19.4068	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.8576	19.9953	20.1695	20.3862	20.5095	20.5535	20.5546	20.5589	20.5511	20.4313	20.2082	19.9171	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8576	19.9953	20.1695	20.3862	20.5095	20.5535	20.5546	20.5589	20.5511	20.4313	20.2082	19.9171	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9929	0.9890	0.9750	0.9267	0.7872	0.5289	0.3510	0.3546	0.6117	0.8999	0.9780	0.9937	(94)
Useful gains	529.1594	548.1578	554.4081	530.3331	440.2602	289.7962	183.4384	181.7370	310.7518	450.1006	492.6245	508.6381	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	924.2470	871.5491	775.5870	628.2859	460.7192	290.4939	183.4580	181.7564	312.9082	514.2344	695.5731	878.9780	(97)
Space heating kWh													
	293.9452	217.3190	164.5571	70.5260	15.2215	0.0000	0.0000	0.0000	0.0000	47.7155	146.1230	275.5329	(98a)
Space heating requirement - total per year (kWh/year)												1230.9401	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	293.9452	217.3190	164.5571	70.5260	15.2215	0.0000	0.0000	0.0000	0.0000	47.7155	146.1230	275.5329	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1230.9401	
Space heating per m2											(98c) / (4) =	21.1429	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	293.9452	217.3190	164.5571	70.5260	15.2215	0.0000	0.0000	0.0000	0.0000	47.7155	146.1230	275.5329	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	293.9452	217.3190	164.5571	70.5260	15.2215	0.0000	0.0000	0.0000	0.0000	47.7155	146.1230	275.5329	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1230.9401	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2359.4492	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												163.0867	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)

Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3753.4760 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1230.9401	27.6700	340.6011	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	27.6700	652.8596	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	27.6700	45.1261	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1038.5868	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1230.9401	0.1571	193.4215	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			526.6900	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	163.0867	0.1443	23.5385	(268)
Total CO2, kg/year			550.2285	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1230.9401	1.5817	1947.0325	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	1.5223	3591.7963	(278)
Space and water heating			5538.8288	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	163.0867	1.5338	250.1478	(282)
Total Primary energy kWh/year			5788.9766	(286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: D 62
Current environmental impact rating: A 92

N	Solar water heating	Not applicable	
U	Solar photovoltaic panels	Not applicable	
V2	Wind turbine	Not applicable	

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: D 62
Potential environmental impact rating: A 92

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1039	£1039	£0
Space heating	£341	£341	£0
Water heating	£653	£653	£0
Lighting	£45	£45	£0
Total cost of fuels	£1039	£1039	£0
Total cost of uses	£1039	£1039	£0
Delivered energy	64 kWh/m²	64 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.6 tonnes	0.6 tonnes	0.0 tonnes
CO2 emissions per m²	9 kg/m²	9 kg/m²	0 kg/m²
Primary energy	99 kWh/m²	99 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8758 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8654	0.8485	0.8315	0.7466	0.7297	0.6448	0.6448	0.6279	0.6788	0.7297	0.7636	0.7976	(22b)
Effective ac	0.8745	0.8599	0.8457	0.7787	0.7662	0.7079	0.7079	0.6971	0.7304	0.7662	0.7916	0.8180	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		12.5628			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Party Ceiling			58.2200			20.0000	1164.4000	(32b)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	22281.1400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		382.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)		5.4980 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	18.0608 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	45.1045	44.3568	40.8453	40.1883	37.1299	37.1299	36.5635	38.3079	40.1883	41.5174	42.9069	(38)
Heat transfer coeff	63.9279	63.1652	62.4176	58.9061	58.2491	55.1906	55.1906	54.6242	56.3687	58.2491	59.5782	60.9677	(39)
Average = Sum(39)m / 12 =												58.9029	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0980	1.0849	1.0721	1.0118	1.0005	0.9480	0.9480	0.9382	0.9682	1.0005	1.0233	1.0472	(40)
HLP (average)												1.0117	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9309 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)

Hot water usage for baths

24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day)		125.7000 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)

Water storage loss (or HIU loss):

Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.2400 (48)
Temperature factor from Table 2b 0.6000 (49)
Enter (49) or (54) in (55) 0.7440 (55)
Total storage loss
23.0640 20.8320 23.0640 22.3200 23.0640 22.3200 23.0640 23.0640 22.3200 23.0640 22.3200 23.0640 (56)
If cylinder contains dedicated solar storage
23.0640 20.8320 23.0640 22.3200 23.0640 22.3200 23.0640 23.0640 22.3200 23.0640 22.3200 23.0640 (57)
Primary loss 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (59)
Combi loss 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (61)
Total heat required for water heating calculated for each month
239.5344 211.5009 223.5319 193.4065 185.4322 164.8269 160.8732 168.4265 171.5935 194.0795 209.7654 236.4782 (62)
WWHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63a)
PV diverter 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63b)
Solar input 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63c)
FGHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63d)
Output from w/h
239.5344 211.5009 223.5319 193.4065 185.4322 164.8269 160.8732 168.4265 171.5935 194.0795 209.7654 236.4782 (64)
Total per year (kWh/year) = Sum(64)m = 2359.4492 (64)
Electric shower(s)
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)
Heat gains from water heating, kWh/month
90.4276 80.0630 85.1068 74.7423 72.4386 65.2395 64.2728 66.7842 67.4894 75.3139 80.1816 89.4114 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5
23.0866 20.5053 16.6760 12.6248 9.4372 7.9673 8.6089 11.1902 15.0195 19.0707 22.2583 23.7283 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5
251.3977 254.0064 247.4325 233.4375 215.7713 199.1675 188.0752 185.4664 192.0403 206.0354 223.7016 240.3054 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5
48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 48.5162 (69)
Pumps, fans 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)
-77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 -77.2354 (71)
Water heating gains (Table 5)
121.5425 119.1414 114.3908 103.8087 97.3637 90.6105 86.3881 89.7638 93.7353 101.2283 111.3633 120.1767 (72)
Total internal gains
483.1607 480.7870 465.6333 437.0049 409.7061 384.8792 370.2061 373.5543 387.9291 413.4683 444.4571 471.3442 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	522.4665	548.6592	560.9425	559.1933	550.3056	526.1062	505.6798	495.0411	492.5073	489.1404	491.7039	504.8733	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	96.8153	97.9844	99.1580	105.0691	106.2542	112.1423	112.1423	113.3051	109.7986	106.2542	103.8838	101.5162	
alpha	7.4544	7.5323	7.6105	8.0046	8.0836	8.4762	8.4762	8.5537	8.3199	8.0836	7.9256	7.7677	
util living area	0.9975	0.9956	0.9899	0.9652	0.8828	0.6637	0.4797	0.5068	0.7635	0.9601	0.9934	0.9979	(86)
MIT	20.2865	20.3843	20.5417	20.7715	20.9261	20.9946	20.9997	20.9995	20.9829	20.8199	20.5522	20.3160	(87)
Th 2	20.0024	20.0132	20.0237	20.0735	20.0829	20.1269	20.1269	20.1351	20.1099	20.0829	20.0639	20.0442	(88)
util rest of house	0.9963	0.9934	0.9846	0.9470	0.8299	0.5774	0.3849	0.4120	0.6780	0.9359	0.9897	0.9969	(89)
MIT 2	19.1927	19.3257	19.5331	19.8556	20.0293	20.1248	20.1269	20.1350	20.1017	19.9224	19.5805	19.2639	(90)
Living area fraction									fLA = Living area / (4) =			0.4997	(91)
MIT	19.7392	19.8547	20.0371	20.3132	20.4774	20.5594	20.5630	20.5670	20.5420	20.3709	20.0660	19.7896	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.7392	19.8547	20.0371	20.3132	20.4774	20.5594	20.5630	20.5670	20.5420	20.3709	20.0660	19.7896	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9959	0.9929	0.9847	0.9524	0.8545	0.6207	0.4323	0.4595	0.7210	0.9447	0.9897	0.9965	(94)
Useful gains	520.3115	544.7807	552.3454	532.5983	470.2245	326.5746	218.6163	227.4572	355.0994	462.1043	486.6336	503.1288	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	986.9993	944.6149	844.9520	672.3087	511.2736	328.9017	218.7183	227.6171	363.1247	569.1449	772.4918	950.4599	(97)
Space heating kWh	347.2157	268.6886	217.6993	100.5915	30.5405	0.0000	0.0000	0.0000	0.0000	79.6382	205.8179	332.8143	(98a)
Space heating requirement - total per year (kWh/year)												1583.0061	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	347.2157	268.6886	217.6993	100.5915	30.5405	0.0000	0.0000	0.0000	0.0000	79.6382	205.8179	332.8143	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1583.0061	
Space heating per m2											(98c) / (4) =	27.1901	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	347.2157	268.6886	217.6993	100.5915	30.5405	0.0000	0.0000	0.0000	0.0000	79.6382	205.8179	332.8143	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	347.2157	268.6886	217.6993	100.5915	30.5405	0.0000	0.0000	0.0000	0.0000	79.6382	205.8179	332.8143	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1583.0061	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2359.4492	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												163.0867	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												4105.5419	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1583.0061	16.4900	261.0377	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	16.4900	389.0732	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	16.4900	26.8930	(250)
Additional standing charges			0.0000	(251)
Total energy cost			677.0039	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.3612	(257)
SAP value		61.7252	
SAP rating (Section 12)		62	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1583.0061	0.1563	247.4683	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			580.7368	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	163.0867	0.1443	23.5385 (268)
Total CO2, kg/year			604.2752 (272)
CO2 emissions per m2			10.3800 (273)
EI value			92.1553
EI rating			92 (274)
EI band			A

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate													
	0.8654	0.7976	0.7806	0.7297	0.7297	0.6788	0.6788	0.6618	0.6788	0.7636	0.7466	0.7976	(22b)
Effective ac	0.8745	0.8180	0.8047	0.7662	0.7662	0.7304	0.7304	0.7190	0.7304	0.7916	0.7787	0.8180	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		12.5628			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Party Ceiling			58.2200			20.0000	1164.4000	(32b)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	22281.1400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		382.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)		5.4980 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	18.0608 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	42.9069	42.2046	40.1883	40.1883	38.3079	38.3079	37.7113	38.3079	41.5174	40.8453	42.9069	(38)
Heat transfer coeff													
	63.9279	60.9677	60.2654	58.2491	58.2491	56.3687	56.3687	55.7721	56.3687	59.5782	58.9061	60.9677	(39)
Average = Sum(39)m / 12 =												58.8324	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0980	1.0472	1.0351	1.0005	1.0005	0.9682	0.9682	0.9580	0.9682	1.0233	1.0118	1.0472	(40)
HLP (average)												1.0105	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9309 (42)
Hot water usage for mixer showers		

	77.8170	76.6475	74.9434	71.6829	69.2768	66.5935	65.0682	66.7594	68.6133	71.4944	74.8249	77.5188	(42a)
Hot water usage for baths													
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses													
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												125.7000	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	136.6817	133.8979	130.4312	124.9764	120.6129	115.8954	113.9472	117.3974	121.0555	126.0256	131.5698	136.3009	(44)
Energy conte	216.4704	190.6689	200.4679	171.0865	162.3682	142.5069	137.8092	145.3625	149.2735	171.0155	187.4454	213.4142	(45)
Energy content (annual)										Total = Sum(45)m =		2087.8892	
Distribution loss (46)m = 0.15 x (45)m													
	32.4706	28.6003	30.0702	25.6630	24.3552	21.3760	20.6714	21.8044	22.3910	25.6523	28.1168	32.0121	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
										Total per year (kWh/year) = Sum(64)m =		2359.4492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.4276	80.0630	85.1068	74.7423	72.4386	65.2395	64.2728	66.7842	67.4894	75.3139	80.1816	89.4114	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.0866	20.5053	16.6760	12.6248	9.4372	7.9673	8.6089	11.1902	15.0195	19.0707	22.2583	23.7283	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	121.5425	119.1414	114.3908	103.8087	97.3637	90.6105	86.3881	89.7638	93.7353	101.2283	111.3633	120.1767	(72)
Total internal gains													
	483.1607	480.7870	465.6333	437.0049	409.7061	384.8792	370.2061	373.5543	387.9291	413.4683	444.4571	471.3442	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	15.0428	0.4600	0.7000	0.7700	3.6924	(75)
Southwest	4.4500	46.3896	0.4600	0.7000	0.7700	46.0649	(79)

Solar gains	49.7573	73.4838	102.9654	135.2716	149.5616	163.0044	152.4518	138.9511	120.0610	86.7229	59.2696	40.5283	(83)
Total gains	532.9180	554.2708	568.5987	572.2765	559.2677	547.8836	522.6579	512.5054	507.9900	500.1912	503.7267	511.8724	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	96.8153	101.5162	102.6992	106.2542	106.2542	109.7986	109.7986	110.9731	109.7986	103.8838	105.0691	101.5162	
alpha	7.4544	7.7677	7.8466	8.0836	8.0836	8.3199	8.3199	8.3982	8.3199	7.9256	8.0046	7.7677	
util living area													
	0.9956	0.9928	0.9827	0.9440	0.8220	0.5737	0.3989	0.4025	0.6581	0.9241	0.9851	0.9961	(86)
MIT	20.3906	20.4972	20.6487	20.8362	20.9609	20.9982	20.9999	20.9999	20.9948	20.8868	20.6752	20.4281	(87)
Th 2	20.0024	20.0442	20.0542	20.0829	20.0829	20.1099	20.1099	20.1185	20.1099	20.0639	20.0735	20.0442	(88)
util rest of house													
	0.9934	0.9892	0.9737	0.9165	0.7538	0.4840	0.3030	0.3067	0.5648	0.8808	0.9764	0.9940	(89)
MIT 2	19.3254	19.4940	19.6910	19.9368	20.0586	20.1094	20.1099	20.1185	20.1080	19.9764	19.7418	19.4068	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.8576	19.9953	20.1695	20.3862	20.5095	20.5535	20.5546	20.5589	20.5511	20.4313	20.2082	19.9171	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8576	19.9953	20.1695	20.3862	20.5095	20.5535	20.5546	20.5589	20.5511	20.4313	20.2082	19.9171	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9929	0.9890	0.9750	0.9267	0.7872	0.5289	0.3510	0.3546	0.6117	0.8999	0.9780	0.9937	(94)
Useful gains	529.1594	548.1578	554.4081	530.3331	440.2602	289.7962	183.4384	181.7370	310.7518	450.1006	492.6245	508.6381	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)

Heat loss rate W

924.2470	871.5491	775.5870	628.2859	460.7192	290.4939	183.4580	181.7564	312.9082	514.2344	695.5731	878.9780	(97)

Space heating kWh

293.9452	217.3190	164.5571	70.5260	15.2215	0.0000	0.0000	0.0000	0.0000	47.7155	146.1230	275.5329	(98a)

Space heating requirement - total per year (kWh/year) 1230.9401

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

293.9452	217.3190	164.5571	70.5260	15.2215	0.0000	0.0000	0.0000	0.0000	47.7155	146.1230	275.5329	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 1230.9401

Space heating per m2 (98c) / (4) = 21.1429 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	293.9452	217.3190	164.5571	70.5260	15.2215	0.0000	0.0000	0.0000	0.0000	47.7155	146.1230	275.5329	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	293.9452	217.3190	164.5571	70.5260	15.2215	0.0000	0.0000	0.0000	0.0000	47.7155	146.1230	275.5329	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	239.5344	211.5009	223.5319	193.4065	185.4322	164.8269	160.8732	168.4265	171.5935	194.0795	209.7654	236.4782	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.2076	16.2113	14.5964	10.6940	8.2603	6.7488	7.5354	9.7947	12.7224	16.6925	18.8541	20.7692	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 1230.9401 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 2359.4492 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 163.0867 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation 0.0000 (233)
Wind generation 0.0000 (234)
Hydro-electric generation (Appendix N) 0.0000 (235a)
Electricity generated - Micro CHP (Appendix N) 0.0000 (235)
Appendix Q - special features
Energy saved or generated -0.0000 (236)
Energy used 0.0000 (237)
Total delivered energy for all uses 3753.4760 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1230.9401	27.6700	340.6011	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	27.6700	652.8596	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	163.0867	27.6700	45.1261	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1038.5868	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1230.9401	0.1571	193.4215	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2359.4492	0.1412	333.2685	(264)
Space and water heating			526.6900	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	163.0867	0.1443	23.5385	(268)
Total CO2, kg/year			550.2285	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1230.9401	1.5817	1947.0325	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2359.4492	1.5223	3591.7963	(278)
Space and water heating			5538.8288	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	163.0867	1.5338	250.1478	(282)
Total Primary energy kWh/year			5788.9766	(286)

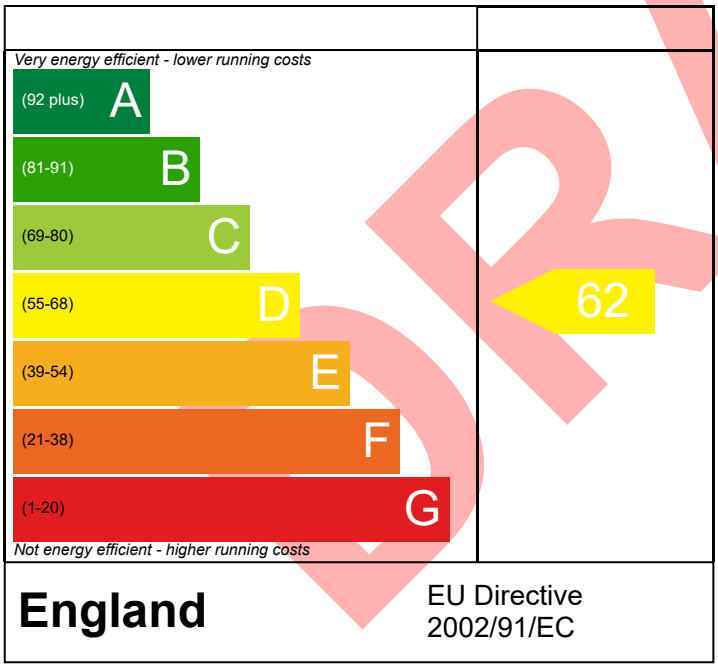
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.22 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

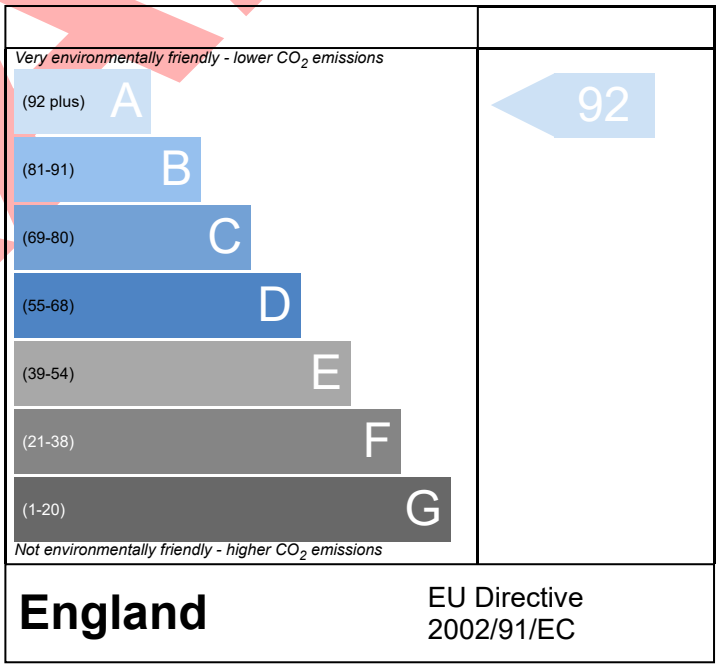
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

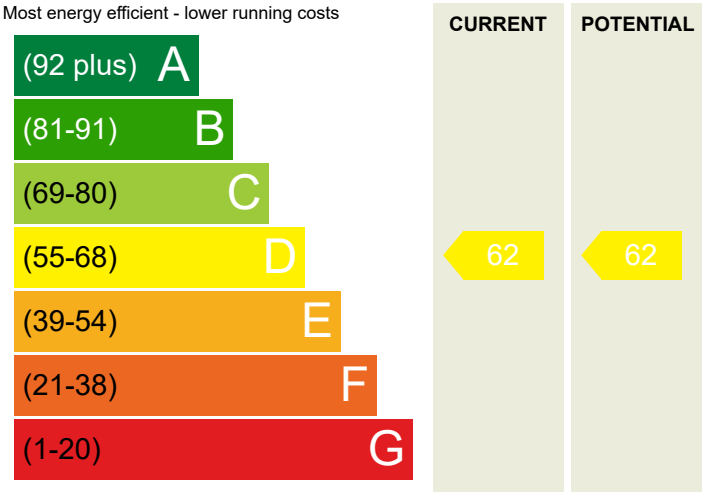
Energy Report

Dwelling Address	
Reference	Flat 7-Be Lean
SAP Version	10.2
Assessment Date	15/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	58

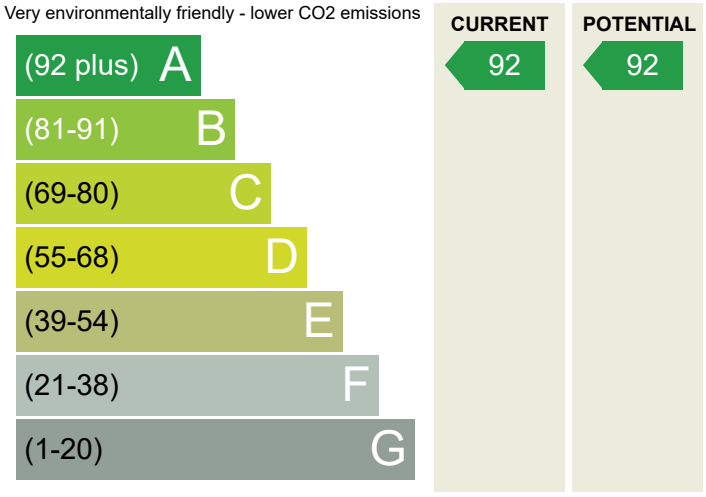
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

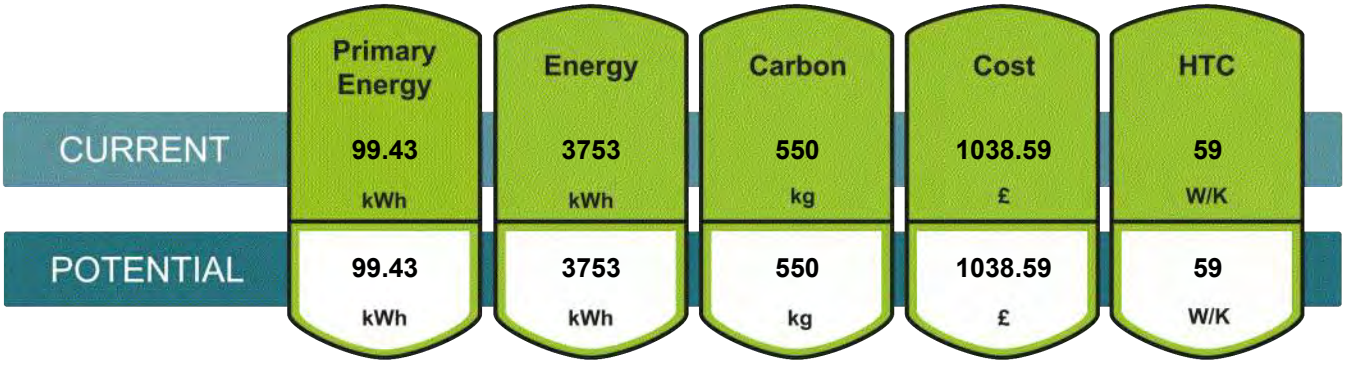


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

Energy Report

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£45	£45	
Heating	£341	£341	
Hot Water	£653	£653	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1039	£1039	

Estimated energy use and potential savings

Space Heating
1231
kWh per year

Water Heating
2359
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

Plot Reference	Flat 8	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	50 E	**DER**	14.13	**TER**	
Environmental	90 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.73	**DFEE**	58.96	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	147.22	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	339.05	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.17 m	58.61 m²	2.73 m

8.0 Living Area	31.93	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	57.79	51.00	0.00	None	6.79	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	36.17	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	82.28

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling	Timber I-joists, carpeted	20.00	58.61

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Timber I-joists, carpeted	30.00	58.61

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	2.96	
SE Windows	Windows	External Wall 1	South East	2.19	
NE Windows	Windows	External Wall 1	North East	1.64	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5.00	425.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	

Summary for Input Data

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over Bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 8	Issued on Date	15/06/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	50 E	DER	14.13	TER	
Environmental	90 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.73	DFEE	58.96	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	147.22	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0319	1.0117	0.9915	0.8903	0.8701	0.7689	0.7689	0.7487	0.8094	0.8701	0.9105	0.9510	(22b)
Effective ac	1.0319	1.0117	0.9915	0.8963	0.8785	0.7956	0.7956	0.7803	0.8275	0.8785	0.9145	0.9522	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.2600	13.2600	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.6507			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Party Ceiling			58.6100			20.0000	1172.2000	(32b)
Internal Walls			82.2800			9.0000	740.5200	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19871.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		339.0483 (35)
Thermal bridges (Default value 0.200 * total exposed area)		11.5580 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	33.2087 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	53.4203	52.3538	47.3275	46.3871	42.0094	42.0094	41.1987	43.6956	46.3871	48.2895	50.2784	(38)
Heat transfer coeff													

	87.6974	86.6290	85.5625	80.5362	79.5958	75.2181	75.2181	74.4074	76.9043	79.5958	81.4982	83.4871 (39)
Average = Sum(39)m / 12 =												80.5291

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4963	1.4781	1.4599	1.3741	1.3581	1.2834	1.2834	1.2695	1.3121	1.3581	1.3905	1.4245	(40)
HLP (average)												1.3740	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421 (42)
Hot water usage for mixer showers												
	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757 (42a)
Hot water usage for baths												
	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583 (42b)
Hot water usage for other uses												
	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188 (42c)
Average daily hot water use (litres/day)												126.1167 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m													
	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.3391	19.8414	16.1361	12.2161	9.1317	7.7093	8.3302	10.8279	14.5332	18.4532	21.5376	22.9600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains													
	484.5162	482.2335	467.1493	438.5346	411.2136	386.3141	371.5410	374.8015	389.1041	414.6194	445.6426	472.6091	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579	(83)
Total gains	530.9288	562.6629	580.8393	585.5083	581.4099	557.7312	535.7851	521.3457	514.2617	504.4933	501.4840	512.1670	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	62.9425	63.7188	64.5130	68.5393	69.3491	73.3852	73.3852	74.1848	71.7762	69.3491	67.7303	66.1167	
alpha	5.1962	5.2479	5.3009	5.5693	5.6233	5.8923	5.8923	5.9457	5.7851	5.6233	5.5154	5.4078	
util living area													
	0.9967	0.9949	0.9904	0.9758	0.9309	0.7853	0.6034	0.6370	0.8656	0.9749	0.9937	0.9973	(86)
MIT	19.7277	19.8615	20.0905	20.4424	20.7241	20.9392	20.9892	20.9857	20.8808	20.5343	20.1244	19.7750	(87)
Th 2	19.6903	19.7040	19.7177	19.7832	19.7956	19.8539	19.8539	19.8648	19.8313	19.7956	19.7706	19.7446	(88)
util rest of house													

	0.9952	0.9925	0.9856	0.9622	0.8890	0.6787	0.4543	0.4907	0.7797	0.9581	0.9903	0.9960	(89)
MIT 2	18.2568	18.4372	18.7381	19.2276	19.5689	19.8239	19.8515	19.8612	19.7601	19.3535	18.8215	18.3564	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.0582	19.2132	19.4749	19.8894	20.1982	20.4315	20.4713	20.4738	20.3706	19.9968	19.5313	19.1293	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0582	19.2132	19.4749	19.8894	20.1982	20.4315	20.4713	20.4738	20.3706	19.9968	19.5313	19.1293	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9942	0.9913	0.9844	0.9637	0.9053	0.7361	0.5366	0.5715	0.8239	0.9616	0.9894	0.9952	(94)
Useful gains	527.8623	557.7661	571.7509	564.2521	526.3342	410.5207	287.4803	297.9540	423.6818	485.1302	496.1923	509.6992	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1294.2514	1239.9337	1110.1608	885.0430	676.4240	438.6338	291.1942	303.1218	482.2388	747.9457	1013.1309	1246.3998	(97)
Space heating kWh	570.1935	458.4166	400.5770	230.9695	111.6668	0.0000	0.0000	0.0000	0.0000	195.5347	372.1958	548.1053	(98a)
Space heating requirement - total per year (kWh/year)												2887.6592	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	570.1935	458.4166	400.5770	230.9695	111.6668	0.0000	0.0000	0.0000	0.0000	195.5347	372.1958	548.1053	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2887.6592	
Space heating per m2											(98c) / (4) =	49.2691	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	570.1935	458.4166	400.5770	230.9695	111.6668	0.0000	0.0000	0.0000	0.0000	195.5347	372.1958	548.1053	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	570.1935	458.4166	400.5770	230.9695	111.6668	0.0000	0.0000	0.0000	0.0000	195.5347	372.1958	548.1053	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2887.6592	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2366.3713	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	157.8062	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5411.8366	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2887.6592	16.4900	476.1750	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	16.4900	390.2146	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	16.4900	26.0222	(250)
Additional standing charges			0.0000	(251)
Total energy cost			892.4119	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.1007	(257)
SAP value		49.7369	
SAP rating (Section 12)		50	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2887.6592	0.1550	447.4806	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			781.7291	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	157.8062	0.1443	22.7763	(268)
Total CO2, kg/year			804.5054	(272)
CO2 emissions per m2			13.7300	(273)
EI value			89.5952	
EI rating			90	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b) x	2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

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2. Ventilation rate

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	m3 per hour			
Number of open chimneys	0 * 80 =	0.0000	(6a)	
Number of open flues	0 * 20 =	0.0000	(6b)	
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)	
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)	
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)	
Number of blocked chimneys	0 * 20 =	0.0000	(6f)	
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)	
Number of passive vents	0 * 10 =	0.0000	(7b)	
Number of flueless gas fires	0 * 40 =	0.0000	(7c)	
	Air changes per hour			
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)	
Pressure test		No		
Pressure Test Method		Blower Door		
Measured/design AP50		15.0000	(17)	
Infiltration rate		0.8750	(18)	
Number of sides sheltered		1	(19)	
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)	
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094	(21)	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0319	0.9510	0.9308	0.8701	0.8701	0.8094	0.8094	0.7891	0.8094	0.9105	0.8903	0.9510	(22b)
Effective ac	1.0319	0.9522	0.9332	0.8785	0.8785	0.8275	0.8275	0.8114	0.8275	0.9145	0.8963	0.9522	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.2600	13.2600	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.6507			(33)
Main dwelling								

Party Wall to Adj Flat	36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1	58.6100			30.0000	1758.3000	(32d)
Party Ceiling	58.6100			20.0000	1172.2000	(32b)
Internal Walls	82.2800			9.0000	740.5200	(32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 19871.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 339.0483 (35)
Thermal bridges (Default value 0.200 * total exposed area) 11.5580 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 33.2087 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	50.2784	49.2732	46.3871	46.3871	43.6956	43.6956	42.8417	43.6956	48.2895	47.3275	50.2784	(38)
Heat transfer coeff	87.6974	83.4871	82.4818	79.5958	79.5958	76.9043	76.9043	76.0504	76.9043	81.4982	80.5362	83.4871	(39)
Average = Sum(39)m / 12 =												80.4285	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4963	1.4245	1.4073	1.3581	1.3581	1.3121	1.3121	1.2976	1.3121	1.3905	1.3741	1.4245	(40)
HLP (average)												1.3723	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9421 (42)
Hot water usage for mixer showers

78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)

Hot water usage for baths

24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)

Hot water usage for other uses

34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)

Average daily hot water use (litres/day) 126.1167 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.3391	19.8414	16.1361	12.2161	9.1317	7.7093	8.3302	10.8279	14.5332	18.4532	21.5376	22.9600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains	484.5162	482.2335	467.1493	438.5346	411.2136	386.3141	371.5410	374.8015	389.1041	414.6194	445.6426	472.6091	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	15.0428	0.4600	0.7000	0.7700	5.5051	(75)
Southeast	2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)
Southwest	2.9600	46.3896	0.4600	0.7000	0.7700	30.6409	(79)

Solar gains	58.8161	87.2005	123.0433	163.0198	181.3464	198.1421	185.1171	167.9173	143.9588	103.1595	70.1321	47.8618	(83)
Total gains	543.3323	569.4340	590.1926	601.5544	592.5600	584.4562	556.6581	542.7188	533.0628	517.7789	515.7748	520.4708	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	62.9425	66.1167	66.9225	69.3491	69.3491	71.7762	71.7762	72.5821	71.7762	67.7303	68.5393	66.1167	
alpha	5.1962	5.4078	5.4615	5.6233	5.6233	5.7851	5.7851	5.8388	5.7851	5.5154	5.5693	5.4078	
util living area	0.9950	0.9929	0.9860	0.9642	0.8952	0.6989	0.5060	0.5130	0.7848	0.9559	0.9885	0.9956	(86)
MIT	19.8745	20.0221	20.2454	20.5463	20.8085	20.9691	20.9960	20.9959	20.9399	20.6483	20.3017	19.9343	(87)
Th 2	19.6903	19.7446	19.7577	19.7956	19.7956	19.8313	19.8313	19.8427	19.8313	19.7706	19.7832	19.7446	(88)
util rest of house	0.9926	0.9895	0.9788	0.9443	0.8342	0.5721	0.3492	0.3558	0.6684	0.9247	0.9818	0.9935	(89)
MIT 2	18.4442	18.6711	18.9630	19.3625	19.6561	19.8198	19.8308	19.8422	19.8040	19.4682	19.0549	18.5600	(90)
Living area fraction									fLA = Living area / (4) =			0.5448	(91)
MIT	19.2234	19.4071	19.6617	20.0074	20.2840	20.4459	20.4656	20.4707	20.4228	20.1111	19.7341	19.3087	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.2234	19.4071	19.6617	20.0074	20.2840	20.4459	20.4656	20.4707	20.4228	20.1111	19.7341	19.3087	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9914	0.9883	0.9781	0.9485	0.8621	0.6417	0.4353	0.4421	0.7316	0.9352	0.9815	0.9925	(94)
Useful gains	538.6677	562.7925	577.2645	570.5853	510.8557	375.0455	242.2971	239.9536	389.9813	484.2274	506.2137	516.5754	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1212.2783	1144.3690	1019.6128	828.3860	611.6101	388.0532	243.4461	241.1330	417.0381	677.3414	912.8091	1152.8486	(97)
Space heating kWh	501.1663	390.8194	329.1071	185.6165	74.9613	0.0000	0.0000	0.0000	0.0000	143.6768	292.7487	473.3872	(98a)
Space heating requirement - total per year (kWh/year)												2391.4833	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	501.1663	390.8194	329.1071	185.6165	74.9613	0.0000	0.0000	0.0000	0.0000	143.6768	292.7487	473.3872	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2391.4833	
Space heating per m2											(98c) / (4) =	40.8033	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	501.1663	390.8194	329.1071	185.6165	74.9613	0.0000	0.0000	0.0000	0.0000	143.6768	292.7487	473.3872	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	501.1663	390.8194	329.1071	185.6165	74.9613	0.0000	0.0000	0.0000	0.0000	143.6768	292.7487	473.3872	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 2391.4833 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2366.3713 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 157.8062 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	4915.6607 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2391.4833	27.6700	661.7234	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	27.6700	654.7749	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	27.6700	43.6650	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1360.1633	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2391.4833	0.1555	371.9199	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			706.1684	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	157.8062	0.1443	22.7763	(268)
Total CO2, kg/year			728.9447	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2391.4833	1.5758	3768.4497	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	1.5223	3602.3424	(278)
Space and water heating			7370.7921	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	157.8062	1.5338	242.0483	(282)
Total Primary energy kWh/year			7612.8405	(286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: E 50
Current environmental impact rating: B 90

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 50
Potential environmental impact rating: B 90

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1360	£1360	£0
Space heating	£662	£662	£0
Water heating	£655	£655	£0
Lighting	£44	£44	£0
Total cost of fuels	£1360	£1360	£0
Total cost of uses	£1361	£1361	£0
Delivered energy	84 kWh/m²	84 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m²	12 kg/m²	12 kg/m²	0 kg/m²
Primary energy	130 kWh/m²	130 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8750 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0319	1.0117	0.9915	0.8903	0.8701	0.7689	0.7689	0.7487	0.8094	0.8701	0.9105	0.9510	(22b)
Effective ac	1.0319	1.0117	0.9915	0.8963	0.8785	0.7956	0.7956	0.7803	0.8275	0.8785	0.9145	0.9522	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.2600	13.2600	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.6507			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Party Ceiling			58.6100			20.0000	1172.2000	(32b)
Internal Walls			82.2800			9.0000	740.5200	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		19871.6200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							339.0483	(35)
Thermal bridges (Default value 0.200 * total exposed area)							11.5580	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		33.2087	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	53.4203	52.3538	47.3275	46.3871	42.0094	42.0094	41.1987	43.6956	46.3871	48.2895	50.2784	(38)
Heat transfer coeff	87.6974	86.6290	85.5625	80.5362	79.5958	75.2181	75.2181	74.4074	76.9043	79.5958	81.4982	83.4871	(39)
Average = Sum(39)m / 12 =												80.5291	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4963	1.4781	1.4599	1.3741	1.3581	1.2834	1.2834	1.2695	1.3121	1.3581	1.3905	1.4245	(40)
HLP (average)												1.3740	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy											1.9421	(42)
Hot water usage for mixer showers	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)
Hot water usage for baths	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)
Hot water usage for other uses	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)
Average daily hot water use (litres/day)												126.1167	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)

a) If manufacturer declared loss factor is known (kWh/day): 1.2400 (48)
Temperature factor from Table 2b 0.6000 (49)
Enter (49) or (54) in (55) 0.7440 (55)
Total storage loss
23.0640 20.8320 23.0640 22.3200 23.0640 22.3200 23.0640 23.0640 22.3200 23.0640 22.3200 23.0640 (56)
If cylinder contains dedicated solar storage
23.0640 20.8320 23.0640 22.3200 23.0640 22.3200 23.0640 23.0640 22.3200 23.0640 22.3200 23.0640 (57)
Primary loss 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (59)
Combi loss 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (61)
Total heat required for water heating calculated for each month
240.2521 212.1330 224.1965 193.9737 185.9705 165.2993 161.3301 168.9085 172.0884 194.6465 210.3868 237.1858 (62)
WWHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63a)
PV diverter 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63b)
Solar input 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63c)
FGHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63d)
Output from w/h
240.2521 212.1330 224.1965 193.9737 185.9705 165.2993 161.3301 168.9085 172.0884 194.6465 210.3868 237.1858 (64)
Total per year (kWh/year) = Sum(64)m = 2366.3713 (64)
Electric shower(s)
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)
Heat gains from water heating, kWh/month
90.6663 80.2732 85.3278 74.9309 72.6176 65.3966 64.4247 66.9445 67.6540 75.5024 80.3882 89.6467 (65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5
22.3391 19.8414 16.1361 12.2161 9.1317 7.7093 8.3302 10.8279 14.5332 18.4532 21.5376 22.9600 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5
252.8779 255.5020 248.8894 234.8119 217.0417 200.3402 189.1825 186.5584 193.1710 207.2485 225.0187 241.7203 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5
48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 48.5945 (69)
Pumps, fans 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)
-77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 -77.6829 (71)
Water heating gains (Table 5)
121.8632 119.4542 114.6879 104.0706 97.6043 90.8287 86.5923 89.9791 93.9639 101.4817 111.6503 120.4929 (72)
Total internal gains
484.5162 482.2335 467.1493 438.5346 411.2136 386.3141 371.5410 374.8015 389.1041 414.6194 445.6426 472.6091 (73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579	(83)
Total gains	530.9288	562.6629	580.8393	585.5083	581.4099	557.7312	535.7851	521.3457	514.2617	504.4933	501.4840	512.1670	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	62.9425	63.7188	64.5130	68.5393	69.3491	73.3852	73.3852	74.1848	71.7762	69.3491	67.7303	66.1167	
alpha	5.1962	5.2479	5.3009	5.5693	5.6233	5.8923	5.8923	5.9457	5.7851	5.6233	5.5154	5.4078	
util living area	0.9967	0.9949	0.9904	0.9758	0.9309	0.7853	0.6034	0.6370	0.8656	0.9749	0.9937	0.9973	(86)
MIT	19.7277	19.8615	20.0905	20.4424	20.7241	20.9392	20.9892	20.9857	20.8808	20.5343	20.1244	19.7750	(87)
Th 2	19.6903	19.7040	19.7177	19.7832	19.7956	19.8539	19.8539	19.8648	19.8313	19.7956	19.7706	19.7446	(88)
util rest of house	0.9952	0.9925	0.9856	0.9622	0.8890	0.6787	0.4543	0.4907	0.7797	0.9581	0.9903	0.9960	(89)
MIT 2	18.2568	18.4372	18.7381	19.2276	19.5689	19.8239	19.8515	19.8612	19.7601	19.3535	18.8215	18.3564	(90)
Living area fraction									fLA = Living area / (4) =			0.5448	(91)
MIT	19.0582	19.2132	19.4749	19.8894	20.1982	20.4315	20.4713	20.4738	20.3706	19.9968	19.5313	19.1293	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0582	19.2132	19.4749	19.8894	20.1982	20.4315	20.4713	20.4738	20.3706	19.9968	19.5313	19.1293	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9942	0.9913	0.9844	0.9637	0.9053	0.7361	0.5366	0.5715	0.8239	0.9616	0.9894	0.9952	(94)
Useful gains	527.8623	557.7661	571.7509	564.2521	526.3342	410.5207	287.4803	297.9540	423.6818	485.1302	496.1923	509.6992	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1294.2514	1239.9337	1110.1608	885.0430	676.4240	438.6338	291.1942	303.1218	482.2388	747.9457	1013.1309	1246.3998	(97)
Space heating kWh	570.1935	458.4166	400.5770	230.9695	111.6668	0.0000	0.0000	0.0000	0.0000	195.5347	372.1958	548.1053	(98a)
Space heating requirement - total per year (kWh/year)												2887.6592	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	570.1935	458.4166	400.5770	230.9695	111.6668	0.0000	0.0000	0.0000	0.0000	195.5347	372.1958	548.1053	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2887.6592	
Space heating per m2											(98c) / (4) =	49.2691	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	570.1935	458.4166	400.5770	230.9695	111.6668	0.0000	0.0000	0.0000	0.0000	195.5347	372.1958	548.1053	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	570.1935	458.4166	400.5770	230.9695	111.6668	0.0000	0.0000	0.0000	0.0000	195.5347	372.1958	548.1053	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2887.6592	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2366.3713	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												157.8062	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5411.8366	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2887.6592	16.4900	476.1750	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	16.4900	390.2146	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	16.4900	26.0222	(250)
Additional standing charges			0.0000	(251)
Total energy cost			892.4119	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.1007	(257)
SAP value		49.7369	
SAP rating (Section 12)		50	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2887.6592	0.1550	447.4806	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			781.7291	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	157.8062	0.1443	22.7763 (268)
Total CO2, kg/year			804.5054 (272)
CO2 emissions per m2			13.7300 (273)
EI value			89.5952
EI rating			90 (274)
EI band			B

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b) x	2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		160.0053	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0319	0.9510	0.9308	0.8701	0.8701	0.8094	0.8094	0.7891	0.8094	0.9105	0.8903	0.9510	(22b)
Effective ac	1.0319	0.9522	0.9332	0.8785	0.8785	0.8275	0.8275	0.8114	0.8275	0.9145	0.8963	0.9522	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.2600	13.2600	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.6507			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Party Ceiling			58.6100			20.0000	1172.2000	(32b)
Internal Walls			82.2800			9.0000	740.5200	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19871.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		339.0483 (35)
Thermal bridges (Default value 0.200 * total exposed area)		11.5580 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	33.2087 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	50.2784	49.2732	46.3871	46.3871	43.6956	43.6956	42.8417	43.6956	48.2895	47.3275	50.2784	(38)
Heat transfer coeff	87.6974	83.4871	82.4818	79.5958	79.5958	76.9043	76.9043	76.0504	76.9043	81.4982	80.5362	83.4871	(39)
Average = Sum(39)m / 12 =												80.4285	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4963	1.4245	1.4073	1.3581	1.3581	1.3121	1.3121	1.2976	1.3121	1.3905	1.3741	1.4245	(40)
HLP (average)												1.3723	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9421 (42)
Hot water usage for mixer showers		

78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)

Hot water usage for baths
24.5412 24.1768 23.6635 22.7172 22.0085 21.2228 20.7984 21.3081 21.8630 22.7038 23.6696 24.4583 (42b)
Hot water usage for other uses
34.5188 33.2635 32.0083 30.7531 29.4979 28.2426 28.2426 29.4979 30.7531 32.0083 33.2635 34.5188 (42c)
Average daily hot water use (litres/day) 126.1167 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m													
	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.3391	19.8414	16.1361	12.2161	9.1317	7.7093	8.3302	10.8279	14.5332	18.4532	21.5376	22.9600	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains													
	484.5162	482.2335	467.1493	438.5346	411.2136	386.3141	371.5410	374.8015	389.1041	414.6194	445.6426	472.6091	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	15.0428	0.4600	0.7000	0.7700	5.5051	(75)
Southeast	2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)
Southwest	2.9600	46.3896	0.4600	0.7000	0.7700	30.6409	(79)

Solar gains	58.8161	87.2005	123.0433	163.0198	181.3464	198.1421	185.1171	167.9173	143.9588	103.1595	70.1321	47.8618	(83)
Total gains	543.3323	569.4340	590.1926	601.5544	592.5600	584.4562	556.6581	542.7188	533.0628	517.7789	515.7748	520.4708	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	62.9425	66.1167	66.9225	69.3491	69.3491	71.7762	71.7762	72.5821	71.7762	67.7303	68.5393	66.1167	
alpha	5.1962	5.4078	5.4615	5.6233	5.6233	5.7851	5.7851	5.8388	5.7851	5.5154	5.5693	5.4078	
util living area													
	0.9950	0.9929	0.9860	0.9642	0.8952	0.6989	0.5060	0.5130	0.7848	0.9559	0.9885	0.9956	(86)
MIT	19.8745	20.0221	20.2454	20.5463	20.8085	20.9691	20.9960	20.9959	20.9399	20.6483	20.3017	19.9343	(87)
Th 2	19.6903	19.7446	19.7577	19.7956	19.7956	19.8313	19.8313	19.8427	19.8313	19.7706	19.7832	19.7446	(88)
util rest of house													
	0.9926	0.9895	0.9788	0.9443	0.8342	0.5721	0.3492	0.3558	0.6684	0.9247	0.9818	0.9935	(89)
MIT 2	18.4442	18.6711	18.9630	19.3625	19.6561	19.8198	19.8308	19.8422	19.8040	19.4682	19.0549	18.5600	(90)
Living area fraction									fLA = Living area / (4) =			0.5448	(91)
MIT	19.2234	19.4071	19.6617	20.0074	20.2840	20.4459	20.4656	20.4707	20.4228	20.1111	19.7341	19.3087	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.2234	19.4071	19.6617	20.0074	20.2840	20.4459	20.4656	20.4707	20.4228	20.1111	19.7341	19.3087	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9914	0.9883	0.9781	0.9485	0.8621	0.6417	0.4353	0.4421	0.7316	0.9352	0.9815	0.9925	(94)
Useful gains	538.6677	562.7925	577.2645	570.5853	510.8557	375.0455	242.2971	239.9536	389.9813	484.2274	506.2137	516.5754	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)

Heat loss rate W

1212.2783	1144.3690	1019.6128	828.3860	611.6101	388.0532	243.4461	241.1330	417.0381	677.3414	912.8091	1152.8486	(97)

Space heating kWh

501.1663	390.8194	329.1071	185.6165	74.9613	0.0000	0.0000	0.0000	0.0000	143.6768	292.7487	473.3872	(98a)

Space heating requirement - total per year (kWh/year) 2391.4833

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

501.1663	390.8194	329.1071	185.6165	74.9613	0.0000	0.0000	0.0000	0.0000	143.6768	292.7487	473.3872	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 2391.4833

Space heating per m2 (98c) / (4) = 40.8033 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	501.1663	390.8194	329.1071	185.6165	74.9613	0.0000	0.0000	0.0000	0.0000	143.6768	292.7487	473.3872	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	501.1663	390.8194	329.1071	185.6165	74.9613	0.0000	0.0000	0.0000	0.0000	143.6768	292.7487	473.3872	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.5533	15.6864	14.1238	10.3477	7.9929	6.5303	7.2914	9.4776	12.3105	16.1520	18.2436	20.0967	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 2391.4833 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 2366.3713 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 157.8062 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N) 0.0000 (235a)

Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated -0.0000 (236)

Energy used 0.0000 (237)

Total delivered energy for all uses 4915.6607 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2391.4833	27.6700	661.7234	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	27.6700	654.7749	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	157.8062	27.6700	43.6650	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1360.1633	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2391.4833	0.1555	371.9199	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			706.1684	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	157.8062	0.1443	22.7763	(268)
Total CO2, kg/year			728.9447	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2391.4833	1.5758	3768.4497	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	1.5223	3602.3424	(278)
Space and water heating			7370.7921	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	157.8062	1.5338	242.0483	(282)
Total Primary energy kWh/year			7612.8405	(286)

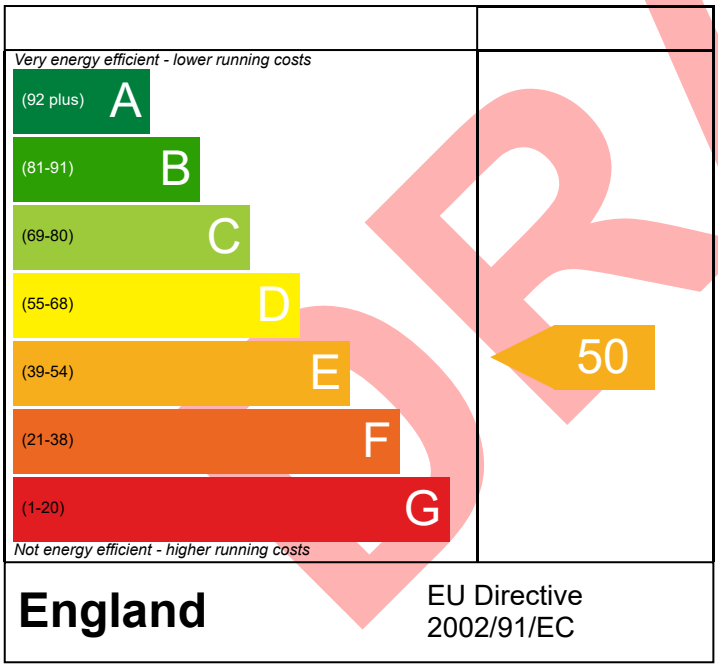
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.61 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

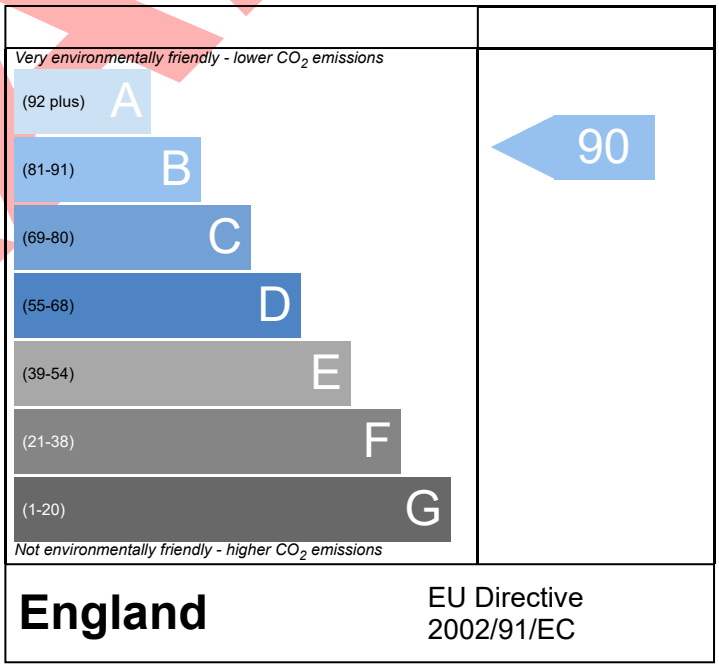
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

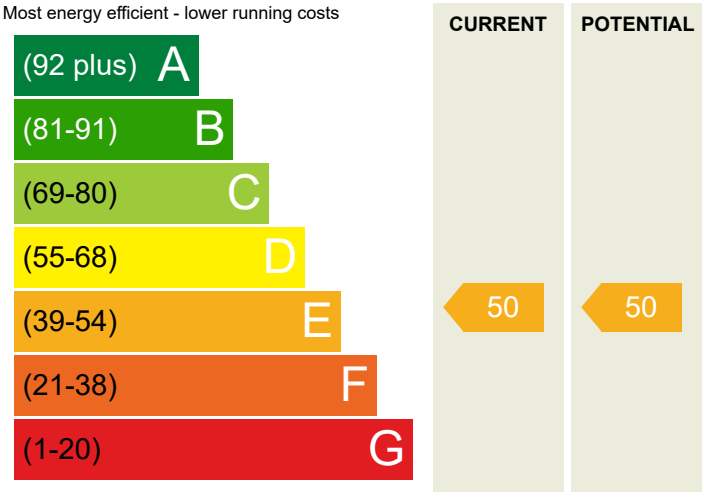
Energy Report

Dwelling Address	
Reference	Flat 8 -Be Lean
SAP Version	10.2
Assessment Date	15/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	59

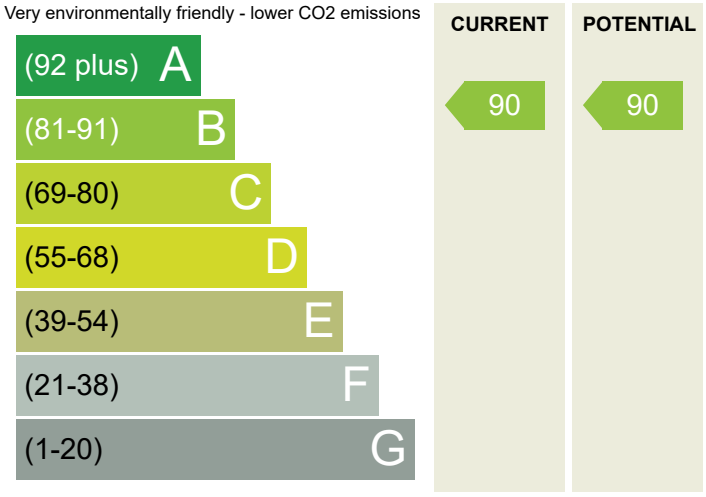
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

Energy Report

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£44	£44	
Heating	£662	£662	
Hot Water	£655	£655	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1360	£1360	

Estimated energy use and potential savings

Space Heating
2391
kWh per year

Water Heating
2366
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 9	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	68 D	**DER**	8.94	**TER**	12.64
Environmental	94 A	**% DER < TER**			29.27
CO_2 Emissions (t/year)	0.46	**DFEE**	29.94	**TFEE**	30.33
Compliance Check	See BREL	**% DFEE < TFEE**			1.29
% DPER < TPER	-40.01	**DPER**	93.64	**TPER**	66.88

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northeast	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	485.57	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	22.85 m	58.22 m²	2.73 m

8.0 Living Area	29.09	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.16	190.00	62.38	56.83	0.00	None	5.55	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	33.47	0.00	None
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	45.43	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	111.06

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	58.22	58.22	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Timber I-joists, carpeted	30.00	58.22

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	4.45	
NW Windows	Windows	External Wall 1	North East	1.10	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	User Input	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E7 Party floor between dwellings (in blocks of flats)		10.07			Yes
E14 Flat roof		10.07			Yes
E18 Party wall between dwellings		5.46			No
E2 Other lintels (including other steel lintels)		5.77			No
E3 Sill		5.77			No
E4 Jamb		9.30			No
E16 Corner (normal)		5.46			No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)		12.75			No
P4 Party wall - Roof (insulation at ceiling level)		12.75			No

Y-value	0.04	W/m²K
Description	Ref	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	3.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting	No				
	Name	**Efficacy**	**Power**	**Capacity**	**Count**
	Lighting 1	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	

Summary for Input Data

In Summer	100.00
Controls SAP Code	2605
Controls description	Programmer and room thermostat
25.0 Main Heating 2	None
26.0 Heat Networks	None
27.0 Secondary Heating	None
28.0 Water Heating	
Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day
34.0 Small-scale Hydro	None	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 9	Issued on Date	15/06/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	68 D	DER	8.94	TER	12.64
Environmental	94 A	% DER < TER			29.27
CO_2 Emissions (t/year)	0.46	DFEE	29.94	TFEE	30.33
Compliance Check	See BREL	% DFEE < TFEE			1.29
% DPER < TPER	-40.01	DPER	93.64	TPER	66.88

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client			

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		3.0000 (17)
Infiltration rate		0.2758 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2138 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.2726	0.2672	0.2619	0.2351	0.2298	0.2031	0.2031	0.1977	0.2138	0.2298	0.2405	0.2512	(22b)
Effective ac	0.5371	0.5357	0.5343	0.5276	0.5264	0.5206	0.5206	0.5196	0.5228	0.5264	0.5289	0.5315	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.1450	6.3550			(27)
External Wall 1	62.3800	5.5500	56.8300	0.1600	9.0928	190.0000	10797.7000	(29a)
External Roof 1	58.2200		58.2200	0.1100	6.4042	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			120.6000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8520			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Internal Walls			111.0600			9.0000	999.5400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		28269.8200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							485.5689	(35)
Thermal bridges (User defined value 0.045 * total exposed area)							5.4270	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		27.2790	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	28.1734	28.0978	28.0236	27.6753	27.6101	27.3068	27.3068	27.2506	27.4236	27.6101	27.7420	27.8798	(38)

Heat transfer coeff

	55.4524	55.3767	55.3026	54.9543	54.8891	54.5858	54.5858	54.5296	54.7026	54.8891	55.0209	55.1588 (39)
Average = Sum(39)m / 12 =												54.9540

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9525	0.9512	0.9499	0.9439	0.9428	0.9376	0.9376	0.9366	0.9396	0.9428	0.9451	0.9474	(40)
HLP (average)												0.9439	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309 (42)
Hot water usage for mixer showers												
	56.5942	55.7437	54.5043	52.1330	50.3831	48.4316	47.3224	48.5523	49.9006	51.9959	54.4181	56.3773 (42a)
Hot water usage for baths												
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)
Hot water usage for other uses												
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)
Average daily hot water use (litres/day)												106.1333 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	115.4589	112.9941	109.9921	105.4265	101.7193	97.7335	96.2013	99.1903	102.3427	106.5271	111.1630	115.1594	(44)
Energy conte	182.8587	160.9021	169.0538	144.3237	136.9337	120.1748	116.3471	122.8183	126.1988	144.5563	158.3721	180.3118	(45)
Energy content (annual)										Total = Sum(45)m =		1762.8511	
Distribution loss (46)m = 0.15 x (45)m													
	27.4288	24.1353	25.3581	21.6486	20.5401	18.0262	17.4521	18.4227	18.9298	21.6834	23.7558	27.0468	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
										Total per year (kWh/year) = Sum(64)m =		1911.7711	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	70.9189	62.6391	66.3288	57.7796	55.6488	49.7501	48.8038	50.9555	51.7531	58.1834	62.4507	70.0721	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	95.3211	93.2130	89.1516	80.2495	74.7968	69.0974	65.5965	68.4886	71.8793	78.2035	86.7371	94.1829	(72)
Total internal gains													
	455.4275	453.5159	439.3020	412.6190	386.5212	362.8443	348.8508	351.5463	365.0895	389.1946	418.3734	443.7966	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	494.7333	521.3881	534.6112	534.8073	527.1207	504.0714	484.3244	473.0331	469.6678	464.8667	465.6202	477.3257	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	141.6121	141.8056	141.9957	142.8957	143.0653	143.8604	143.8604	144.0086	143.5531	143.0653	142.7225	142.3659	
alpha	10.4408	10.4537	10.4664	10.5264	10.5377	10.5907	10.5907	10.6006	10.5702	10.5377	10.5148	10.4911	
util living area													
	0.9993	0.9985	0.9952	0.9785	0.8979	0.6886	0.4958	0.5300	0.7866	0.9765	0.9979	0.9995	(86)
MIT	20.5349	20.6002	20.7092	20.8472	20.9599	20.9976	20.9999	20.9998	20.9914	20.8739	20.6763	20.5154	(87)
Th 2	20.1231	20.1242	20.1253	20.1303	20.1313	20.1357	20.1357	20.1365	20.1340	20.1313	20.1294	20.1274	(88)
util rest of house													

	0.9989	0.9975	0.9918	0.9634	0.8430	0.5984	0.3985	0.4307	0.6977	0.9569	0.9962	0.9992	(89)
MIT 2	19.5933	19.6776	19.8165	19.9893	20.1058	20.1349	20.1357	20.1365	20.1307	20.0229	19.7793	19.5719	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	20.0638	20.1386	20.2625	20.4180	20.5326	20.5660	20.5675	20.5679	20.5607	20.4481	20.2275	20.0433	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.0638	20.1386	20.2625	20.4180	20.5326	20.5660	20.5675	20.5679	20.5607	20.4481	20.2275	20.0433	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9989	0.9975	0.9925	0.9693	0.8704	0.6438	0.4471	0.4804	0.7429	0.9654	0.9965	0.9992	(94)
Useful gains	494.1691	520.0845	530.5963	518.3781	458.7863	324.5213	216.5451	227.2219	348.9214	448.7613	463.9739	476.9450	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	874.1392	843.8645	761.1043	632.9628	484.8112	325.6565	216.5689	227.2717	353.4185	540.5528	722.2875	873.8971	(97)
Space heating kWh	282.6978	217.5802	171.4979	82.5010	19.3626	0.0000	0.0000	0.0000	0.0000	68.2929	185.9858	295.3324	(98a)
Space heating requirement - total per year (kWh/year)												1323.2505	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	282.6978	217.5802	171.4979	82.5010	19.3626	0.0000	0.0000	0.0000	0.0000	68.2929	185.9858	295.3324	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1323.2505	
Space heating per m2										(98c) / (4) =		22.7285	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	282.6978	217.5802	171.4979	82.5010	19.3626	0.0000	0.0000	0.0000	0.0000	68.2929	185.9858	295.3324	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	282.6978	217.5802	171.4979	82.5010	19.3626	0.0000	0.0000	0.0000	0.0000	68.2929	185.9858	295.3324	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	1323.2505	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1911.7711	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	152.4072	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	3387.4288	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1323.2505	16.4900	218.2040	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	16.4900	315.2511	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	16.4900	25.1319	(250)
Additional standing charges			0.0000	(251)
Total energy cost			558.5870	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.9482	(257)
SAP value		68.4200	
SAP rating (Section 12)		68	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1323.2505	0.1564	206.9961	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1911.7711	0.1414	270.2382	(264)
Space and water heating			477.2343	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Total CO2, kg/year			499.2314	(272)
CO2 emissions per m2			8.5700	(273)
EI value			93.5190	
EI rating			94	(274)
EI band			A	

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b) x	2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.0000	(17)
Infiltration rate		0.2758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2138	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.2245	0.2138	0.2138	0.1977	0.1977	0.1764	0.1817	0.1710	0.1764	0.1870	0.1870	0.2031	(22b)
Effective ac	0.5252	0.5228	0.5228	0.5196	0.5196	0.5156	0.5165	0.5146	0.5156	0.5175	0.5175	0.5206	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.1450	6.3550			(27)
External Wall 1	62.3800	5.5500	56.8300	0.1600	9.0928	190.0000	10797.7000	(29a)
External Roof 1	58.2200		58.2200	0.1100	6.4042	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			120.6000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8520			(33)

Main dwelling					
Party Wall to Adj Property	33.4700	0.0000	0.0000	180.0000	6024.6000 (32)
Party Wall to Adj Flat	45.4300	0.0000	0.0000	180.0000	8177.4000 (32)
Party Floor 1	58.2200			30.0000	1746.6000 (32d)
Internal Walls	111.0600			9.0000	999.5400 (32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 28269.8200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 485.5689 (35)
Thermal bridges (User defined value 0.045 * total exposed area) 5.4270 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 27.2790 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	27.5465	27.4236	27.4236	27.2506	27.2506	27.0409	27.0911	26.9922	27.0409	27.1428	27.1428	27.3068	(38)
Heat transfer coeff	54.8254	54.7026	54.7026	54.5296	54.5296	54.3198	54.3700	54.2712	54.3198	54.4217	54.4217	54.5858	(39)
Average = Sum(39)m / 12 =												54.5000	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9417	0.9396	0.9396	0.9366	0.9366	0.9330	0.9339	0.9322	0.9330	0.9348	0.9348	0.9376	(40)
HLP (average)												0.9361	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9309 (42)
Hot water usage for mixer showers

56.5942	55.7437	54.5043	52.1330	50.3831	48.4316	47.3224	48.5523	49.9006	51.9959	54.4181	56.3773	(42a)

Hot water usage for baths

24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day) 106.1333 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	115.4589	112.9941	109.9921	105.4265	101.7193	97.7335	96.2013	99.1903	102.3427	106.5271	111.1630	115.1594	(44)
Energy conte	182.8587	160.9021	169.0538	144.3237	136.9337	120.1748	116.3471	122.8183	126.1988	144.5563	158.3721	180.3118	(45)
Energy content (annual)										Total = Sum(45)m =		1762.8511	
Distribution loss (46)m = 0.15 x (45)m	27.4288	24.1353	25.3581	21.6486	20.5401	18.0262	17.4521	18.4227	18.9298	21.6834	23.7558	27.0468	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
										Total per year (kWh/year) = Sum(64)m =		1911.7711	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	70.9189	62.6391	66.3288	57.7796	55.6488	49.7501	48.8038	50.9555	51.7531	58.1834	62.4507	70.0721	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	95.3211	93.2130	89.1516	80.2495	74.7968	69.0974	65.5965	68.4886	71.8793	78.2035	86.7371	94.1829	(72)
Total internal gains	455.4275	453.5159	439.3020	412.6190	386.5212	362.8443	348.8508	351.5463	365.0895	389.1946	418.3734	443.7966	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	12.9236	0.4600	0.7000	0.7700	3.1722	(75)
Southwest	4.4500	40.4699	0.4600	0.7000	0.7700	40.1866	(79)

Solar gains	43.3588	67.4204	93.7963	124.6046	140.3662	151.2008	143.3455	130.9389	111.7795	80.3225	53.4001	36.6282	(83)
Total gains	498.7864	520.9363	533.0983	537.2236	526.8874	514.0452	492.1963	482.4853	476.8691	469.5171	471.7735	480.4247	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	143.2315	143.5531	143.5531	144.0086	144.0086	144.5646	144.4312	144.6943	144.5646	144.2940	144.2940	143.8604	
alpha	10.5488	10.5702	10.5702	10.6006	10.6006	10.6376	10.6287	10.6463	10.6376	10.6196	10.6196	10.5907	
util living area	0.9988	0.9976	0.9915	0.9576	0.8063	0.5281	0.3424	0.3599	0.6579	0.9476	0.9955	0.9991	(86)
MIT	20.5971	20.6518	20.7676	20.9020	20.9877	20.9998	21.0000	21.0000	20.9986	20.9281	20.7432	20.5814	(87)
Th 2	20.1322	20.1340	20.1340	20.1365	20.1365	20.1395	20.1388	20.1402	20.1395	20.1381	20.1381	20.1357	(88)
util rest of house	0.9980	0.9960	0.9855	0.9302	0.7306	0.4374	0.2473	0.2632	0.5621	0.9091	0.9918	0.9986	(89)
MIT 2	19.6805	19.7516	19.8969	20.0555	20.1306	20.1395	20.1388	20.1402	20.1392	20.0857	19.8712	19.6635	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	20.1385	20.2014	20.3320	20.4785	20.5589	20.5694	20.5691	20.5698	20.5686	20.5066	20.3069	20.1221	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.1385	20.2014	20.3320	20.4785	20.5589	20.5694	20.5691	20.5698	20.5686	20.5066	20.3069	20.1221	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9980	0.9962	0.9871	0.9425	0.7689	0.4827	0.2948	0.3116	0.6103	0.9277	0.9927	0.9986	(94)
Useful gains	497.8015	518.9447	526.2350	506.3397	405.1258	248.1524	145.1191	150.3211	291.0131	435.5889	468.3399	479.7319	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)
Heat loss rate W	824.4911	798.7349	707.4114	576.8390	412.1817	248.2080	145.1194	150.3215	291.6207	484.7111	669.7638	819.9943	(97)
Space heating kWh	243.0570	188.0190	134.7952	50.7596	5.2496	0.0000	0.0000	0.0000	0.0000	36.5469	145.0252	253.1552	(98a)
Space heating requirement - total per year (kWh/year)												1056.6076	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	243.0570	188.0190	134.7952	50.7596	5.2496	0.0000	0.0000	0.0000	0.0000	36.5469	145.0252	253.1552	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1056.6076	
Space heating per m2											(98c) / (4) =	18.1485	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	243.0570	188.0190	134.7952	50.7596	5.2496	0.0000	0.0000	0.0000	0.0000	36.5469	145.0252	253.1552	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	243.0570	188.0190	134.7952	50.7596	5.2496	0.0000	0.0000	0.0000	0.0000	36.5469	145.0252	253.1552	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 1056.6076 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 1911.7711 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 152.4072 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3120.7859 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1056.6076	27.6700	292.3633	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	27.6700	528.9871	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	27.6700	42.1711	(250)
Additional standing charges			0.0000	(251)
Total energy cost			863.5215	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1056.6076	0.1575	166.4100	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1911.7711	0.1414	270.2382	(264)
Space and water heating			436.6482	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Total CO2, kg/year			458.6453	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1056.6076	1.5831	1672.6955	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	1.5227	2911.0568	(278)
Space and water heating			4583.7523	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	152.4072	1.5338	233.7672	(282)
Total Primary energy kWh/year			4817.5195	(286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: D 68
Current environmental impact rating: A 94

N	Solar water heating	Not applicable	
U	Solar photovoltaic panels	Not applicable	
V2	Wind turbine	Not applicable	

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: D 68
Potential environmental impact rating: A 94

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current	Potential	Saving
Electricity	£864	£864	£0
Space heating	£292	£292	£0
Water heating	£529	£529	£0
Lighting	£42	£42	£0
Total cost of fuels	£864	£864	£0
Total cost of uses	£863	£863	£0
Delivered energy	54 kWh/m²	54 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.5 tonnes	0.5 tonnes	0.0 tonnes
CO2 emissions per m²	8 kg/m²	8 kg/m²	0 kg/m²
Primary energy	83 kWh/m²	83 kWh/m²	0 kWh/m²

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		3.0000 (17)
Infiltration rate		0.2758 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2138 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.2726	0.2672	0.2619	0.2351	0.2298	0.2031	0.2031	0.1977	0.2138	0.2298	0.2405	0.2512	(22b)
Effective ac	0.5371	0.5357	0.5343	0.5276	0.5264	0.5206	0.5206	0.5196	0.5228	0.5264	0.5289	0.5315	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.1450	6.3550			(27)
External Wall 1	62.3800	5.5500	56.8300	0.1600	9.0928	190.0000	10797.7000	(29a)
External Roof 1	58.2200		58.2200	0.1100	6.4042	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			120.6000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8520			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	28269.8200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		485.5689 (35)
Thermal bridges (User defined value 0.045 * total exposed area)		5.4270 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	27.2790 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	28.1734	28.0978	28.0236	27.6753	27.6101	27.3068	27.3068	27.2506	27.4236	27.6101	27.7420	27.8798	(38)
Heat transfer coeff	55.4524	55.3767	55.3026	54.9543	54.8891	54.5858	54.5858	54.5296	54.7026	54.8891	55.0209	55.1588	(39)
Average = Sum(39)m / 12 =												54.9540	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9525	0.9512	0.9499	0.9439	0.9428	0.9376	0.9376	0.9366	0.9396	0.9428	0.9451	0.9474	(40)
HLP (average)												0.9439	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9309 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
56.5942	55.7437	54.5043	52.1330	50.3831	48.4316	47.3224	48.5523	49.9006	51.9959	54.4181	56.3773	(42a)

Hot water usage for baths

24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day)		106.1333 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	115.4589	112.9941	109.9921	105.4265	101.7193	97.7335	96.2013	99.1903	102.3427	106.5271	111.1630	115.1594	(44)
Energy conte	182.8587	160.9021	169.0538	144.3237	136.9337	120.1748	116.3471	122.8183	126.1988	144.5563	158.3721	180.3118	(45)
Energy content (annual)										Total = Sum(45)m =		1762.8511	
Distribution loss (46)m = 0.15 x (45)m													
	27.4288	24.1353	25.3581	21.6486	20.5401	18.0262	17.4521	18.4227	18.9298	21.6834	23.7558	27.0468	(46)

Water storage loss (or HIU loss):

Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
										Total per year (kWh/year) = Sum(64)m =		1911.7711	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	70.9189	62.6391	66.3288	57.7796	55.6488	49.7501	48.8038	50.9555	51.7531	58.1834	62.4507	70.0721	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	95.3211	93.2130	89.1516	80.2495	74.7968	69.0974	65.5965	68.4886	71.8793	78.2035	86.7371	94.1829	(72)
Total internal gains													
	455.4275	453.5159	439.3020	412.6190	386.5212	362.8443	348.8508	351.5463	365.0895	389.1946	418.3734	443.7966	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	494.7333	521.3881	534.6112	534.8073	527.1207	504.0714	484.3244	473.0331	469.6678	464.8667	465.6202	477.3257	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	141.6121	141.8056	141.9957	142.8957	143.0653	143.8604	143.8604	144.0086	143.5531	143.0653	142.7225	142.3659	
alpha	10.4408	10.4537	10.4664	10.5264	10.5377	10.5907	10.5907	10.6006	10.5702	10.5377	10.5148	10.4911	
util living area													
	0.9993	0.9985	0.9952	0.9785	0.8979	0.6886	0.4958	0.5300	0.7866	0.9765	0.9979	0.9995	(86)
MIT	20.5349	20.6002	20.7092	20.8472	20.9599	20.9976	20.9999	20.9998	20.9914	20.8739	20.6763	20.5154	(87)
Th 2	20.1231	20.1242	20.1253	20.1303	20.1313	20.1357	20.1357	20.1365	20.1340	20.1313	20.1294	20.1274	(88)
util rest of house													
	0.9989	0.9975	0.9918	0.9634	0.8430	0.5984	0.3985	0.4307	0.6977	0.9569	0.9962	0.9992	(89)
MIT 2	19.5933	19.6776	19.8165	19.9893	20.1058	20.1349	20.1357	20.1365	20.1307	20.0229	19.7793	19.5719	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	20.0638	20.1386	20.2625	20.4180	20.5326	20.5660	20.5675	20.5679	20.5607	20.4481	20.2275	20.0433	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.0638	20.1386	20.2625	20.4180	20.5326	20.5660	20.5675	20.5679	20.5607	20.4481	20.2275	20.0433	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9989	0.9975	0.9925	0.9693	0.8704	0.6438	0.4471	0.4804	0.7429	0.9654	0.9965	0.9992	(94)
Useful gains	494.1691	520.0845	530.5963	518.3781	458.7863	324.5213	216.5451	227.2219	348.9214	448.7613	463.9739	476.9450	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	874.1392	843.8645	761.1043	632.9628	484.8112	325.6565	216.5689	227.2717	353.4185	540.5528	722.2875	873.8971	(97)
Space heating kWh													
	282.6978	217.5802	171.4979	82.5010	19.3626	0.0000	0.0000	0.0000	0.0000	68.2929	185.9858	295.3324	(98a)
Space heating requirement - total per year (kWh/year)												1323.2505	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	282.6978	217.5802	171.4979	82.5010	19.3626	0.0000	0.0000	0.0000	0.0000	68.2929	185.9858	295.3324	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1323.2505	
Space heating per m2											(98c) / (4) =	22.7285	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	282.6978	217.5802	171.4979	82.5010	19.3626	0.0000	0.0000	0.0000	0.0000	68.2929	185.9858	295.3324	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	282.6978	217.5802	171.4979	82.5010	19.3626	0.0000	0.0000	0.0000	0.0000	68.2929	185.9858	295.3324	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1323.2505	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1911.7711	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												152.4072	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												3387.4288	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1323.2505	16.4900	218.2040	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	16.4900	315.2511	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	16.4900	25.1319	(250)
Additional standing charges			0.0000	(251)
Total energy cost			558.5870	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.9482	(257)
SAP value		68.4200	
SAP rating (Section 12)		68	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1323.2505	0.1564	206.9961	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1911.7711	0.1414	270.2382	(264)
Space and water heating			477.2343	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	152.4072	0.1443	21.9971 (268)
Total CO2, kg/year			499.2314 (272)
CO2 emissions per m2			8.5700 (273)
EI value			93.5190
EI rating			94 (274)
EI band			A

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.0000	(17)
Infiltration rate		0.2758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2138	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.2245	0.2138	0.2138	0.1977	0.1977	0.1764	0.1817	0.1710	0.1764	0.1870	0.1870	0.2031	(22b)
Effective ac	0.5252	0.5228	0.5228	0.5196	0.5196	0.5156	0.5165	0.5146	0.5156	0.5175	0.5175	0.5206	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.1450	6.3550			(27)
External Wall 1	62.3800	5.5500	56.8300	0.1600	9.0928	190.0000	10797.7000	(29a)
External Roof 1	58.2200		58.2200	0.1100	6.4042	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			120.6000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.8520			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Internal Walls			111.0600			9.0000	999.5400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		28269.8200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							485.5689	(35)
Thermal bridges (User defined value 0.045 * total exposed area)							5.4270	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		27.2790	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	27.5465	27.4236	27.4236	27.2506	27.2506	27.0409	27.0911	26.9922	27.0409	27.1428	27.1428	27.3068	(38)
Heat transfer coeff	54.8254	54.7026	54.7026	54.5296	54.5296	54.3198	54.3700	54.2712	54.3198	54.4217	54.4217	54.5858	(39)
Average = Sum(39)m / 12 =												54.5000	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9417	0.9396	0.9396	0.9366	0.9366	0.9330	0.9339	0.9322	0.9330	0.9348	0.9348	0.9376	(40)
HLP (average)												0.9361	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9309 (42)
Hot water usage for mixer showers		

	56.5942	55.7437	54.5043	52.1330	50.3831	48.4316	47.3224	48.5523	49.9006	51.9959	54.4181	56.3773	(42a)
Hot water usage for baths													
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses													
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												106.1333	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	115.4589	112.9941	109.9921	105.4265	101.7193	97.7335	96.2013	99.1903	102.3427	106.5271	111.1630	115.1594	(44)
Energy conte	182.8587	160.9021	169.0538	144.3237	136.9337	120.1748	116.3471	122.8183	126.1988	144.5563	158.3721	180.3118	(45)
Energy content (annual)										Total = Sum(45)m =		1762.8511	
Distribution loss (46)m = 0.15 x (45)m													
	27.4288	24.1353	25.3581	21.6486	20.5401	18.0262	17.4521	18.4227	18.9298	21.6834	23.7558	27.0468	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
										Total per year (kWh/year) = Sum(64)m =		1911.7711	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	70.9189	62.6391	66.3288	57.7796	55.6488	49.7501	48.8038	50.9555	51.7531	58.1834	62.4507	70.0721	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	95.3211	93.2130	89.1516	80.2495	74.7968	69.0974	65.5965	68.4886	71.8793	78.2035	86.7371	94.1829	(72)
Total internal gains													
	455.4275	453.5159	439.3020	412.6190	386.5212	362.8443	348.8508	351.5463	365.0895	389.1946	418.3734	443.7966	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	12.9236	0.4600	0.7000	0.7700	3.1722	(75)
Southwest	4.4500	40.4699	0.4600	0.7000	0.7700	40.1866	(79)

Solar gains	43.3588	67.4204	93.7963	124.6046	140.3662	151.2008	143.3455	130.9389	111.7795	80.3225	53.4001	36.6282	(83)
Total gains	498.7864	520.9363	533.0983	537.2236	526.8874	514.0452	492.1963	482.4853	476.8691	469.5171	471.7735	480.4247	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	143.2315	143.5531	143.5531	144.0086	144.0086	144.5646	144.4312	144.6943	144.5646	144.2940	144.2940	143.8604	
alpha	10.5488	10.5702	10.5702	10.6006	10.6006	10.6376	10.6287	10.6463	10.6376	10.6196	10.6196	10.5907	
util living area													
	0.9988	0.9976	0.9915	0.9576	0.8063	0.5281	0.3424	0.3599	0.6579	0.9476	0.9955	0.9991	(86)
MIT	20.5971	20.6518	20.7676	20.9020	20.9877	20.9998	21.0000	21.0000	20.9986	20.9281	20.7432	20.5814	(87)
Th 2	20.1322	20.1340	20.1340	20.1365	20.1365	20.1395	20.1388	20.1402	20.1395	20.1381	20.1381	20.1357	(88)
util rest of house													
	0.9980	0.9960	0.9855	0.9302	0.7306	0.4374	0.2473	0.2632	0.5621	0.9091	0.9918	0.9986	(89)
MIT 2	19.6805	19.7516	19.8969	20.0555	20.1306	20.1395	20.1388	20.1402	20.1392	20.0857	19.8712	19.6635	(90)
Living area fraction									fLA = Living area / (4) =			0.4997	(91)
MIT	20.1385	20.2014	20.3320	20.4785	20.5589	20.5694	20.5691	20.5698	20.5686	20.5066	20.3069	20.1221	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.1385	20.2014	20.3320	20.4785	20.5589	20.5694	20.5691	20.5698	20.5686	20.5066	20.3069	20.1221	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9980	0.9962	0.9871	0.9425	0.7689	0.4827	0.2948	0.3116	0.6103	0.9277	0.9927	0.9986	(94)
Useful gains	497.8015	518.9447	526.2350	506.3397	405.1258	248.1524	145.1191	150.3211	291.0131	435.5889	468.3399	479.7319	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)

Heat loss rate W

824.4911	798.7349	707.4114	576.8390	412.1817	248.2080	145.1194	150.3215	291.6207	484.7111	669.7638	819.9943	(97)

Space heating kWh

243.0570	188.0190	134.7952	50.7596	5.2496	0.0000	0.0000	0.0000	0.0000	36.5469	145.0252	253.1552	(98a)

Space heating requirement - total per year (kWh/year) 1056.6076

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

243.0570	188.0190	134.7952	50.7596	5.2496	0.0000	0.0000	0.0000	0.0000	36.5469	145.0252	253.1552	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 1056.6076

Space heating per m2 (98c) / (4) = 18.1485 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	243.0570	188.0190	134.7952	50.7596	5.2496	0.0000	0.0000	0.0000	0.0000	36.5469	145.0252	253.1552	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	243.0570	188.0190	134.7952	50.7596	5.2496	0.0000	0.0000	0.0000	0.0000	36.5469	145.0252	253.1552	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 1056.6076 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 1911.7711 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 152.4072 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N) 0.0000 (235a)

Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated -0.0000 (236)

Energy used 0.0000 (237)

Total delivered energy for all uses 3120.7859 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1056.6076	27.6700	292.3633	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	27.6700	528.9871	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	27.6700	42.1711	(250)
Additional standing charges			0.0000	(251)
Total energy cost			863.5215	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1056.6076	0.1575	166.4100	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1911.7711	0.1414	270.2382	(264)
Space and water heating			436.6482	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Total CO2, kg/year			458.6453	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1056.6076	1.5831	1672.6955	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	1.5227	2911.0568	(278)
Space and water heating			4583.7523	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	152.4072	1.5338	233.7672	(282)
Total Primary energy kWh/year			4817.5195	(286)

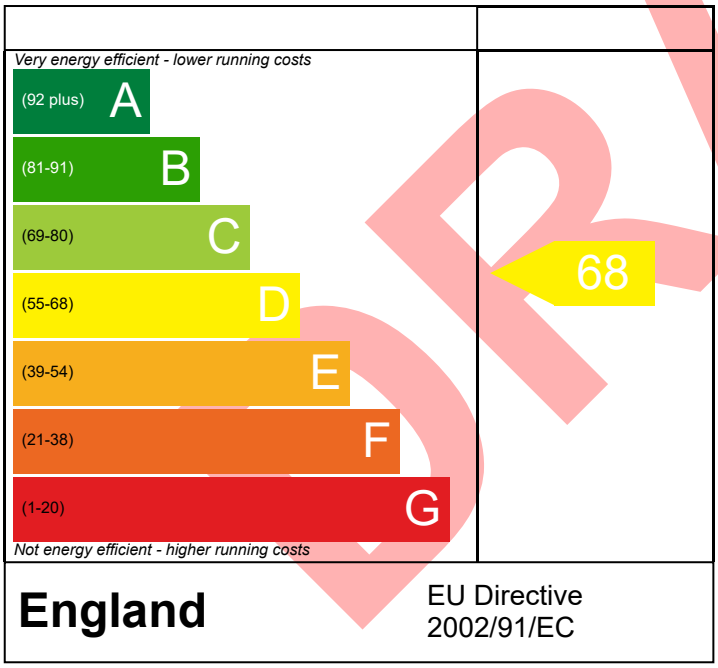
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.22 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

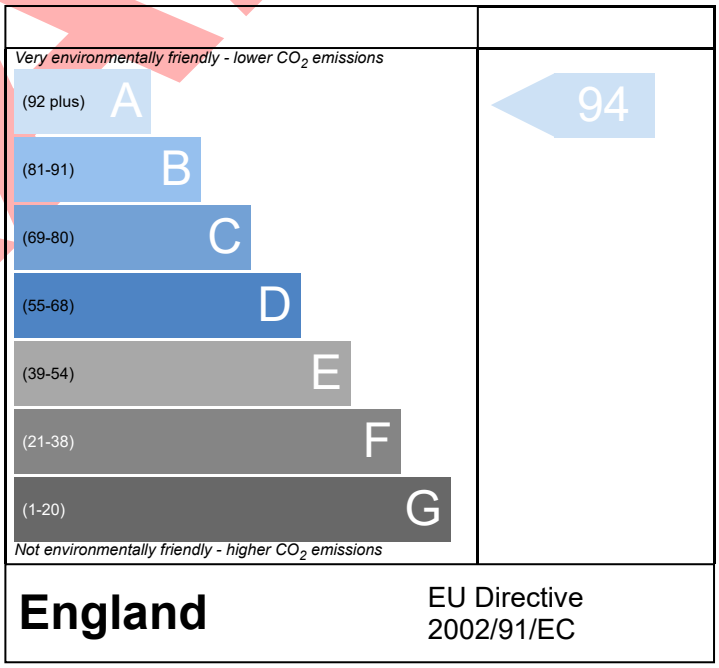
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

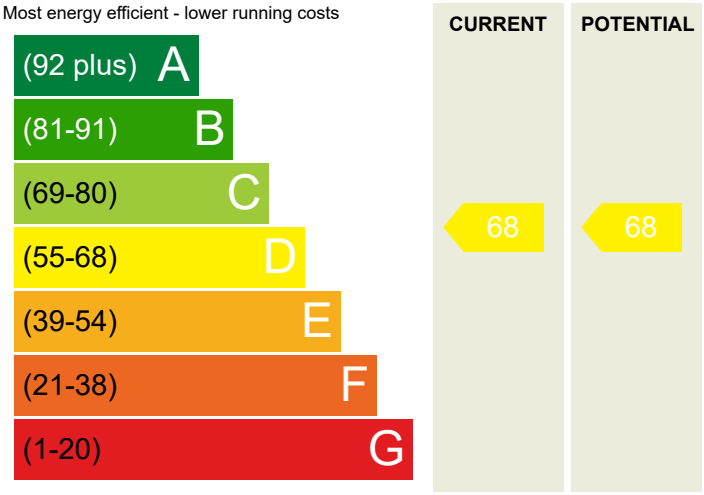
Energy Report

Dwelling Address	
Reference	Flat 9-Be Lean
SAP Version	10.2
Assessment Date	12/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	58

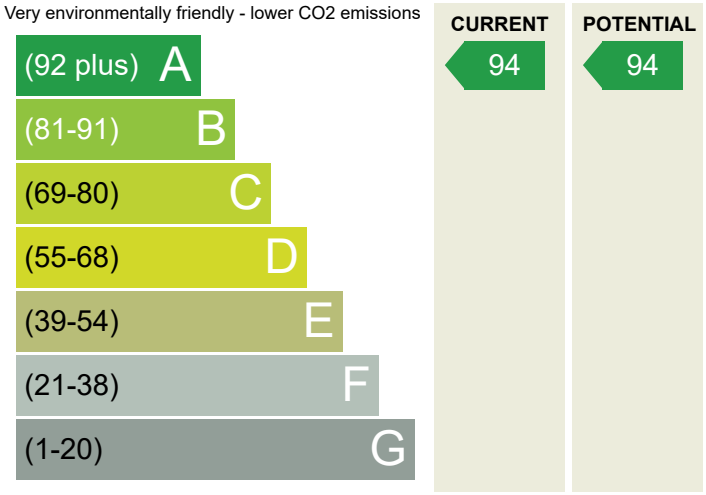
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

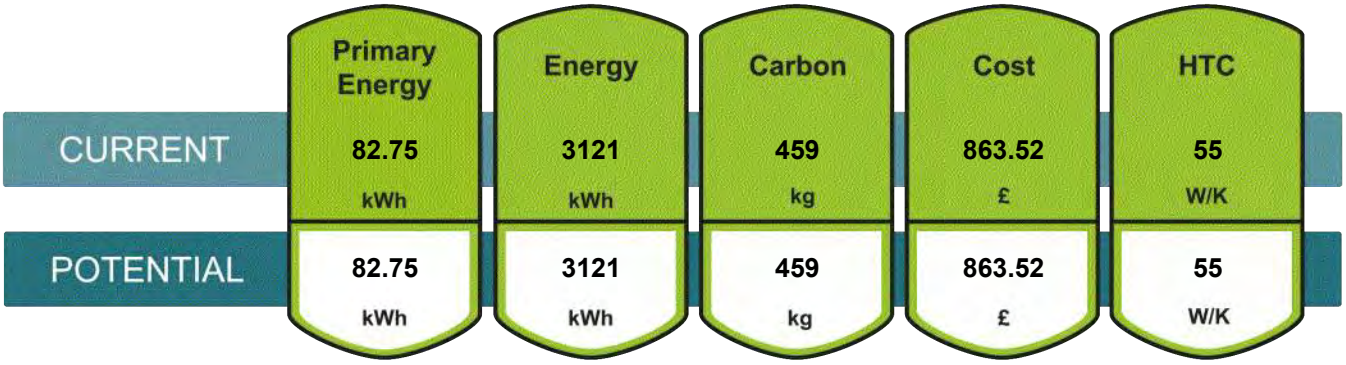


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.16 W/m²K	Very Good
Roof	Average thermal transmittance 0.11 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m³/h.m² (assumed)	Good

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£42	£42	
Heating	£292	£292	
Hot Water	£529	£529	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£864	£864	

Estimated energy use and potential savings

Space Heating
1057
kWh per year

Water Heating
1912
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 10	**Issued on Date**	15/06/2026
Assessment Reference	Be Lean	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	68 D	**DER**	9.07	**TER**	13.01
Environmental	93 A	**% DER < TER**			30.28
CO_2 Emissions (t/year)	0.47	**DFEE**	31.01	**TFEE**	32.10
Compliance Check	See BREL	**% DFEE < TFEE**			3.40
% DPER < TPER	-37.99	**DPER**	94.94	**TPER**	68.80

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	328.05	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.17 m	58.61 m²	2.73 m

8.0 Living Area	31.93	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.16	190.00	57.79	51.00	0.00	None	6.79	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	36.17	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	82.28

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	58.61	58.61	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)

Summary for Input Data

elmhurst energy

Party Floor 1	Lowest occupied	Timber I-joists, carpeted			30.00	58.61

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	2.96	
SE Windows	Windows	External Wall 1	South East	2.19	
NE Windows	Windows	External Wall 1	North East	1.64	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	User Input	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E7 Party floor between dwellings (in blocks of flats)		21.17			Yes
E14 Flat roof		21.17			Yes
E18 Party wall between dwellings		10.92			Yes
E16 Corner (normal)		10.92			No
E2 Other lintels (including other steel lintels)		4.57			No
E4 Jamb		7.20			No
E3 Sill		4.57			No

Y-value	0.05	W/m²K
Description	Ref	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	3.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	

Summary for Input Data

Controls description	Programmer and room thermostat
25.0 Main Heating 2	None
26.0 Heat Networks	None
27.0 Secondary Heating	None

28.0 Water Heating

Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over Bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day
34.0 Small-scale Hydro	None	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 10	Issued on Date	15/06/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	68 D	DER	9.07	TER	13.01
Environmental	93 A	% DER < TER			30.28
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Compliance Check	See BREL	% DFEE < TFEE			3.40
% DPER < TPER	-37.99	DPER	94.94	TPER	68.80

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client			

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		3.0000 (17)
Infiltration rate		0.2750 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2544 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.3243	0.3180	0.3116	0.2798	0.2734	0.2417	0.2417	0.2353	0.2544	0.2734	0.2862	0.2989	(22b)
Effective ac	0.5526	0.5506	0.5485	0.5391	0.5374	0.5292	0.5292	0.5277	0.5324	0.5374	0.5409	0.5447	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1600	8.1600	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		22.3819			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Internal Walls			82.2800			9.0000	740.5200	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19226.9100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		328.0483 (35)
Thermal bridges (User defined value 0.050 * total exposed area)		5.8200 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	28.2019 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	29.1779	29.0700	28.9643	28.4679	28.3750	27.9426	27.9426	27.8625	28.1091	28.3750	28.5629	28.7593	(38)
Heat transfer coeff													

	57.3798	57.2719	57.1662	56.6698	56.5769	56.1445	56.1445	56.0644	56.3110	56.5769	56.7648	56.9613 (39)
Average = Sum(39)m / 12 =												56.6693

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9790	0.9772	0.9754	0.9669	0.9653	0.9579	0.9579	0.9566	0.9608	0.9653	0.9685	0.9719	(40)
HLP (average)												0.9669	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421 (42)
Hot water usage for mixer showers												
	56.7817	55.9284	54.6850	52.3058	50.5501	48.5921	47.4792	48.7133	50.0660	52.1683	54.5985	56.5642 (42a)
Hot water usage for baths												
	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583 (42b)
Hot water usage for other uses												
	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188 (42c)
Average daily hot water use (litres/day)												106.4851 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	115.8417	113.3687	110.3568	105.7761	102.0565	98.0576	96.5202	99.5192	102.6821	106.8803	111.5316	115.5412	(44)
Energy conte	183.4650	161.4355	169.6143	144.8022	137.3877	120.5732	116.7329	123.2255	126.6172	145.0356	158.8972	180.9096	(45)
Energy content (annual)										Total = Sum(45)m =		1768.6958	
Distribution loss (46)m = 0.15 x (45)m													
	27.5197	24.2153	25.4421	21.7203	20.6082	18.0860	17.5099	18.4838	18.9926	21.7553	23.8346	27.1364	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
									Total per year (kWh/year) = Sum(64)m =			1917.6158	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
							Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					0.0000	(64a)
Heat gains from water heating, kWh/month													
	71.1205	62.8165	66.5151	57.9387	55.7998	49.8826	48.9321	51.0909	51.8922	58.3427	62.6253	70.2708	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	95.5921	93.4770	89.4021	80.4704	74.9997	69.2814	65.7689	68.6705	72.0725	78.4177	86.9796	94.4501	(72)
Total internal gains													
	456.7211	454.9027	440.7627	414.1010	387.9861	364.2409	350.1493	352.7542	366.2213	390.2965	419.5027	444.9999	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579	(83)
Total gains	503.1337	535.3321	554.4528	561.0747	558.1824	535.6580	514.3935	499.2984	491.3789	480.1704	475.3441	484.5579	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	93.0782	93.2535	93.4259	94.2444	94.3991	95.1261	95.1261	95.2620	94.8448	94.3991	94.0866	93.7621	
alpha	7.2052	7.2169	7.2284	7.2830	7.2933	7.3417	7.3417	7.3508	7.3230	7.2933	7.2724	7.2508	
util living area													
	0.9954	0.9916	0.9812	0.9479	0.8519	0.6586	0.4791	0.5146	0.7562	0.9487	0.9899	0.9964	(86)
MIT	20.3118	20.4112	20.5712	20.7681	20.9236	20.9901	20.9991	20.9985	20.9744	20.7997	20.5201	20.2859	(87)
Th 2	20.1009	20.1024	20.1039	20.1110	20.1123	20.1185	20.1185	20.1197	20.1161	20.1123	20.1097	20.1068	(88)
util rest of house													

	0.9936	0.9883	0.9735	0.9265	0.7991	0.5740	0.3838	0.4173	0.6747	0.9233	0.9851	0.9950	(89)
MIT 2	19.3156	19.4427	19.6443	19.8876	20.0545	20.1139	20.1183	20.1193	20.1021	19.9289	19.5872	19.2875	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.8583	19.9703	20.1493	20.3673	20.5280	20.5913	20.5982	20.5983	20.5773	20.4033	20.0954	19.8314	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8583	19.9703	20.1493	20.3673	20.5280	20.5913	20.5982	20.5983	20.5773	20.4033	20.0954	19.8314	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9929	0.9877	0.9739	0.9334	0.8253	0.6201	0.4358	0.4704	0.7187	0.9327	0.9851	0.9944	(94)
Useful gains	499.5761	528.7296	540.0071	523.7097	460.6734	332.1798	224.1875	234.8795	353.1763	447.8752	468.2388	481.8596	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	892.7320	863.1072	780.2763	649.8493	499.4605	336.3772	224.4750	235.3749	364.7454	554.6400	737.6809	890.3856	(97)
Space heating kWh													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98a)
Space heating requirement - total per year (kWh/year)												1393.0229	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1393.0229	
Space heating per m2											(98c) / (4) =	23.7677	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	1393.0229	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1917.6158	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	147.0407	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	3457.6795	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1393.0229	16.4900	229.7095	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	16.4900	316.2149	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	16.4900	24.2470	(250)
Additional standing charges			0.0000	(251)
Total energy cost			570.1714	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.9811	(257)
SAP value		67.8864	
SAP rating (Section 12)		68	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1393.0229	0.1561	217.4174	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1917.6158	0.1414	271.0657	(264)
Space and water heating			488.4830	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Total CO2, kg/year			509.7055	(272)
CO2 emissions per m2			8.7000	(273)
EI value			93.4079	
EI rating			93	(274)
EI band			A	

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b) x	2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.0000	(17)
Infiltration rate		0.2750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2544	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.2671	0.2544	0.2544	0.2353	0.2353	0.2099	0.2162	0.2035	0.2099	0.2226	0.2226	0.2417	(22b)
Effective ac	0.5357	0.5324	0.5324	0.5277	0.5277	0.5220	0.5234	0.5207	0.5220	0.5248	0.5248	0.5292	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1600	8.1600	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		22.3819			(33)

Main dwelling					
Party Wall to Adj Flat	36.1700	0.0000	0.0000	180.0000	6510.6000 (32)
Party Floor 1	58.6100			30.0000	1758.3000 (32d)
Internal Walls	82.2800			9.0000	740.5200 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19226.9100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		328.0483 (35)
Thermal bridges (User defined value 0.050 * total exposed area)		5.8200 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	28.2019 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	28.2842	28.1091	28.1091	27.8625	27.8625	27.5636	27.6351	27.4942	27.5636	27.7088	27.7088	27.9426	(38)
Heat transfer coeff	56.4861	56.3110	56.3110	56.0644	56.0644	55.7655	55.8370	55.6961	55.7655	55.9107	55.9107	56.1445	(39)
Average = Sum(39)m / 12 =												56.0222	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9638	0.9608	0.9608	0.9566	0.9566	0.9515	0.9527	0.9503	0.9515	0.9539	0.9539	0.9579	(40)
HLP (average)												0.9558	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421	(42)
Hot water usage for mixer showers	56.7817	55.9284	54.6850	52.3058	50.5501	48.5921	47.4792	48.7133	50.0660	52.1683	54.5985	56.5642	(42a)
Hot water usage for baths	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)
Hot water usage for other uses	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)
Average daily hot water use (litres/day)												106.4851	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	115.8417	113.3687	110.3568	105.7761	102.0565	98.0576	96.5202	99.5192	102.6821	106.8803	111.5316	115.5412	(44)
Energy conte	183.4650	161.4355	169.6143	144.8022	137.3877	120.5732	116.7329	123.2255	126.6172	145.0356	158.8972	180.9096	(45)
Energy content (annual)										Total = Sum(45)m =		1768.6958	
Distribution loss (46)m = 0.15 x (45)m	27.5197	24.2153	25.4421	21.7203	20.6082	18.0860	17.5099	18.4838	18.9926	21.7553	23.8346	27.1364	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
									Total per year (kWh/year) = Sum(64)m =			1917.6158	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month	71.1205	62.8165	66.5151	57.9387	55.7998	49.8826	48.9321	51.0909	51.8922	58.3427	62.6253	70.2708	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)	95.5921	93.4770	89.4021	80.4704	74.9997	69.2814	65.7689	68.6705	72.0725	78.4177	86.9796	94.4501	(72)
Total internal gains	456.7211	454.9027	440.7627	414.1010	387.9861	364.2409	350.1493	352.7542	366.2213	390.2965	419.5027	444.9999	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	12.9236	0.4600	0.7000	0.7700	4.7295	(75)
Southeast	2.1900	40.4699	0.4600	0.7000	0.7700	19.7772	(77)
Southwest	2.9600	40.4699	0.4600	0.7000	0.7700	26.7309	(79)

Solar gains	51.2376	79.9745	112.0314	150.0885	170.1223	183.7233	173.9883	158.1581	133.9603	95.5050	63.1666	43.2442	(83)
Total gains	507.9587	534.8772	552.7941	564.1895	558.1084	547.9642	524.1377	510.9123	500.1816	485.8015	482.6693	488.2442	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	94.5508	94.8448	94.8448	95.2620	95.2620	95.7727	95.6500	95.8920	95.7727	95.5240	95.5240	95.1261	
alpha	7.3034	7.3230	7.3230	7.3508	7.3508	7.3848	7.3767	7.3928	7.3848	7.3683	7.3683	7.3417	
util living area	0.9932	0.9887	0.9726	0.9187	0.7659	0.5071	0.3302	0.3487	0.6373	0.9121	0.9830	0.9946	(86)
MIT	20.4064	20.4895	20.6558	20.8430	20.9682	20.9986	21.0000	20.9999	20.9929	20.8755	20.6189	20.3856	(87)
Th 2	20.1136	20.1161	20.1161	20.1197	20.1197	20.1240	20.1229	20.1250	20.1240	20.1219	20.1219	20.1185	(88)
util rest of house	0.9904	0.9841	0.9612	0.8869	0.6967	0.4193	0.2368	0.2534	0.5460	0.8718	0.9749	0.9923	(89)
MIT 2	19.4461	19.5527	19.7586	19.9791	20.0997	20.1235	20.1229	20.1250	20.1211	20.0193	19.7204	19.4238	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.9692	20.0630	20.2474	20.4498	20.5729	20.6003	20.6007	20.6016	20.5960	20.4857	20.2099	19.9478	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.9692	20.0630	20.2474	20.4498	20.5729	20.6003	20.6007	20.6016	20.5960	20.4857	20.2099	19.9478	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9898	0.9837	0.9632	0.9000	0.7336	0.4672	0.2877	0.3054	0.5959	0.8901	0.9759	0.9917	(94)
Useful gains	502.7789	526.1672	532.4448	507.7528	409.4172	256.0325	150.7895	156.0231	298.0610	432.4246	471.0368	484.2144	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)
Heat loss rate W	839.9065	814.4293	723.4485	591.4670	424.5687	256.5356	150.8004	156.0399	300.9132	496.8074	682.6624	833.6194	(97)
Space heating kWh	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98a)
Space heating requirement - total per year (kWh/year)												1118.4173	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1118.4173	
Space heating per m2											(98c) / (4) =	19.0824	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 1118.4173 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 1917.6158 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 147.0407 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3183.0739 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1118.4173	27.6700	309.4661	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	27.6700	530.6043	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	27.6700	40.6862	(250)
Additional standing charges			0.0000	(251)
Total energy cost			880.7565	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1118.4173	0.1570	175.6231	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1917.6158	0.1414	271.0657	(264)
Space and water heating			446.6888	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Total CO2, kg/year			467.9113	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1118.4173	1.5814	1768.6147	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	1.5227	2919.9616	(278)
Space and water heating			4688.5763	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	147.0407	1.5338	225.5360	(282)
Total Primary energy kWh/year			4914.1123	(286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: D 68
Current environmental impact rating: A 93

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: D 68
Potential environmental impact rating: A 93

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current	Potential	Saving
Electricity	£881	£881	£0
Space heating	£309	£309	£0
Water heating	£531	£531	£0
Lighting	£41	£41	£0
Total cost of fuels	£881	£881	£0
Total cost of uses	£881	£881	£0
Delivered energy	54 kWh/m²	54 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.5 tonnes	0.5 tonnes	0.0 tonnes
CO2 emissions per m²	8 kg/m²	8 kg/m²	0 kg/m²
Primary energy	84 kWh/m²	84 kWh/m²	0 kWh/m²

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		3.0000 (17)
Infiltration rate		0.2750 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2544 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.3243	0.3180	0.3116	0.2798	0.2734	0.2417	0.2417	0.2353	0.2544	0.2734	0.2862	0.2989	(22b)
Effective ac	0.5526	0.5506	0.5485	0.5391	0.5374	0.5292	0.5292	0.5277	0.5324	0.5374	0.5409	0.5447	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1600	8.1600	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		22.3819			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Internal Walls			82.2800			9.0000	740.5200	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		19226.9100	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							328.0483	(35)
Thermal bridges (User defined value 0.050 * total exposed area)							5.8200	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		28.2019	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	29.1779	29.0700	28.9643	28.4679	28.3750	27.9426	27.9426	27.8625	28.1091	28.3750	28.5629	28.7593	(38)
Heat transfer coeff	57.3798	57.2719	57.1662	56.6698	56.5769	56.1445	56.1445	56.0644	56.3110	56.5769	56.7648	56.9613	(39)
Average = Sum(39)m / 12 =												56.6693	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9790	0.9772	0.9754	0.9669	0.9653	0.9579	0.9579	0.9566	0.9608	0.9653	0.9685	0.9719	(40)
HLP (average)												0.9669	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy											1.9421	(42)
Hot water usage for mixer showers	56.7817	55.9284	54.6850	52.3058	50.5501	48.5921	47.4792	48.7133	50.0660	52.1683	54.5985	56.5642	(42a)
Hot water usage for baths	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)
Hot water usage for other uses	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)
Average daily hot water use (litres/day)												106.4851	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	115.8417	113.3687	110.3568	105.7761	102.0565	98.0576	96.5202	99.5192	102.6821	106.8803	111.5316	115.5412	(44)
Energy conte	183.4650	161.4355	169.6143	144.8022	137.3877	120.5732	116.7329	123.2255	126.6172	145.0356	158.8972	180.9096	(45)
Energy content (annual)										Total = Sum(45)m =		1768.6958	
Distribution loss (46)m = 0.15 x (45)m	27.5197	24.2153	25.4421	21.7203	20.6082	18.0860	17.5099	18.4838	18.9926	21.7553	23.8346	27.1364	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)

a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
									Total per year (kWh/year) = Sum(64)m =			1917.6158	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	71.1205	62.8165	66.5151	57.9387	55.7998	49.8826	48.9321	51.0909	51.8922	58.3427	62.6253	70.2708	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	95.5921	93.4770	89.4021	80.4704	74.9997	69.2814	65.7689	68.6705	72.0725	78.4177	86.9796	94.4501	(72)
Total internal gains													
	456.7211	454.9027	440.7627	414.1010	387.9861	364.2409	350.1493	352.7542	366.2213	390.2965	419.5027	444.9999	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579	(83)
Total gains	503.1337	535.3321	554.4528	561.0747	558.1824	535.6580	514.3935	499.2984	491.3789	480.1704	475.3441	484.5579	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	93.0782	93.2535	93.4259	94.2444	94.3991	95.1261	95.1261	95.2620	94.8448	94.3991	94.0866	93.7621	
alpha	7.2052	7.2169	7.2284	7.2830	7.2933	7.3417	7.3417	7.3508	7.3230	7.2933	7.2724	7.2508	
util living area													
	0.9954	0.9916	0.9812	0.9479	0.8519	0.6586	0.4791	0.5146	0.7562	0.9487	0.9899	0.9964	(86)
MIT	20.3118	20.4112	20.5712	20.7681	20.9236	20.9901	20.9991	20.9985	20.9744	20.7997	20.5201	20.2859	(87)
Th 2	20.1009	20.1024	20.1039	20.1110	20.1123	20.1185	20.1185	20.1197	20.1161	20.1123	20.1097	20.1068	(88)
util rest of house													
	0.9936	0.9883	0.9735	0.9265	0.7991	0.5740	0.3838	0.4173	0.6747	0.9233	0.9851	0.9950	(89)
MIT 2	19.3156	19.4427	19.6443	19.8876	20.0545	20.1139	20.1183	20.1193	20.1021	19.9289	19.5872	19.2875	(90)
Living area fraction									fLA = Living area / (4) =			0.5448	(91)
MIT	19.8583	19.9703	20.1493	20.3673	20.5280	20.5913	20.5982	20.5983	20.5773	20.4033	20.0954	19.8314	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8583	19.9703	20.1493	20.3673	20.5280	20.5913	20.5982	20.5983	20.5773	20.4033	20.0954	19.8314	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9929	0.9877	0.9739	0.9334	0.8253	0.6201	0.4358	0.4704	0.7187	0.9327	0.9851	0.9944	(94)
Useful gains	499.5761	528.7296	540.0071	523.7097	460.6734	332.1798	224.1875	234.8795	353.1763	447.8752	468.2388	481.8596	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	892.7320	863.1072	780.2763	649.8493	499.4605	336.3772	224.4750	235.3749	364.7454	554.6400	737.6809	890.3856	(97)
Space heating kWh													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98a)
Space heating requirement - total per year (kWh/year)												1393.0229	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1393.0229	
Space heating per m2											(98c) / (4) =	23.7677	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1393.0229	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1917.6158	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												147.0407	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												3457.6795	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1393.0229	16.4900	229.7095	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	16.4900	316.2149	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	16.4900	24.2470	(250)
Additional standing charges			0.0000	(251)
Total energy cost			570.1714	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.9811	(257)
SAP value		67.8864	
SAP rating (Section 12)		68	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1393.0229	0.1561	217.4174	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1917.6158	0.1414	271.0657	(264)
Space and water heating			488.4830	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	147.0407	0.1443	21.2225 (268)
Total CO2, kg/year			509.7055 (272)
CO2 emissions per m2			8.7000 (273)
EI value			93.4079
EI rating			93 (274)
EI band			A

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		3.0000 (17)
Infiltration rate		0.2750 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2544 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.2671	0.2544	0.2544	0.2353	0.2353	0.2099	0.2162	0.2035	0.2099	0.2226	0.2226	0.2417	(22b)
Effective ac	0.5357	0.5324	0.5324	0.5277	0.5277	0.5220	0.5234	0.5207	0.5220	0.5248	0.5248	0.5292	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1600	8.1600	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	22.3819			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Internal Walls			82.2800			9.0000	740.5200	(32c)
Heat capacity Cm = Sum(A x k)				(28)...(30) + (32) + (32a)...(32e) =			19226.9100	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							328.0483	(35)
Thermal bridges (User defined value 0.050 * total exposed area)							5.8200	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		28.2019	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	28.2842	28.1091	28.1091	27.8625	27.8625	27.5636	27.6351	27.4942	27.5636	27.7088	27.7088	27.9426	(38)
Heat transfer coeff	56.4861	56.3110	56.3110	56.0644	56.0644	55.7655	55.8370	55.6961	55.7655	55.9107	55.9107	56.1445	(39)
Average = Sum(39)m / 12 =												56.0222	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9638	0.9608	0.9608	0.9566	0.9566	0.9515	0.9527	0.9503	0.9515	0.9539	0.9539	0.9579	(40)
HLP (average)												0.9558	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421	(42)
Hot water usage for mixer showers	56.7817	55.9284	54.6850	52.3058	50.5501	48.5921	47.4792	48.7133	50.0660	52.1683	54.5985	56.5642	(42a)

Hot water usage for baths
24.5412 24.1768 23.6635 22.7172 22.0085 21.2228 20.7984 21.3081 21.8630 22.7038 23.6696 24.4583 (42b)
Hot water usage for other uses
34.5188 33.2635 32.0083 30.7531 29.4979 28.2426 28.2426 29.4979 30.7531 32.0083 33.2635 34.5188 (42c)
Average daily hot water use (litres/day) 106.4851 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	115.8417	113.3687	110.3568	105.7761	102.0565	98.0576	96.5202	99.5192	102.6821	106.8803	111.5316	115.5412	(44)
Energy conte	183.4650	161.4355	169.6143	144.8022	137.3877	120.5732	116.7329	123.2255	126.6172	145.0356	158.8972	180.9096	(45)
Energy content (annual)										Total = Sum(45)m =		1768.6958	
Distribution loss (46)m = 0.15 x (45)m													
	27.5197	24.2153	25.4421	21.7203	20.6082	18.0860	17.5099	18.4838	18.9926	21.7553	23.8346	27.1364	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
										Total per year (kWh/year) = Sum(64)m =		1917.6158	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	71.1205	62.8165	66.5151	57.9387	55.7998	49.8826	48.9321	51.0909	51.8922	58.3427	62.6253	70.2708	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	95.5921	93.4770	89.4021	80.4704	74.9997	69.2814	65.7689	68.6705	72.0725	78.4177	86.9796	94.4501	(72)
Total internal gains													
	456.7211	454.9027	440.7627	414.1010	387.9861	364.2409	350.1493	352.7542	366.2213	390.2965	419.5027	444.9999	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	12.9236	0.4600	0.7000	0.7700	4.7295	(75)
Southeast	2.1900	40.4699	0.4600	0.7000	0.7700	19.7772	(77)
Southwest	2.9600	40.4699	0.4600	0.7000	0.7700	26.7309	(79)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	51.2376	79.9745	112.0314	150.0885	170.1223	183.7233	173.9883	158.1581	133.9603	95.5050	63.1666	43.2442	(83)
Total gains	507.9587	534.8772	552.7941	564.1895	558.1084	547.9642	524.1377	510.9123	500.1816	485.8015	482.6693	488.2442	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	94.5508	94.8448	94.8448	95.2620	95.2620	95.7727	95.6500	95.8920	95.7727	95.5240	95.5240	95.1261	
alpha	7.3034	7.3230	7.3230	7.3508	7.3508	7.3848	7.3767	7.3928	7.3848	7.3683	7.3683	7.3417	
util living area													
	0.9932	0.9887	0.9726	0.9187	0.7659	0.5071	0.3302	0.3487	0.6373	0.9121	0.9830	0.9946	(86)
MIT	20.4064	20.4895	20.6558	20.8430	20.9682	20.9986	21.0000	20.9999	20.9929	20.8755	20.6189	20.3856	(87)
Th 2	20.1136	20.1161	20.1161	20.1197	20.1197	20.1240	20.1229	20.1250	20.1240	20.1219	20.1219	20.1185	(88)
util rest of house													
	0.9904	0.9841	0.9612	0.8869	0.6967	0.4193	0.2368	0.2534	0.5460	0.8718	0.9749	0.9923	(89)
MIT 2	19.4461	19.5527	19.7586	19.9791	20.0997	20.1235	20.1229	20.1250	20.1211	20.0193	19.7204	19.4238	(90)
Living area fraction									fLA = Living area / (4) =			0.5448	(91)
MIT	19.9692	20.0630	20.2474	20.4498	20.5729	20.6003	20.6007	20.6016	20.5960	20.4857	20.2099	19.9478	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.9692	20.0630	20.2474	20.4498	20.5729	20.6003	20.6007	20.6016	20.5960	20.4857	20.2099	19.9478	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9898	0.9837	0.9632	0.9000	0.7336	0.4672	0.2877	0.3054	0.5959	0.8901	0.9759	0.9917	(94)
Useful gains	502.7789	526.1672	532.4448	507.7528	409.4172	256.0325	150.7895	156.0231	298.0610	432.4246	471.0368	484.2144	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)

Heat loss rate W

839.9065	814.4293	723.4485	591.4670	424.5687	256.5356	150.8004	156.0399	300.9132	496.8074	682.6624	833.6194	(97)

Space heating kWh

250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98a)

Space heating requirement - total per year (kWh/year) 1118.4173

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 1118.4173

Space heating per m2 (98c) / (4) = 19.0824 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 1118.4173 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 1917.6158 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 147.0407 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation 0.0000 (233)
Wind generation 0.0000 (234)
Hydro-electric generation (Appendix N) 0.0000 (235a)
Electricity generated - Micro CHP (Appendix N) 0.0000 (235)
Appendix Q - special features
Energy saved or generated -0.0000 (236)
Energy used 0.0000 (237)
Total delivered energy for all uses 3183.0739 (238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1118.4173	27.6700	309.4661	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	27.6700	530.6043	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	27.6700	40.6862	(250)
Additional standing charges			0.0000	(251)
Total energy cost			880.7565	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1118.4173	0.1570	175.6231	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1917.6158	0.1414	271.0657	(264)
Space and water heating			446.6888	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Total CO2, kg/year			467.9113	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1118.4173	1.5814	1768.6147	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	1.5227	2919.9616	(278)
Space and water heating			4688.5763	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	147.0407	1.5338	225.5360	(282)
Total Primary energy kWh/year			4914.1123	(286)

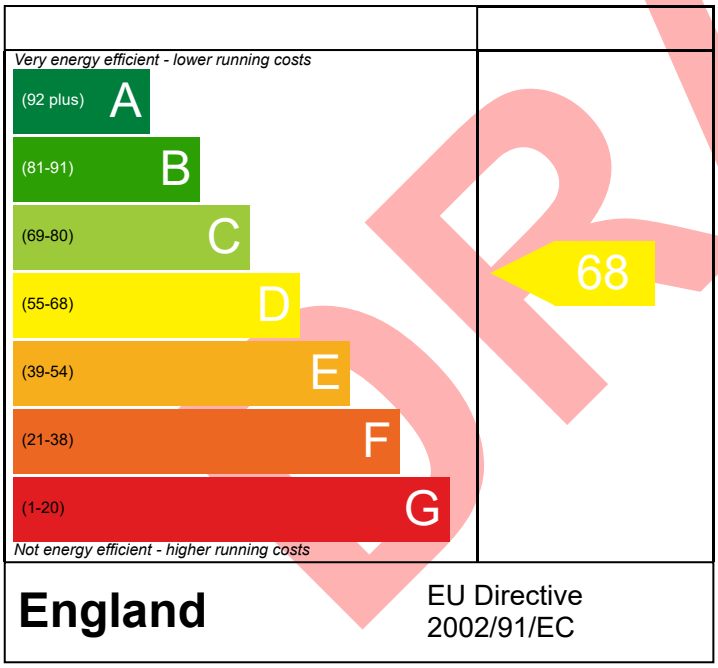
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.61 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

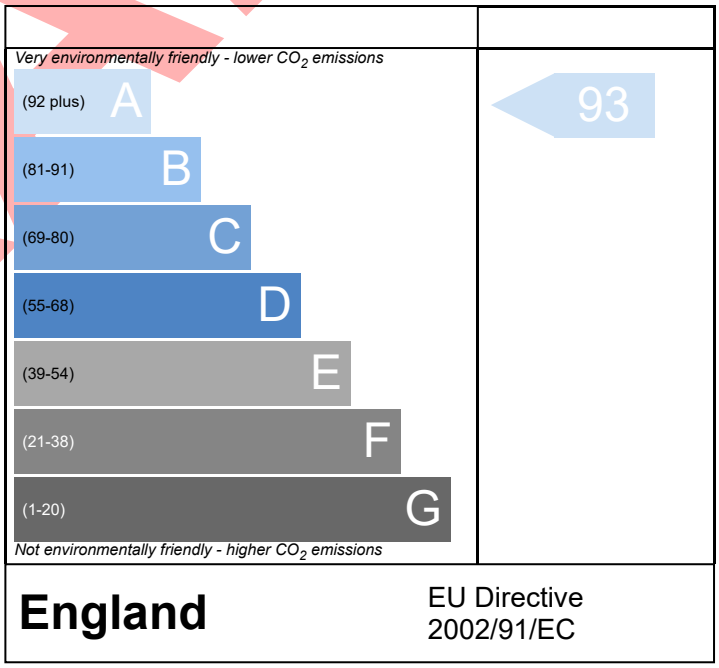
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

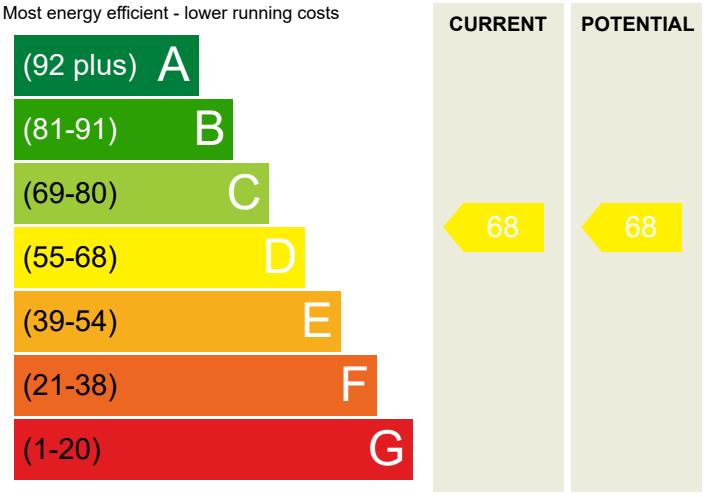
Energy Report

Dwelling Address	
Reference	Flat 10-Be Lean
SAP Version	10.2
Assessment Date	15/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	59

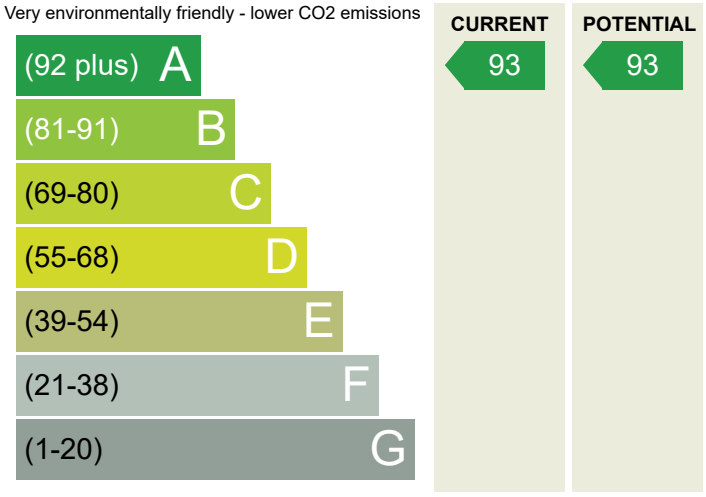
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

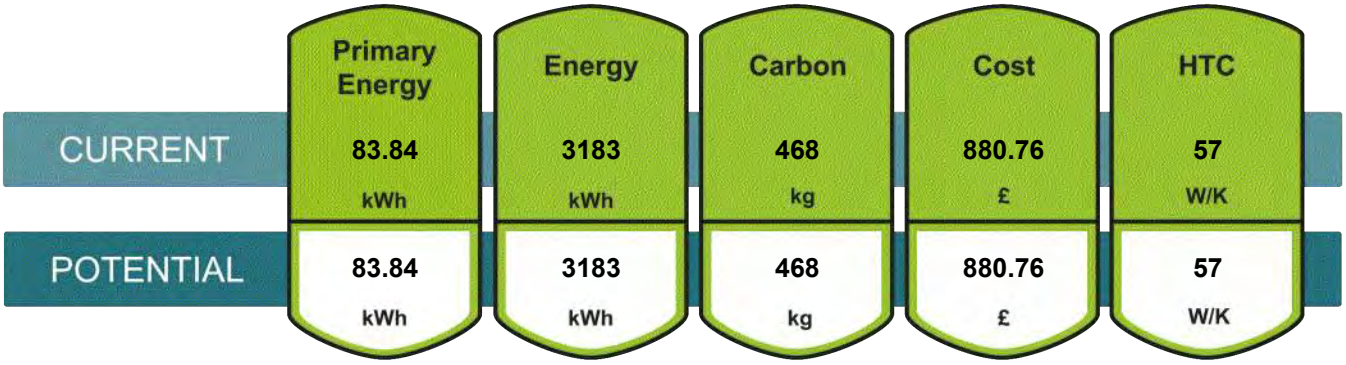


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.16 W/m²K	Very Good
Roof	Average thermal transmittance 0.11 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m³/h.m² (assumed)	Good

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£41	£41	
Heating	£309	£309	
Hot Water	£531	£531	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£881	£881	

Estimated energy use and potential savings

Space Heating
1118
kWh per year

Water Heating
1918
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

12. APPENDIX E SAP OUTPUT SHEETS_BE GREEN CASE

Summary for Input Data

elmhurst energy

Plot Reference	Flat 1	**Issued on Date**	15/06/2026
Assessment Reference	Be Green	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	76 C	**DER**	4.87	**TER**	
Environmental	97 A	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.09	**DFEE**	55.15	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	82.11	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	254.27	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	7.40 m	50.01 m²	2.50 m

8.0 Living Area	23.40	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.26	17.00	18.50	11.07	0.00	None	7.43	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	17.70	0.00	None
Party Wall to Adj Flat	Filled Cavity with Edge Sealing	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	36.20	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall	Plasterboard on timber frame	9.00	91.70

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Timber I-joists, carpeted	20.00	50.01

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Suspended timber, insulation between joists	0.18	None	0.00	20.00	50.01

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Opening	Windows	External Wall 1	South West	7.43	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	3	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
LED Downlight	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	
Flue Gas Heat Recovery System	No	

Summary for Input Data

Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day

32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	No	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.08	South West	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 1	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	76 C	DER	4.87	TER	
Environmental	97 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.09	DFEE	55.15	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	82.11	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		50.0100	(1b)	x 2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	125.0250	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9900	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0729	1.0518	1.0308	0.9256	0.9046	0.7994	0.7994	0.7783	0.8415	0.9046	0.9466	0.9887	(22b)
Effective ac	1.0729	1.0518	1.0308	0.9284	0.9091	0.8195	0.8195	0.8029	0.8540	0.9091	0.9481	0.9888	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.1800	9.0018	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.2600	2.8782	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.0616			(33)
Main dwelling								
Party Wall to Adj Property			17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat			36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1			50.0100			20.0000	1000.2000	(32b)
Internal Wall			91.7000			9.0000	825.3000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12715.8900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		254.2669 (35)
Thermal bridges (Default value 0.200 * total exposed area)		13.7020 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	34.7636 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	43.3964	42.5285	38.3030	37.5088	33.8115	33.8115	33.1268	35.2357	37.5088	39.1155	40.7953	(38)

Heat transfer coeff

	79.0279	78.1600	77.2920	73.0666	72.2724	68.5751	68.5751	67.8904	69.9992	72.2724	73.8791	75.5588 (39)
Average = Sum(39)m / 12 =												73.0474
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.5802	1.5629	1.5455	1.4610	1.4452	1.3712	1.3712	1.3575	1.3997	1.4452	1.4773	1.5109 (40)
HLP (average)												1.4607
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.6904 (42)

Hot water usage for mixer showers

	49.2767	48.5362	47.4571	45.3924	43.8688	42.1696	41.2038	42.2747	43.4486	45.2731	47.3821	49.0879 (42a)

Hot water usage for baths

	22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497 (42b)

Hot water usage for other uses

	31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413 (42c)

Average daily hot water use (litres/day) 95.5402 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	103.9446	101.7051	98.9892	94.8866	91.5452	87.9569	86.5981	89.3025	92.1518	95.9163	100.0813	103.6790	(44)
Energy conte	164.6229	144.8267	152.1427	129.8950	123.2375	108.1533	104.7328	110.5751	113.6324	130.1575	142.5841	162.3363	(45)
Energy content (annual)										Total = Sum(45)m =		1586.8963	
Distribution loss (46)m = 0.15 x (45)m													
	24.6934	21.7240	22.8214	19.4843	18.4856	16.2230	15.7099	16.5863	17.0449	19.5236	21.3876	24.3504	(46)

Water storage loss (or HIU loss):

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 0.6800 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.4080 (55)

Total storage loss

	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)

If cylinder contains dedicated solar storage

	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(64)
										Total per year (kWh/year) = Sum(64)m =		1735.8163	(64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

	64.8555	57.2941	60.7058	52.9821	51.0949	45.7530	44.9421	46.8846	47.5748	53.3958	57.2012	64.0952	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	17.1310	15.2156	12.3742	9.3680	7.0027	5.9120	6.3881	8.3035	11.1450	14.1511	16.5164	17.6071	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)

Water heating gains (Table 5)

	87.1714	85.2590	81.5939	73.5863	68.6759	63.5458	60.4060	63.0170	66.0761	71.7685	79.4461	86.1495	(72)

Total internal gains

	404.7340	403.1870	390.9330	367.6837	344.9629	324.2258	311.8644	314.1100	325.7579	346.6920	372.1801	394.4904	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	36.7938	0.4600	0.7000	0.7700	61.0032	(79)

Solar gains	61.0032	103.9111	142.1757	176.1626	197.3168	195.8899	188.8587	173.0768	153.9462	114.8439	73.0678	52.2061	(83)
Total gains	465.7372	507.0981	533.1087	543.8463	542.2796	520.1156	500.7231	487.1867	479.7041	461.5359	445.2479	446.6965	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.6955	45.1918	45.6993	48.3421	48.8733	51.5084	51.5084	52.0279	50.4605	48.8733	47.8105	46.7476	
alpha	3.9797	4.0128	4.0466	4.2228	4.2582	4.4339	4.4339	4.4685	4.3640	4.2582	4.1874	4.1165	
util living area													
	0.9897	0.9843	0.9734	0.9463	0.8855	0.7408	0.5755	0.6064	0.8163	0.9476	0.9827	0.9912	(86)
MIT	19.3140	19.5051	19.8117	20.2600	20.6145	20.8910	20.9724	20.9656	20.8150	20.3688	19.8227	19.3582	(87)
Th 2	19.6279	19.6407	19.6535	19.7168	19.7289	19.7855	19.7855	19.7960	19.7636	19.7289	19.7046	19.6794	(88)
util rest of house													
	0.9862	0.9789	0.9637	0.9250	0.8362	0.6378	0.4300	0.4643	0.7289	0.9226	0.9757	0.9882	(89)

MIT 2	17.7334	17.9840	18.3793	18.9785	19.4020	19.7232	19.7772	19.7846	19.6421	19.1259	18.4313	17.8235	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.4729	18.6957	19.0495	19.5781	19.9694	20.2696	20.3365	20.3372	20.1909	19.7074	19.0823	18.5416	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4729	18.6957	19.0495	19.5781	19.9694	20.2696	20.3365	20.3372	20.1909	19.7074	19.0823	18.5416	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9820	0.9737	0.9580	0.9222	0.8470	0.6821	0.4986	0.5311	0.7627	0.9220	0.9712	0.9845	(94)
Useful gains	457.3511	493.7811	510.7103	501.5302	459.3055	354.7835	249.6418	258.7261	365.8792	425.5523	432.4337	439.7846	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1120.0585	1078.2729	969.9782	780.2114	597.6471	388.7950	256.2294	267.3002	426.3587	658.2164	885.2429	1083.6310	(97)
Space heating kWh	493.0543	392.7785	341.6953	200.6504	102.9261	0.0000	0.0000	0.0000	0.0000	173.1021	326.0226	479.0218	(98a)
Space heating requirement - total per year (kWh/year)												2509.2511	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	493.0543	392.7785	341.6953	200.6504	102.9261	0.0000	0.0000	0.0000	0.0000	173.1021	326.0226	479.0218	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2509.2511	
Space heating per m2											(98c) / (4) =	50.1750	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	493.0543	392.7785	341.6953	200.6504	102.9261	0.0000	0.0000	0.0000	0.0000	173.1021	326.0226	479.0218	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	493.0543	392.7785	341.6953	200.6504	102.9261	0.0000	0.0000	0.0000	0.0000	173.1021	326.0226	479.0218	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	14.9947	12.0293	10.8310	7.9353	6.1294	5.0078	5.5915	7.2680	9.4404	12.3864	13.9904	15.4114	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-65.0958	-96.7541	-143.8125	-156.1455	-154.1988	-118.4841	-116.3989	-112.5859	-102.1271	-103.4768	-71.4039	-55.4217	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-24.8304	-57.4066	-127.8563	-218.2813	-315.2129	-345.2932	-340.3291	-282.3122	-200.2441	-96.2481	-36.1124	-19.2338	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2509.2511	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1735.8163	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	121.0156	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	1006.8174	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2509.2511	16.4900	413.7755	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	1735.8163	16.4900	286.2361	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	121.0156	16.4900	19.9555	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1295.9052	16.4900	-213.6948	
PV Unit electricity exported	-2063.3603	5.5900	-115.3418	
Total			-329.0366	(252)
Total energy cost			390.9305	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.4813	(257)
SAP value		75.9887	
SAP rating (Section 12)		76	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2509.2511	0.1549	388.6229	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1735.8163	0.1413	245.3267	(264)
Space and water heating			633.9496	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	121.0156	0.1443	17.4663	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1295.9052	0.1365	-176.8737	
PV Unit electricity exported	-2063.3603	0.1219	-251.5759	
Total			-428.4496	(269)
Total CO2, kg/year			222.9663	(272)
CO2 emissions per m2			4.4600	(273)
EI value			96.8553	
EI rating			97	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b)	x 2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		125.0250	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9900	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0729	0.9887	0.9677	0.9046	0.9046	0.8415	0.8415	0.8204	0.8415	0.9466	0.9256	0.9887	(22b)
Effective ac	1.0729	0.9888	0.9682	0.9091	0.9091	0.8540	0.8540	0.8365	0.8540	0.9481	0.9284	0.9888	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.1800	9.0018	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.2600	2.8782	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	21.0616			(33)
Main dwelling								
Party Wall to Adj Property			17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat			36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1			50.0100			20.0000	1000.2000	(32b)
Internal Wall			91.7000			9.0000	825.3000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12715.8900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		254.2669 (35)
Thermal bridges (Default value 0.200 * total exposed area)		13.7020 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	34.7636 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	40.7953	39.9463	37.5088	37.5088	35.2357	35.2357	34.5145	35.2357	39.1155	38.3030	40.7953	(38)
Heat transfer coeff	79.0279	75.5588	74.7098	72.2724	72.2724	69.9992	69.9992	69.2780	69.9992	73.8791	73.0666	75.5588	(39)
Average = Sum(39)m / 12 =												72.9684	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5802	1.5109	1.4939	1.4452	1.4452	1.3997	1.3997	1.3853	1.3997	1.4773	1.4610	1.5109	(40)
HLP (average)												1.4591	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.6904 (42)
Hot water usage for mixer showers	49.2767 48.5362 47.4571 45.3924 43.8688 42.1696 41.2038 42.2747 43.4486 45.2731 47.3821	49.0879 (42a)
Hot water usage for baths	22.7265 22.3890 21.9137 21.0374 20.3811 19.6535 19.2605 19.7324 20.2463 21.0249 21.9194	22.6497 (42b)
Hot water usage for other uses	31.9413 30.7798 29.6183 28.4568 27.2953 26.1338 26.1338 27.2953 28.4568 29.6183 30.7798	31.9413 (42c)
Average daily hot water use (litres/day)		95.5402 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	103.9446	101.7051	98.9892	94.8866	91.5452	87.9569	86.5981	89.3025	92.1518	95.9163	100.0813	103.6790	(44)
Energy conte	164.6229	144.8267	152.1427	129.8950	123.2375	108.1533	104.7328	110.5751	113.6324	130.1575	142.5841	162.3363	(45)
Energy content (annual)										Total = Sum(45)m =		1586.8963	
Distribution loss (46)m = 0.15 x (45)m	24.6934	21.7240	22.8214	19.4843	18.4856	16.2230	15.7099	16.5863	17.0449	19.5236	21.3876	24.3504	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(64)
									Total per year (kWh/year) = Sum(64)m =			1735.8163	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	64.8555	57.2941	60.7058	52.9821	51.0949	45.7530	44.9421	46.8846	47.5748	53.3958	57.2012	64.0952	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.1310	15.2156	12.3742	9.3680	7.0027	5.9120	6.3881	8.3035	11.1450	14.1511	16.5164	17.6071	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)	87.1714	85.2590	81.5939	73.5863	68.6759	63.5458	60.4060	63.0170	66.0761	71.7685	79.4461	86.1495	(72)
Total internal gains	404.7340	403.1870	390.9330	367.6837	344.9629	324.2258	311.8644	314.1100	325.7579	346.6920	372.1801	394.4904	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W

Southwest			7.4300		46.3896		0.4600		0.7000		0.7700		76.9128 (79)
Solar gains	76.9128	111.8951	152.4928	193.4785	208.3854	224.6334	211.0798	196.4229	175.3780	130.8100	91.2565	62.8726 (83)	
Total gains	481.6468	515.0821	543.4258	561.1623	553.3482	548.8592	522.9442	510.5329	501.1359	477.5020	463.4366	457.3630 (84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)	
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.6955	46.7476	47.2788	48.8733	48.8733	50.4605	50.4605	50.9858	50.4605	47.8105	48.3421	46.7476	
alpha	3.9797	4.1165	4.1519	4.2582	4.2582	4.3640	4.3640	4.3991	4.3640	4.1874	4.2228	4.1165	
util living area	0.9854	0.9798	0.9648	0.9283	0.8454	0.6580	0.4833	0.4897	0.7356	0.9192	0.9719	0.9872 (86)	
MIT	19.5115	19.7063	20.0056	20.3915	20.7202	20.9375	20.9874	20.9872	20.8960	20.5191	20.0581	19.5706 (87)	
Th 2	19.6279	19.6794	19.6921	19.7289	19.7289	19.7636	19.7636	19.7746	19.7636	19.7046	19.7168	19.6794 (88)	
util rest of house	0.9801	0.9727	0.9517	0.9000	0.7798	0.5365	0.3280	0.3340	0.6230	0.8789	0.9599	0.9825 (89)	
MIT 2	17.9846	18.2642	18.6476	19.1439	19.5132	19.7351	19.7612	19.7722	19.7084	19.2834	18.7350	18.0941 (90)	
Living area fraction										fLA = Living area / (4) =		0.4679 (91)	
MIT	18.6990	18.9389	19.2830	19.7277	20.0780	20.2977	20.3349	20.3407	20.2641	19.8616	19.3541	18.7850 (92)	
Temperature adjustment												0.0000	
adjusted MIT	18.6990	18.9389	19.2830	19.7277	20.0780	20.2977	20.3349	20.3407	20.2641	19.8616	19.3541	18.7850 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9752	0.9673	0.9465	0.9000	0.8002	0.5919	0.4015	0.4076	0.6723	0.8848	0.9555	0.9782 (94)	
Useful gains	469.7093	498.2608	514.3266	505.0479	442.7622	324.8921	209.9477	208.1128	336.9245	422.4892	442.8334	447.3931 (95)	
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000 (96)	
Heat loss rate W	1050.9936	1000.3192	895.2494	731.9520	540.4497	342.8358	212.4427	210.6533	368.4810	595.5841	800.3765	1003.7985 (97)	
Space heating kWh	432.4755	337.3833	283.4066	163.3710	72.6795	0.0000	0.0000	0.0000	0.0000	128.7826	257.4311	413.9656 (98a)	
Space heating requirement - total per year (kWh/year)												2089.4951	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)	
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	432.4755	337.3833	283.4066	163.3710	72.6795	0.0000	0.0000	0.0000	0.0000	128.7826	257.4311	413.9656 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												2089.4951	
Space heating per m2										(98c) / (4) =		41.7815 (99)	

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (201)	
Fraction of space heat from main system(s)												1.0000 (202)	
Efficiency of main space heating system 1 (in %)												100.0000 (206)	
Efficiency of main space heating system 2 (in %)												0.0000 (207)	
Efficiency of secondary/supplementary heating system, %												0.0000 (208)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	432.4755	337.3833	283.4066	163.3710	72.6795	0.0000	0.0000	0.0000	0.0000	128.7826	257.4311	413.9656 (98)	
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)	
Space heating fuel (main heating system)	432.4755	337.3833	283.4066	163.3710	72.6795	0.0000	0.0000	0.0000	0.0000	128.7826	257.4311	413.9656 (211)	
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)	
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)	
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)	
Water heating													
Water heating requirement	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843 (64)	
Efficiency of water heater												100.0000 (216)	
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (217)	
Fuel for water heating, kWh/month	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843 (219)	
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)	
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)	
Lighting	14.9947	12.0293	10.8310	7.9353	6.1294	5.0078	5.5915	7.2680	9.4404	12.3864	13.9904	15.4114 (232)	
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-79.9549	-103.0274	-149.4567	-160.5798	-151.6244	-123.5008	-120.5777	-118.3254	-109.3324	-111.1339	-84.8807	-65.7446 (233a)	
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)	
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)	
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)	
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-37.4696	-69.1047	-151.9726	-261.4771	-352.9692	-415.7260	-397.8601	-340.0233	-246.0828	-124.6903	-54.2662	-27.3096 (233b)	
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)	
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)	
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)	
Annual totals kWh/year													
Space heating fuel - main system 1												2089.4951 (211)	
Space heating fuel - main system 2												0.0000 (213)	
Space heating fuel - secondary												0.0000 (215)	
Efficiency of water heater												100.0000	
Water heating fuel used												1735.8163 (219)	
Space cooling fuel												0.0000 (221)	

Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	121.0156	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	89.2367	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2089.4951	27.6700	578.1633	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1735.8163	27.6700	480.3004	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	121.0156	27.6700	33.4850	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1378.1387	27.6700	-381.3310	
PV Unit electricity exported	-2478.9515	5.8100	-144.0271	
Total			-525.3581	(252)
Total energy cost			566.5906	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2089.4951	0.1554	324.6547	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1735.8163	0.1413	245.3267	(264)
Space and water heating			569.9814	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	121.0156	0.1443	17.4663	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1378.1387	0.1370	-188.8040	
PV Unit electricity exported	-2478.9515	0.1225	-303.7278	
Total			-492.5318	(269)
Total CO2, kg/year			94.9159	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2089.4951	1.5752	3291.4582	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1735.8163	1.5226	2642.9826	(278)
Space and water heating			5934.4409	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	121.0156	1.5338	185.6177	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1378.1387	1.5065	-2076.1505	
PV Unit electricity exported	-2478.9515	0.4495	-1114.2608	
Total			-3190.4113	(283)
Total Primary energy kWh/year			2929.6473	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating:	C 76
Current environmental impact rating:	A 97

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating:	C 76
Potential environmental impact rating:	A 97

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1092	£1092	£0
Space heating	£578	£578	£0
Water heating	£480	£480	£0
Lighting	£33	£33	£0
Generated (PV)	-£525	-£525	£0
Total cost of fuels	£567	£567	£0
Total cost of uses	£566	£566	£0
Delivered energy	2 kWh/m²	2 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.1 tonnes	0.1 tonnes	0.0 tonnes
CO2 emissions per m²	2 kg/m²	2 kg/m²	0 kg/m²
Primary energy	59 kWh/m²	59 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b)	x 2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	125.0250	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9900	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0729	1.0518	1.0308	0.9256	0.9046	0.7994	0.7994	0.7783	0.8415	0.9046	0.9466	0.9887	(22b)
Effective ac	1.0729	1.0518	1.0308	0.9284	0.9091	0.8195	0.8195	0.8029	0.8540	0.9091	0.9481	0.9888	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.1800	9.0018	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.2600	2.8782	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.0616			(33)
Main dwelling								
Party Wall to Adj Property			17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat			36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1			50.0100			20.0000	1000.2000	(32b)
Internal Wall			91.7000			9.0000	825.3000	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		12715.8900	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							254.2669	(35)
Thermal bridges (Default value 0.200 * total exposed area)							13.7020	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		34.7636	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	43.3964	42.5285	38.3030	37.5088	33.8115	33.8115	33.1268	35.2357	37.5088	39.1155	40.7953	(38)
Heat transfer coeff	79.0279	78.1600	77.2920	73.0666	72.2724	68.5751	68.5751	67.8904	69.9992	72.2724	73.8791	75.5588	(39)
Average = Sum(39)m / 12 =												73.0474	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5802	1.5629	1.5455	1.4610	1.4452	1.3712	1.3712	1.3575	1.3997	1.4452	1.4773	1.5109	(40)
HLP (average)												1.4607	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.6904	(42)
Hot water usage for mixer showers													
	49.2767	48.5362	47.4571	45.3924	43.8688	42.1696	41.2038	42.2747	43.4486	45.2731	47.3821	49.0879	(42a)
Hot water usage for baths													
	22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497	(42b)
Hot water usage for other uses													
	31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413	(42c)
Average daily hot water use (litres/day)												95.5402	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	103.9446	101.7051	98.9892	94.8866	91.5452	87.9569	86.5981	89.3025	92.1518	95.9163	100.0813	103.6790	(44)
Energy conte	164.6229	144.8267	152.1427	129.8950	123.2375	108.1533	104.7328	110.5751	113.6324	130.1575	142.5841	162.3363	(45)
Energy content (annual)										Total = Sum(45)m =		1586.8963	
Distribution loss (46)m = 0.15 x (45)m													
	24.6934	21.7240	22.8214	19.4843	18.4856	16.2230	15.7099	16.5863	17.0449	19.5236	21.3876	24.3504	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(64)
										Total per year (kWh/year) = Sum(64)m =		1735.8163	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	64.8555	57.2941	60.7058	52.9821	51.0949	45.7530	44.9421	46.8846	47.5748	53.3958	57.2012	64.0952	(65)

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5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.1310	15.2156	12.3742	9.3680	7.0027	5.9120	6.3881	8.3035	11.1450	14.1511	16.5164	17.6071	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)													
	87.1714	85.2590	81.5939	73.5863	68.6759	63.5458	60.4060	63.0170	66.0761	71.7685	79.4461	86.1495	(72)
Total internal gains													
	404.7340	403.1870	390.9330	367.6837	344.9629	324.2258	311.8644	314.1100	325.7579	346.6920	372.1801	394.4904	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	36.7938	0.4600	0.7000	0.7700	61.0032	(79)

Solar gains	61.0032	103.9111	142.1757	176.1626	197.3168	195.8899	188.8587	173.0768	153.9462	114.8439	73.0678	52.2061	(83)
Total gains	465.7372	507.0981	533.1087	543.8463	542.2796	520.1156	500.7231	487.1867	479.7041	461.5359	445.2479	446.6965	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.6955	45.1918	45.6993	48.3421	48.8733	51.5084	51.5084	52.0279	50.4605	48.8733	47.8105	46.7476	
alpha	3.9797	4.0128	4.0466	4.2228	4.2582	4.4339	4.4339	4.4685	4.3640	4.2582	4.1874	4.1165	
util living area													
	0.9897	0.9843	0.9734	0.9463	0.8855	0.7408	0.5755	0.6064	0.8163	0.9476	0.9827	0.9912	(86)
MIT	19.3140	19.5051	19.8117	20.2600	20.6145	20.8910	20.9724	20.9656	20.8150	20.3688	19.8227	19.3582	(87)
Th 2	19.6279	19.6407	19.6535	19.7168	19.7289	19.7855	19.7855	19.7960	19.7636	19.7289	19.7046	19.6794	(88)
util rest of house													
	0.9862	0.9789	0.9637	0.9250	0.8362	0.6378	0.4300	0.4643	0.7289	0.9226	0.9757	0.9882	(89)
MIT 2	17.7334	17.9840	18.3793	18.9785	19.4020	19.7232	19.7772	19.7846	19.6421	19.1259	18.4313	17.8235	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.4729	18.6957	19.0495	19.5781	19.9694	20.2696	20.3365	20.3372	20.1909	19.7074	19.0823	18.5416	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4729	18.6957	19.0495	19.5781	19.9694	20.2696	20.3365	20.3372	20.1909	19.7074	19.0823	18.5416	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9820	0.9737	0.9580	0.9222	0.8470	0.6821	0.4986	0.5311	0.7627	0.9220	0.9712	0.9845	(94)
Useful gains	457.3511	493.7811	510.7103	501.5302	459.3055	354.7835	249.6418	258.7261	365.8792	425.5523	432.4337	439.7846	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1120.0585	1078.2729	969.9782	780.2114	597.6471	388.7950	256.2294	267.3002	426.3587	658.2164	885.2429	1083.6310	(97)
Space heating kWh	493.0543	392.7785	341.6953	200.6504	102.9261	0.0000	0.0000	0.0000	0.0000	173.1021	326.0226	479.0218	(98a)
Space heating requirement - total per year (kWh/year)												2509.2511	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	493.0543	392.7785	341.6953	200.6504	102.9261	0.0000	0.0000	0.0000	0.0000	173.1021	326.0226	479.0218	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2509.2511	
Space heating per m2											(98c) / (4) =	50.1750	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	493.0543	392.7785	341.6953	200.6504	102.9261	0.0000	0.0000	0.0000	0.0000	173.1021	326.0226	479.0218	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	493.0543	392.7785	341.6953	200.6504	102.9261	0.0000	0.0000	0.0000	0.0000	173.1021	326.0226	479.0218	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	14.9947	12.0293	10.8310	7.9353	6.1294	5.0078	5.5915	7.2680	9.4404	12.3864	13.9904	15.4114	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-65.0958	-96.7541	-143.8125	-156.1455	-154.1988	-118.4841	-116.3989	-112.5859	-102.1271	-103.4768	-71.4039	-55.4217	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-24.8304	-57.4066	-127.8563	-218.2813	-315.2129	-345.2932	-340.3291	-282.3122	-200.2441	-96.2481	-36.1124	-19.2338	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2509.2511	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1735.8163	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	121.0156	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	1006.8174	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2509.2511	16.4900	413.7755	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1735.8163	16.4900	286.2361	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	121.0156	16.4900	19.9555	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1295.9052	16.4900	-213.6948	

PV Unit electricity exported	-2063.3603	5.5900	-115.3418
Total			-329.0366 (252)
Total energy cost			390.9305 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.4813 (257)
SAP value		75.9887
SAP rating (Section 12)		76 (258)
SAP band		C

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2509.2511	0.1549	388.6229	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1735.8163	0.1413	245.3267	(264)
Space and water heating			633.9496	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	121.0156	0.1443	17.4663	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1295.9052	0.1365	-176.8737	
PV Unit electricity exported	-2063.3603	0.1219	-251.5759	
Total			-428.4496	(269)
Total CO2, kg/year			222.9663	(272)
CO2 emissions per m2			4.4600	(273)
EI value			96.8553	
EI rating			97	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	50.0100	(1b) x	2.5000	(2b) =	125.0250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		125.0250	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2400	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9900	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8415	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0729	0.9887	0.9677	0.9046	0.9046	0.8415	0.8415	0.8204	0.8415	0.9466	0.9256	0.9887	(22b)
Effective ac	1.0729	0.9888	0.9682	0.9091	0.9091	0.8540	0.8540	0.8365	0.8540	0.9481	0.9284	0.9888	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.4300	1.2357	9.1816			(27)
Heatloss Floor 1			50.0100	0.1800	9.0018	20.0000	1000.2000	(28a)
External Wall 1	18.5000	7.4300	11.0700	0.2600	2.8782	17.0000	188.1900	(29a)
Total net area of external elements Aum(A, m2)			68.5100					(31)

Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	21.0616		(33)
Main dwelling						
Party Wall to Adj Property	17.7000	0.0000	0.0000	180.0000	3186.0000	(32)
Party Wall to Adj Flat	36.2000	0.0000	0.0000	180.0000	6516.0000	(32)
Party Ceiling 1	50.0100			20.0000	1000.2000	(32b)
Internal Wall	91.7000			9.0000	825.3000	(32c)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =		12715.8900	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K					254.2669	(35)
Thermal bridges (Default value 0.200 * total exposed area)					13.7020	(36)
Point Thermal bridges				(36a) =	0.0000	
Total fabric heat loss			(33) + (36) + (36a) =		34.7636	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.2643	40.7953	39.9463	37.5088	37.5088	35.2357	35.2357	34.5145	35.2357	39.1155	38.3030	40.7953	(38)
Heat transfer coeff	79.0279	75.5588	74.7098	72.2724	72.2724	69.9992	69.9992	69.2780	69.9992	73.8791	73.0666	75.5588	(39)
Average = Sum(39)m / 12 =												72.9684	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5802	1.5109	1.4939	1.4452	1.4452	1.3997	1.3997	1.3853	1.3997	1.4773	1.4610	1.5109	(40)
HLP (average)												1.4591	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy											1.6904	(42)
Hot water usage for mixer showers	49.2767	48.5362	47.4571	45.3924	43.8688	42.1696	41.2038	42.2747	43.4486	45.2731	47.3821	49.0879	(42a)
Hot water usage for baths	22.7265	22.3890	21.9137	21.0374	20.3811	19.6535	19.2605	19.7324	20.2463	21.0249	21.9194	22.6497	(42b)
Hot water usage for other uses	31.9413	30.7798	29.6183	28.4568	27.2953	26.1338	26.1338	27.2953	28.4568	29.6183	30.7798	31.9413	(42c)
Average daily hot water use (litres/day)												95.5402	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	103.9446	101.7051	98.9892	94.8866	91.5452	87.9569	86.5981	89.3025	92.1518	95.9163	100.0813	103.6790	(44)
Energy conte	164.6229	144.8267	152.1427	129.8950	123.2375	108.1533	104.7328	110.5751	113.6324	130.1575	142.5841	162.3363	(45)
Energy content (annual)										Total = Sum(45)m =		1586.8963	
Distribution loss (46)m = 0.15 x (45)m	24.6934	21.7240	22.8214	19.4843	18.4856	16.2230	15.7099	16.5863	17.0449	19.5236	21.3876	24.3504	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(64)
										Total per year (kWh/year) = Sum(64)m =		1735.8163	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	64.8555	57.2941	60.7058	52.9821	51.0949	45.7530	44.9421	46.8846	47.5748	53.3958	57.2012	64.0952	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	101.4237	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.1310	15.2156	12.3742	9.3680	7.0027	5.9120	6.3881	8.3035	11.1450	14.1511	16.5164	17.6071	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	219.7909	222.0717	216.3243	204.0887	188.6436	174.1273	164.4296	162.1488	167.8962	180.1317	195.5769	210.0932	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	46.8328	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	-67.6158	(71)
Water heating gains (Table 5)	87.1714	85.2590	81.5939	73.5863	68.6759	63.5458	60.4060	63.0170	66.0761	71.7685	79.4461	86.1495	(72)
Total internal gains	404.7340	403.1870	390.9330	367.6837	344.9629	324.2258	311.8644	314.1100	325.7579	346.6920	372.1801	394.4904	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	7.4300	46.3896	0.4600	0.7000	0.7700	76.9128	(79)

Solar gains	76.9128	111.8951	152.4928	193.4785	208.3854	224.6334	211.0798	196.4229	175.3780	130.8100	91.2565	62.8726	(83)
Total gains	481.6468	515.0821	543.4258	561.1623	553.3482	548.8592	522.9442	510.5329	501.1359	477.5020	463.4366	457.3630	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.6955	46.7476	47.2788	48.8733	48.8733	50.4605	50.4605	50.9858	50.4605	47.8105	48.3421	46.7476	
alpha	3.9797	4.1165	4.1519	4.2582	4.2582	4.3640	4.3640	4.3991	4.3640	4.1874	4.2228	4.1165	
util living area													
	0.9854	0.9798	0.9648	0.9283	0.8454	0.6580	0.4833	0.4897	0.7356	0.9192	0.9719	0.9872	(86)
MIT	19.5115	19.7063	20.0056	20.3915	20.7202	20.9375	20.9874	20.9872	20.8960	20.5191	20.0581	19.5706	(87)
Th 2	19.6279	19.6794	19.6921	19.7289	19.7289	19.7636	19.7636	19.7746	19.7636	19.7046	19.7168	19.6794	(88)
util rest of house													
	0.9801	0.9727	0.9517	0.9000	0.7798	0.5365	0.3280	0.3340	0.6230	0.8789	0.9599	0.9825	(89)
MIT 2	17.9846	18.2642	18.6476	19.1439	19.5132	19.7351	19.7612	19.7722	19.7084	19.2834	18.7350	18.0941	(90)
Living area fraction										fLA = Living area / (4) =		0.4679	(91)
MIT	18.6990	18.9389	19.2830	19.7277	20.0780	20.2977	20.3349	20.3407	20.2641	19.8616	19.3541	18.7850	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6990	18.9389	19.2830	19.7277	20.0780	20.2977	20.3349	20.3407	20.2641	19.8616	19.3541	18.7850	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9752	0.9673	0.9465	0.9000	0.8002	0.5919	0.4015	0.4076	0.6723	0.8848	0.9555	0.9782	(94)
Useful gains	469.7093	498.2608	514.3266	505.0479	442.7622	324.8921	209.9477	208.1128	336.9245	422.4892	442.8334	447.3931	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1050.9936	1000.3192	895.2494	731.9520	540.4497	342.8358	212.4427	210.6533	368.4810	595.5841	800.3765	1003.7985	(97)
Space heating kWh													
	432.4755	337.3833	283.4066	163.3710	72.6795	0.0000	0.0000	0.0000	0.0000	128.7826	257.4311	413.9656	(98a)
Space heating requirement - total per year (kWh/year)												2089.4951	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	432.4755	337.3833	283.4066	163.3710	72.6795	0.0000	0.0000	0.0000	0.0000	128.7826	257.4311	413.9656	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2089.4951	
Space heating per m2											(98c) / (4) =	41.7815	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	432.4755	337.3833	283.4066	163.3710	72.6795	0.0000	0.0000	0.0000	0.0000	128.7826	257.4311	413.9656	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	432.4755	337.3833	283.4066	163.3710	72.6795	0.0000	0.0000	0.0000	0.0000	128.7826	257.4311	413.9656	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	177.2709	156.2507	164.7907	142.1350	135.8855	120.3933	117.3808	123.2231	125.8724	142.8055	154.8241	174.9843	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	14.9947	12.0293	10.8310	7.9353	6.1294	5.0078	5.5915	7.2680	9.4404	12.3864	13.9904	15.4114	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-79.9549	-103.0274	-149.4567	-160.5798	-151.6244	-123.5008	-120.5777	-118.3254	-109.3324	-111.1339	-84.8807	-65.7446	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-37.4696	-69.1047	-151.9726	-261.4771	-352.9692	-415.7260	-397.8601	-340.0233	-246.0828	-124.6903	-54.2662	-27.3096	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2089.4951	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1735.8163	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												121.0156	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3857.0902	(233)
Wind generation												0.0000	(234)

Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	89.2367	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2089.4951	27.6700	578.1633	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1735.8163	27.6700	480.3004	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	121.0156	27.6700	33.4850	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1378.1387	27.6700	-381.3310	
PV Unit electricity exported	-2478.9515	5.8100	-144.0271	
Total			-525.3581	(252)
Total energy cost			566.5906	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2089.4951	0.1554	324.6547	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1735.8163	0.1413	245.3267	(264)
Space and water heating			569.9814	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	121.0156	0.1443	17.4663	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1378.1387	0.1370	-188.8040	
PV Unit electricity exported	-2478.9515	0.1225	-303.7278	
Total			-492.5318	(269)
Total CO2, kg/year			94.9159	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2089.4951	1.5752	3291.4582	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1735.8163	1.5226	2642.9826	(278)
Space and water heating			5934.4409	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	121.0156	1.5338	185.6177	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1378.1387	1.5065	-2076.1505	
PV Unit electricity exported	-2478.9515	0.4495	-1114.2608	
Total			-3190.4113	(283)
Total Primary energy kWh/year			2929.6473	(286)

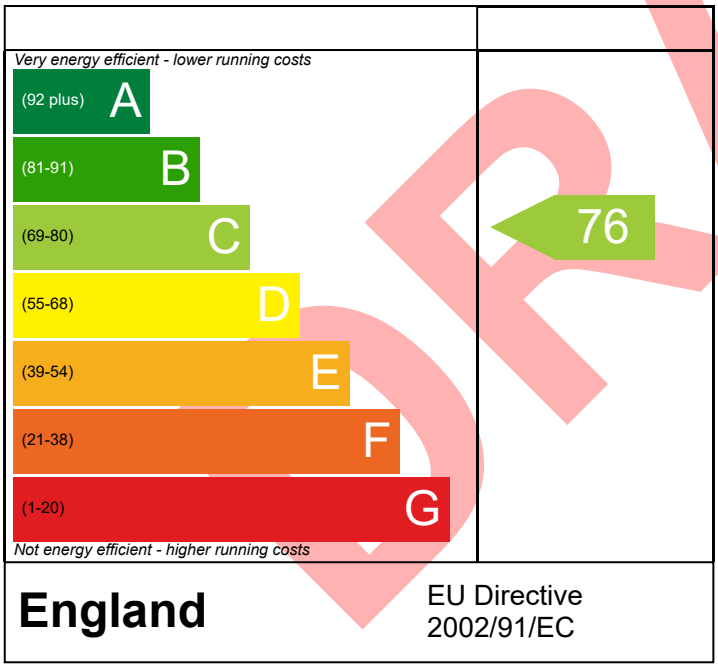
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	50.01 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

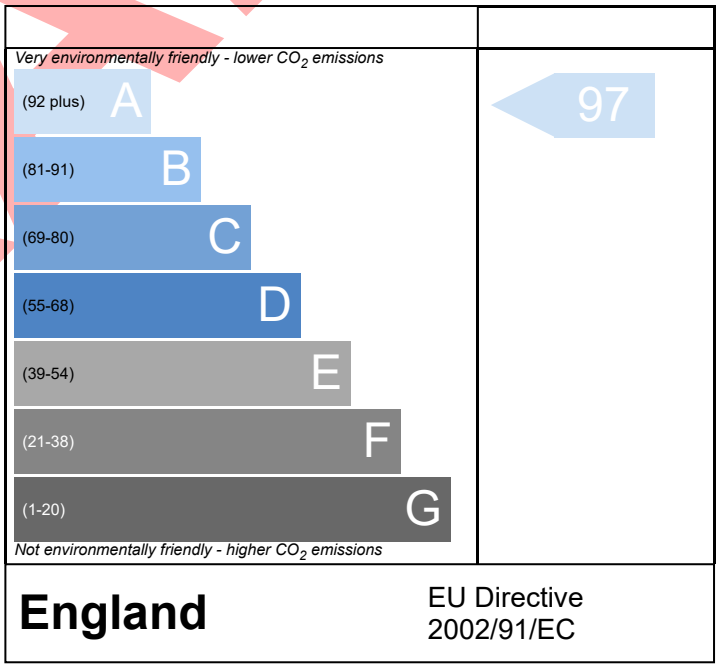
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

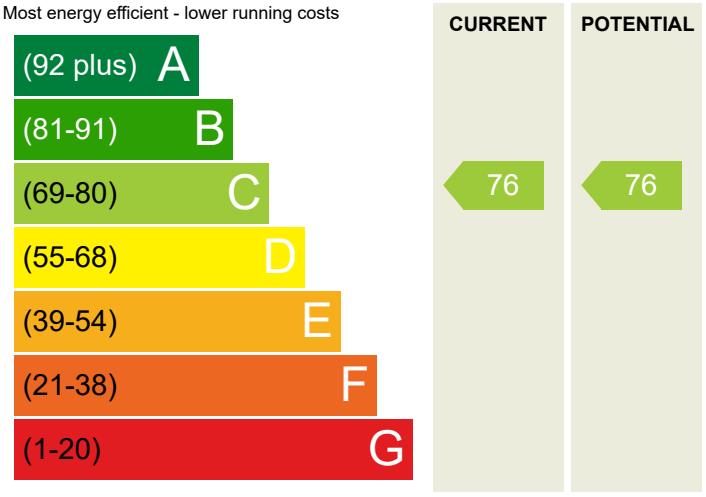
Energy Report

Dwelling Address	
Reference	Flat 1-Be Green
SAP Version	10.2
Assessment Date	11/05/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	50

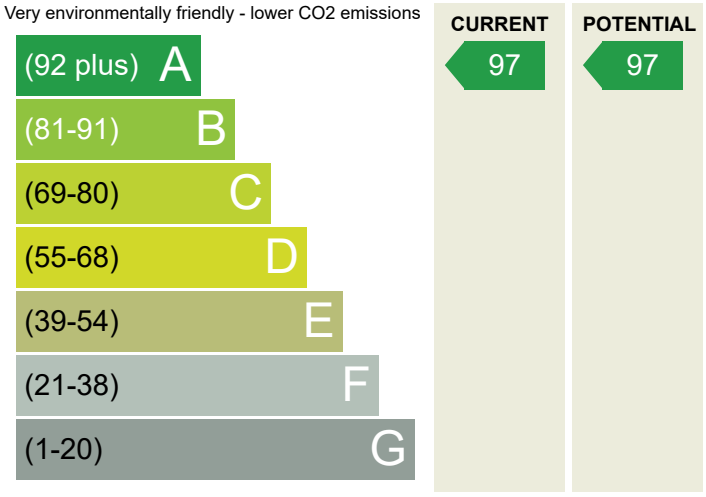
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

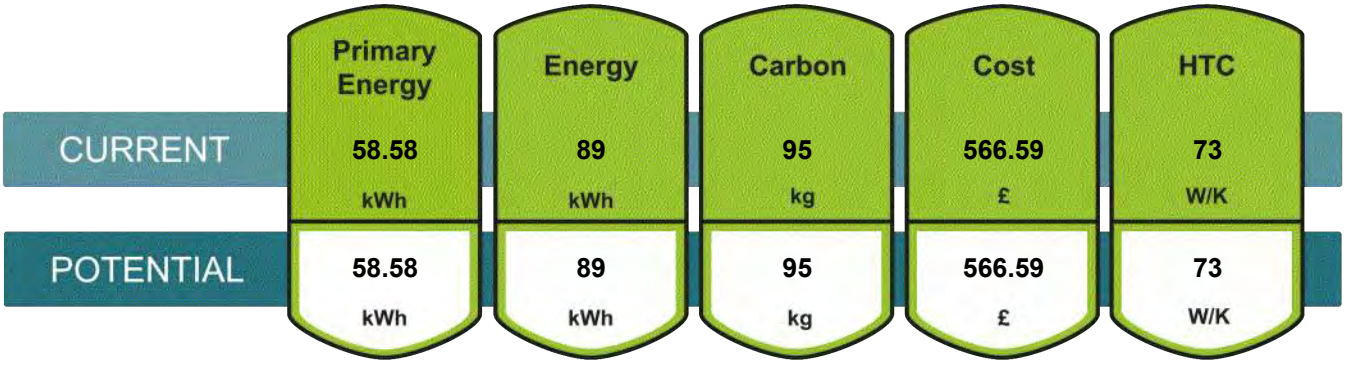


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£33	£33	You could save £0
Heating	£578	£578	
Hot Water	£480	£480	
New Technologies e.g. Impact of PV	-(£525)	-(£525)	
TOTAL	£567	£567	

Estimated energy use and potential savings

Space Heating
2089
kWh per year

Water Heating
1736
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 2	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	69 C	DER	6.79	TER	
Environmental	95 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.23	DFEE	65.40	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	95.86	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	299.39	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	17.16 m	58.22 m²	2.50 m

8.0 Living Area	29.09	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	42.90	34.90	0.00	None	8.00	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	42.88	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	83.56

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Timber I-joists, carpeted	20.00	58.22

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	58.22

12.0 Opening Types

Summary for Input Data

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	5.81	
SE Windows	Windows	External Wall 1	South East	2.19	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	

Summary for Input Data

elmhurst energy

Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower Over bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day

32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	No	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.08	South West	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 2	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	69 C	DER	6.79	TER	
Environmental	95 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.23	DFEE	65.40	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	95.86	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	145.5500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9617	0.9429	0.9240	0.8297	0.8109	0.7166	0.7166	0.6977	0.7543	0.8109	0.8486	0.8863	(22b)
Effective ac	0.9625	0.9445	0.9269	0.8442	0.8288	0.7567	0.7567	0.7434	0.7845	0.8288	0.8600	0.8928	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.1800	10.4796	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.2600	9.0740	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		29.4395			(33)
Main dwelling								
Party Wall 1			42.8800	0.0000	0.0000	180.0000	7718.4000	(32)
Party Ceiling 1			58.2200			20.0000	1164.4000	(32b)
Internal Wall 1			83.5600			9.0000	752.0400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	17430.2400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		299.3858 (35)
Thermal bridges (Default value 0.200 * total exposed area)		20.2240 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	49.6635 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	45.3660	44.5205	40.5494	39.8064	36.3476	36.3476	35.7071	37.6799	39.8064	41.3094	42.8808	(38)
Heat transfer coeff													

	95.8921	95.0295	94.1840	90.2129	89.4699	86.0112	86.0112	85.3707	87.3434	89.4699	90.9730	92.5443 (39)
Average = Sum(39)m / 12 =												90.2093

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6471	1.6322	1.6177	1.5495	1.5368	1.4773	1.4773	1.4663	1.5002	1.5368	1.5626	1.5896	(40)
HLP (average)												1.5495	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309 (42)
Hot water usage for mixer showers												
	53.0570	52.2597	51.0978	48.8747	47.2342	45.4046	44.3647	45.5178	46.7818	48.7462	51.0170	52.8537 (42a)
Hot water usage for baths												
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)
Hot water usage for other uses												
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)
Average daily hot water use (litres/day)												102.8721 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	111.9218	109.5101	106.5856	102.1682	98.5703	94.7066	93.2436	96.1558	99.2239	103.2774	107.7619	111.6358	(44)
Energy conte	177.2567	155.9409	163.8181	139.8632	132.6946	116.4528	112.7701	119.0609	122.3530	140.1464	153.5266	174.7947	(45)
Energy content (annual)										Total = Sum(45)m =		1708.6781	
Distribution loss (46)m = 0.15 x (45)m													
	26.5885	23.3911	24.5727	20.9795	19.9042	17.4679	16.9155	17.8591	18.3530	21.0220	23.0290	26.2192	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
										Total per year (kWh/year) = Sum(64)m =		1857.5981	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	69.0563	60.9896	64.5879	56.2965	54.2394	48.5125	47.6145	49.7062	50.4744	56.7171	60.8396	68.2376	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.9269	17.6989	14.3937	10.8970	8.1456	6.8769	7.4307	9.6587	12.9639	16.4607	19.2120	20.4808	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	92.8176	90.7583	86.8117	78.1896	72.9024	67.3785	63.9979	66.8094	70.1033	76.2326	84.4994	91.7172	(72)
Total internal gains													
	451.2761	449.5975	435.7719	409.6580	383.9531	360.5568	346.6377	349.0684	362.2415	385.8626	414.5470	439.6373	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	5.8100	36.7938	0.4600	0.7000	0.7700	47.7024	(79)

Solar gains	65.6832	111.8827	153.0828	189.6771	212.4541	210.9178	203.3472	186.3545	165.7563	123.6543	78.6733	56.2111 (83)
Total gains	516.9593	561.4803	588.8547	599.3350	596.4073	571.4746	549.9849	535.4229	527.9978	509.5169	493.2203	495.8484 (84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	50.4915	50.9498	51.4072	53.6701	54.1158	56.2919	56.2919	56.7143	55.4333	54.1158	53.2217	52.3180
alpha	4.3661	4.3967	4.4271	4.5780	4.6077	4.7528	4.7528	4.7810	4.6956	4.6077	4.5481	4.4879
util living area												
	0.9951	0.9923	0.9861	0.9700	0.9278	0.8104	0.6470	0.6802	0.8742	0.9708	0.9915	0.9960 (86)
MIT	19.3947	19.5601	19.8357	20.2355	20.5816	20.8677	20.9658	20.9567	20.7871	20.3458	19.8404	19.4199 (87)
Th 2	19.5790	19.5898	19.6004	19.6506	19.6600	19.7045	19.7045	19.7128	19.6873	19.6600	19.6409	19.6210 (88)
util rest of house												
	0.9931	0.9890	0.9799	0.9547	0.8861	0.7031	0.4773	0.5161	0.7905	0.9528	0.9874	0.9943 (89)

MIT 2	17.7754	17.9932	18.3502	18.8861	19.3062	19.6322	19.6958	19.7002	19.5505	19.0338	18.3862	17.8358	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	18.5845	18.7761	19.0924	19.5603	19.9435	20.2495	20.3303	20.3280	20.1684	19.6893	19.1128	18.6273	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5845	18.7761	19.0924	19.5603	19.9435	20.2495	20.3303	20.3280	20.1684	19.6893	19.1128	18.6273	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9911	0.9864	0.9768	0.9534	0.8967	0.7532	0.5637	0.5995	0.8260	0.9533	0.9851	0.9926	(94)
Useful gains	512.3641	553.8505	575.1890	571.4212	534.7928	430.4383	310.0446	321.0011	436.1288	485.7171	485.8716	492.1754	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1369.7665	1318.6390	1186.0054	961.7010	737.5414	485.9198	320.8509	335.3399	530.0309	813.2195	1092.8388	1335.1632	(97)
Space heating kWh	637.9074	513.9379	454.4474	281.0014	150.8449	0.0000	0.0000	0.0000	0.0000	243.6617	437.0164	627.1829	(98a)
Space heating requirement - total per year (kWh/year)												3346.0001	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	637.9074	513.9379	454.4474	281.0014	150.8449	0.0000	0.0000	0.0000	0.0000	243.6617	437.0164	627.1829	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3346.0001	
Space heating per m2											(98c) / (4) =	57.4717	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	637.9074	513.9379	454.4474	281.0014	150.8449	0.0000	0.0000	0.0000	0.0000	243.6617	437.0164	627.1829	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	637.9074	513.9379	454.4474	281.0014	150.8449	0.0000	0.0000	0.0000	0.0000	243.6617	437.0164	627.1829	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4419	13.9926	12.5988	9.2304	7.1298	5.8251	6.5041	8.4542	10.9812	14.4079	16.2737	17.9267	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-67.1012	-101.1298	-152.7810	-169.9648	-170.0537	-126.7397	-124.5044	-119.7313	-107.7354	-110.1061	-74.3164	-57.0483	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-22.8250	-53.0308	-118.8877	-204.4621	-299.3580	-337.0376	-332.2236	-275.1668	-194.6357	-89.6188	-33.1998	-17.6072	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3346.0001	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1857.5981	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	140.7664	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	1985.0992	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3346.0001	16.4900	551.7554	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	1857.5981	16.4900	306.3179	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	140.7664	16.4900	23.2124	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1381.2122	16.4900	-227.7619	
PV Unit electricity exported	-1978.0533	5.5900	-110.5732	
Total			-338.3351	(252)
Total energy cost			542.9507	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.8936	(257)
SAP value		69.3040	
SAP rating (Section 12)		69	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3346.0001	0.1546	517.1925	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1857.5981	0.1413	262.5684	(264)
Space and water heating			779.7608	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	140.7664	0.1443	20.3169	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1381.2122	0.1363	-188.3233	
PV Unit electricity exported	-1978.0533	0.1213	-239.9926	
Total			-428.3159	(269)
Total CO2, kg/year			371.7619	(272)
CO2 emissions per m2			6.3900	(273)
EI value			95.1738	
EI rating			95	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200 (1b)	x	2.5000 (2b)	=	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	145.5500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9617	0.8863	0.8674	0.8109	0.8109	0.7543	0.7543	0.7354	0.7543	0.8486	0.8297	0.8863	(22b)
Effective ac	0.9625	0.8928	0.8762	0.8288	0.8288	0.7845	0.7845	0.7704	0.7845	0.8600	0.8442	0.8928	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.1800	10.4796	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.2600	9.0740	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	29.4395			(33)
Main dwelling								
Party Wall 1			42.8800	0.0000	0.0000	180.0000	7718.4000	(32)
Party Ceiling 1			58.2200			20.0000	1164.4000	(32b)
Internal Wall 1			83.5600			9.0000	752.0400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	17430.2400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		299.3858 (35)
Thermal bridges (Default value 0.200 * total exposed area)		20.2240 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	49.6635 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	42.8808	42.0866	39.8064	39.8064	37.6799	37.6799	37.0052	37.6799	41.3094	40.5494	42.8808	(38)
Heat transfer coeff	95.8921	92.5443	91.7501	89.4699	89.4699	87.3434	87.3434	86.6688	87.3434	90.9730	90.2129	92.5443	(39)
Average = Sum(39)m / 12 =												90.1296	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6471	1.5896	1.5759	1.5368	1.5368	1.5002	1.5002	1.4886	1.5002	1.5626	1.5495	1.5896	(40)
HLP (average)												1.5481	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309 (42)
Hot water usage for mixer showers	53.0570	52.2597	51.0978	48.8747	47.2342	45.4046	44.3647	45.5178	46.7818	48.7462	51.0170	52.8537 (42a)
Hot water usage for baths	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)
Hot water usage for other uses	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)
Average daily hot water use (litres/day)												102.8721 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	111.9218	109.5101	106.5856	102.1682	98.5703	94.7066	93.2436	96.1558	99.2239	103.2774	107.7619	111.6358	(44)
Energy conte	177.2567	155.9409	163.8181	139.8632	132.6946	116.4528	112.7701	119.0609	122.3530	140.1464	153.5266	174.7947	(45)
Energy content (annual)										Total = Sum(45)m =		1708.6781	
Distribution loss (46)m = 0.15 x (45)m	26.5885	23.3911	24.5727	20.9795	19.9042	17.4679	16.9155	17.8591	18.3530	21.0220	23.0290	26.2192	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
										Total per year (kWh/year) = Sum(64)m =		1857.5981	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	69.0563	60.9896	64.5879	56.2965	54.2394	48.5125	47.6145	49.7062	50.4744	56.7171	60.8396	68.2376	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.9269	17.6989	14.3937	10.8970	8.1456	6.8769	7.4307	9.6587	12.9639	16.4607	19.2120	20.4808	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	92.8176	90.7583	86.8117	78.1896	72.9024	67.3785	63.9979	66.8094	70.1033	76.2326	84.4994	91.7172	(72)
Total internal gains	451.2761	449.5975	435.7719	409.6580	383.9531	360.5568	346.6377	349.0684	362.2415	385.8626	414.5470	439.6373	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W

Southeast				2.1900		46.3896		0.4600		0.7000		0.7700	22.6701 (77)
Southwest				5.8100		46.3896		0.4600		0.7000		0.7700	60.1431 (79)
Solar gains	82.8132	120.4793	164.1915	208.3215	224.3718	241.8664	227.2731	211.4917	188.8323	140.8452	98.2573	67.6960 (83)	
Total gains	534.0893	570.0768	599.9633	617.9794	608.3250	602.4232	573.9107	560.5601	551.0737	526.7078	512.8043	507.3332 (84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	50.4915	52.3180	52.7709	54.1158	54.1158	55.4333	55.4333	55.8648	55.4333	53.2217	53.6701	52.3180	
alpha	4.3661	4.4879	4.5181	4.6077	4.6077	4.6956	4.6956	4.7243	4.6956	4.5481	4.5780	4.4879	
util living area	0.9928	0.9899	0.9812	0.9583	0.8964	0.7293	0.5459	0.5538	0.8031	0.9512	0.9855	0.9939	(86)
MIT	19.5738	19.7316	20.0026	20.3579	20.6904	20.9249	20.9851	20.9845	20.8770	20.4976	20.0541	19.6146	(87)
Th 2	19.5790	19.6210	19.6310	19.6600	19.6600	19.6873	19.6873	19.6960	19.6873	19.6409	19.6506	19.6210	(88)
util rest of house	0.9897	0.9855	0.9724	0.9369	0.8368	0.5946	0.3613	0.3683	0.6849	0.9191	0.9778	0.9912	(89)
MIT 2	18.0040	18.2325	18.5817	19.0416	19.4238	19.6558	19.6851	19.6937	19.6254	19.2011	18.6633	18.0845	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	18.7884	18.9815	19.2917	19.6993	20.0567	20.2899	20.3346	20.3387	20.2508	19.8489	19.3582	18.8490	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7884	18.9815	19.2917	19.6993	20.0567	20.2899	20.3346	20.3387	20.2508	19.8489	19.3582	18.8490	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9872	0.9827	0.9696	0.9377	0.8574	0.6612	0.4552	0.4627	0.7414	0.9253	0.9755	0.9891	(94)
Useful gains	527.2513	560.2079	581.7020	579.4814	521.5670	398.3199	261.2166	259.3694	408.5418	487.3384	500.2540	501.7823	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1283.8377	1229.1297	1100.2372	903.5852	667.1499	427.1001	265.0556	263.3581	458.6215	732.2322	988.5729	1235.3742	(97)
Space heating kWh	562.9003	449.5155	385.7902	233.3547	108.3137	0.0000	0.0000	0.0000	0.0000	182.2010	351.5896	545.7924	(98a)
Space heating requirement - total per year (kWh/year)												2819.4574	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	562.9003	449.5155	385.7902	233.3547	108.3137	0.0000	0.0000	0.0000	0.0000	182.2010	351.5896	545.7924	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2819.4574	
Space heating per m2											(98c) / (4) =	48.4276	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement	562.9003	449.5155	385.7902	233.3547	108.3137	0.0000	0.0000	0.0000	0.0000	182.2010	351.5896	545.7924	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	562.9003	449.5155	385.7902	233.3547	108.3137	0.0000	0.0000	0.0000	0.0000	182.2010	351.5896	545.7924	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4419	13.9926	12.5988	9.2304	7.1298	5.8251	6.5041	8.4542	10.9812	14.4079	16.2737	17.9267	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-82.8698	-108.2650	-159.9175	-176.0639	-167.1768	-132.8203	-129.5564	-126.4491	-115.8685	-118.7084	-89.0352	-67.9778	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-34.5546	-63.8671	-141.5119	-245.9929	-337.4167	-406.4065	-388.8815	-331.8996	-239.5466	-117.1159	-50.1117	-25.0764	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2819.4574	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1857.5981	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	140.7664	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	960.7317	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2819.4574	27.6700	780.1439	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	27.6700	513.9974	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	140.7664	27.6700	38.9501	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1474.7087	27.6700	-408.0519	
PV Unit electricity exported	-2382.3815	5.8100	-138.4164	
Total			-546.4683	(252)
Total energy cost			786.6230	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2819.4574	0.1551	437.2018	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1857.5981	0.1413	262.5684	(264)
Space and water heating			699.7702	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	140.7664	0.1443	20.3169	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1474.7087	0.1369	-201.8285	
PV Unit electricity exported	-2382.3815	0.1219	-290.4796	
Total			-492.3081	(269)
Total CO2, kg/year			227.7790	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2819.4574	1.5741	4438.1165	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	1.5227	2828.5219	(278)
Space and water heating			7266.6384	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	140.7664	1.5338	215.9122	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1474.7087	1.5060	-2220.8691	
PV Unit electricity exported	-2382.3815	0.4473	-1065.5229	
Total			-3286.3920	(283)
Total Primary energy kWh/year			4196.1587	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating:	C 69
Current environmental impact rating:	A 95

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating:	C 69
Potential environmental impact rating:	A 95

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1333	£1333	£0
Space heating	£780	£780	£0
Water heating	£514	£514	£0
Lighting	£39	£39	£0
Generated (PV)	-£546	-£546	£0
Total cost of fuels	£787	£787	£0
Total cost of uses	£787	£787	£0
Delivered energy	17 kWh/m²	17 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.2 tonnes	0.2 tonnes	0.0 tonnes
CO2 emissions per m²	4 kg/m²	4 kg/m²	0 kg/m²
Primary energy	72 kWh/m²	72 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	145.5500	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9617	0.9429	0.9240	0.8297	0.8109	0.7166	0.7166	0.6977	0.7543	0.8109	0.8486	0.8863	(22b)
Effective ac	0.9625	0.9445	0.9269	0.8442	0.8288	0.7567	0.7567	0.7434	0.7845	0.8288	0.8600	0.8928	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.1800	10.4796	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.2600	9.0740	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	29.4395			(33)
Main dwelling								
Party Wall 1			42.8800	0.0000	0.0000	180.0000	7718.4000	(32)
Party Ceiling 1			58.2200			20.0000	1164.4000	(32b)
Internal Wall 1			83.5600			9.0000	752.0400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		17430.2400	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							299.3858	(35)
Thermal bridges (Default value 0.200 * total exposed area)							20.2240	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		49.6635	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	45.3660	44.5205	40.5494	39.8064	36.3476	36.3476	35.7071	37.6799	39.8064	41.3094	42.8808	(38)
Heat transfer coeff	95.8921	95.0295	94.1840	90.2129	89.4699	86.0112	86.0112	85.3707	87.3434	89.4699	90.9730	92.5443	(39)
Average = Sum(39)m / 12 =												90.2093	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6471	1.6322	1.6177	1.5495	1.5368	1.4773	1.4773	1.4663	1.5002	1.5368	1.5626	1.5896	(40)
HLP (average)												1.5495	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9309 (42)

Hot water usage for mixer showers

	53.0570	52.2597	51.0978	48.8747	47.2342	45.4046	44.3647	45.5178	46.7818	48.7462	51.0170	52.8537 (42a)

Hot water usage for baths

	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)

Hot water usage for other uses

	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)

Average daily hot water use (litres/day) 102.8721 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	111.9218	109.5101	106.5856	102.1682	98.5703	94.7066	93.2436	96.1558	99.2239	103.2774	107.7619	111.6358	(44)
Energy conte	177.2567	155.9409	163.8181	139.8632	132.6946	116.4528	112.7701	119.0609	122.3530	140.1464	153.5266	174.7947	(45)

Energy content (annual) Total = Sum(45)m = 1708.6781

Distribution loss (46)m = 0.15 x (45)m

	26.5885	23.3911	24.5727	20.9795	19.9042	17.4679	16.9155	17.8591	18.3530	21.0220	23.0290	26.2192 (46)

Water storage loss (or HIU loss):

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 0.6800 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.4080 (55)

Total storage loss

	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480 (56)

If cylinder contains dedicated solar storage

	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)

Total heat required for water heating calculated for each month

	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)

Output from w/h

	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427 (64)

Total per year (kWh/year) = Sum(64)m = 1857.5981 (64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

	69.0563	60.9896	64.5879	56.2965	54.2394	48.5125	47.6145	49.7062	50.4744	56.7171	60.8396	68.2376 (65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	19.9269	17.6989	14.3937	10.8970	8.1456	6.8769	7.4307	9.6587	12.9639	16.4607	19.2120	20.4808 (67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054 (68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)

Losses e.g. evaporation (negative values) (Table 5)

	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354 (71)

Water heating gains (Table 5)

	92.8176	90.7583	86.8117	78.1896	72.9024	67.3785	63.9979	66.8094	70.1033	76.2326	84.4994	91.7172 (72)

Total internal gains

	451.2761	449.5975	435.7719	409.6580	383.9531	360.5568	346.6377	349.0684	362.2415	385.8626	414.5470	439.6373 (73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	5.8100	36.7938	0.4600	0.7000	0.7700	47.7024	(79)

Solar gains	65.6832	111.8827	153.0828	189.6771	212.4541	210.9178	203.3472	186.3545	165.7563	123.6543	78.6733	56.2111	(83)
Total gains	516.9593	561.4803	588.8547	599.3350	596.4073	571.4746	549.9849	535.4229	527.9978	509.5169	493.2203	495.8484	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	50.4915	50.9498	51.4072	53.6701	54.1158	56.2919	56.2919	56.7143	55.4333	54.1158	53.2217	52.3180	
alpha	4.3661	4.3967	4.4271	4.5780	4.6077	4.7528	4.7528	4.7810	4.6956	4.6077	4.5481	4.4879	
util living area	0.9951	0.9923	0.9861	0.9700	0.9278	0.8104	0.6470	0.6802	0.8742	0.9708	0.9915	0.9960	(86)
MIT	19.3947	19.5601	19.8357	20.2355	20.5816	20.8677	20.9658	20.9567	20.7871	20.3458	19.8404	19.4199	(87)
Th 2	19.5790	19.5898	19.6004	19.6506	19.6600	19.7045	19.7045	19.7128	19.6873	19.6600	19.6409	19.6210	(88)
util rest of house	0.9931	0.9890	0.9799	0.9547	0.8861	0.7031	0.4773	0.5161	0.7905	0.9528	0.9874	0.9943	(89)
MIT 2	17.7754	17.9932	18.3502	18.8861	19.3062	19.6322	19.6958	19.7002	19.5505	19.0338	18.3862	17.8358	(90)

Living area fraction fLA = Living area / (4) = 0.4997 (91)

MIT	18.5845	18.7761	19.0924	19.5603	19.9435	20.2495	20.3303	20.3280	20.1684	19.6893	19.1128	18.6273	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5845	18.7761	19.0924	19.5603	19.9435	20.2495	20.3303	20.3280	20.1684	19.6893	19.1128	18.6273	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9911	0.9864	0.9768	0.9534	0.8967	0.7532	0.5637	0.5995	0.8260	0.9533	0.9851	0.9926	(94)
Useful gains	512.3641	553.8505	575.1890	571.4212	534.7928	430.4383	310.0446	321.0011	436.1288	485.7171	485.8716	492.1754	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1369.7665	1318.6390	1186.0054	961.7010	737.5414	485.9198	320.8509	335.3399	530.0309	813.2195	1092.8388	1335.1632	(97)
Space heating kWh	637.9074	513.9379	454.4474	281.0014	150.8449	0.0000	0.0000	0.0000	0.0000	243.6617	437.0164	627.1829	(98a)
Space heating requirement - total per year (kWh/year)												3346.0001	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	637.9074	513.9379	454.4474	281.0014	150.8449	0.0000	0.0000	0.0000	0.0000	243.6617	437.0164	627.1829	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3346.0001	
Space heating per m2											(98c) / (4) =	57.4717	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	637.9074	513.9379	454.4474	281.0014	150.8449	0.0000	0.0000	0.0000	0.0000	243.6617	437.0164	627.1829	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	637.9074	513.9379	454.4474	281.0014	150.8449	0.0000	0.0000	0.0000	0.0000	243.6617	437.0164	627.1829	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4419	13.9926	12.5988	9.2304	7.1298	5.8251	6.5041	8.4542	10.9812	14.4079	16.2737	17.9267	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-67.1012	-101.1298	-152.7810	-169.9648	-170.0537	-126.7397	-124.5044	-119.7313	-107.7354	-110.1061	-74.3164	-57.0483	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-22.8250	-53.0308	-118.8877	-204.4621	-299.3580	-337.0376	-332.2236	-275.1668	-194.6357	-89.6188	-33.1998	-17.6072	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3346.0001	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1857.5981	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	140.7664	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	1985.0992	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3346.0001	16.4900	551.7554	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	16.4900	306.3179	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	140.7664	16.4900	23.2124	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1381.2122	16.4900	-227.7619	

PV Unit electricity exported	-1978.0533	5.5900	-110.5732	
Total			-338.3351	(252)
Total energy cost			542.9507	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):			0.3600	(256)
Energy cost factor (ECF)		[(255) x (256)] / [(4) + 45.0] =	1.8936	(257)
SAP value			69.3040	
SAP rating (Section 12)			69	(258)
SAP band			C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3346.0001	0.1546	517.1925	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1857.5981	0.1413	262.5684	(264)
Space and water heating			779.7608	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	140.7664	0.1443	20.3169	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1381.2122	0.1363	-188.3233	
PV Unit electricity exported	-1978.0533	0.1213	-239.9926	
Total			-428.3159	(269)
Total CO2, kg/year			371.7619	(272)
CO2 emissions per m2			6.3900	(273)
EI value			95.1738	
EI rating			95	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b) x	2.5000	(2b) =	145.5500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7543	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9617	0.8863	0.8674	0.8109	0.8109	0.7543	0.7543	0.7354	0.7543	0.8486	0.8297	0.8863	(22b)
Effective ac	0.9625	0.8928	0.8762	0.8288	0.8288	0.7845	0.7845	0.7704	0.7845	0.8600	0.8442	0.8928	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			8.0000	1.2357	9.8859			(27)
Heatloss Floor 1			58.2200	0.1800	10.4796	20.0000	1164.4000	(28b)
External Wall 1	42.9000	8.0000	34.9000	0.2600	9.0740	190.0000	6631.0000	(29a)
Total net area of external elements Aum(A, m2)			101.1200					(31)

Fabric heat loss, W/K = Sum (A x U) (26)...(30) + (32) = 29.4395 (33)
Main dwelling

Party Wall 1	42.8800	0.0000	0.0000	180.0000	7718.4000	(32)
Party Ceiling 1	58.2200			20.0000	1164.4000	(32b)
Internal Wall 1	83.5600			9.0000	752.0400	(32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 17430.2400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 299.3858 (35)
Thermal bridges (Default value 0.200 * total exposed area) 20.2240 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 49.6635 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.2285	42.8808	42.0866	39.8064	39.8064	37.6799	37.6799	37.0052	37.6799	41.3094	40.5494	42.8808	(38)
Heat transfer coeff	95.8921	92.5443	91.7501	89.4699	89.4699	87.3434	87.3434	86.6688	87.3434	90.9730	90.2129	92.5443	(39)
Average = Sum(39)m / 12 =												90.1296	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6471	1.5896	1.5759	1.5368	1.5368	1.5002	1.5002	1.4886	1.5002	1.5626	1.5495	1.5896	(40)
HLP (average)												1.5481	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9309 (42)
Hot water usage for mixer showers

53.0570	52.2597	51.0978	48.8747	47.2342	45.4046	44.3647	45.5178	46.7818	48.7462	51.0170	52.8537	(42a)

Hot water usage for baths

24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day) 102.8721 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	111.9218	109.5101	106.5856	102.1682	98.5703	94.7066	93.2436	96.1558	99.2239	103.2774	107.7619	111.6358	(44)
Energy conte	177.2567	155.9409	163.8181	139.8632	132.6946	116.4528	112.7701	119.0609	122.3530	140.1464	153.5266	174.7947	(45)
Energy content (annual)										Total = Sum(45)m =		1708.6781	
Distribution loss (46)m = 0.15 x (45)m	26.5885	23.3911	24.5727	20.9795	19.9042	17.4679	16.9155	17.8591	18.3530	21.0220	23.0290	26.2192	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
										Total per year (kWh/year) = Sum(64)m =		1857.5981	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	69.0563	60.9896	64.5879	56.2965	54.2394	48.5125	47.6145	49.7062	50.4744	56.7171	60.8396	68.2376	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.9269	17.6989	14.3937	10.8970	8.1456	6.8769	7.4307	9.6587	12.9639	16.4607	19.2120	20.4808	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	92.8176	90.7583	86.8117	78.1896	72.9024	67.3785	63.9979	66.8094	70.1033	76.2326	84.4994	91.7172	(72)
Total internal gains	451.2761	449.5975	435.7719	409.6580	383.9531	360.5568	346.6377	349.0684	362.2415	385.8626	414.5470	439.6373	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)
Southwest	5.8100	46.3896	0.4600	0.7000	0.7700	60.1431	(79)

Solar gains	82.8132	120.4793	164.1915	208.3215	224.3718	241.8664	227.2731	211.4917	188.8323	140.8452	98.2573	67.6960	(83)
Total gains	534.0893	570.0768	599.9633	617.9794	608.3250	602.4232	573.9107	560.5601	551.0737	526.7078	512.8043	507.3332	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	50.4915	52.3180	52.7709	54.1158	54.1158	55.4333	55.4333	55.8648	55.4333	53.2217	53.6701	52.3180	
alpha	4.3661	4.4879	4.5181	4.6077	4.6077	4.6956	4.6956	4.7243	4.6956	4.5481	4.5780	4.4879	
util living area													
	0.9928	0.9899	0.9812	0.9583	0.8964	0.7293	0.5459	0.5538	0.8031	0.9512	0.9855	0.9939	(86)
MIT	19.5738	19.7316	20.0026	20.3579	20.6904	20.9249	20.9851	20.9845	20.8770	20.4976	20.0541	19.6146	(87)
Th 2	19.5790	19.6210	19.6310	19.6600	19.6600	19.6873	19.6873	19.6960	19.6873	19.6409	19.6506	19.6210	(88)
util rest of house													
	0.9897	0.9855	0.9724	0.9369	0.8368	0.5946	0.3613	0.3683	0.6849	0.9191	0.9778	0.9912	(89)
MIT 2	18.0040	18.2325	18.5817	19.0416	19.4238	19.6558	19.6851	19.6937	19.6254	19.2011	18.6633	18.0845	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	18.7884	18.9815	19.2917	19.6993	20.0567	20.2899	20.3346	20.3387	20.2508	19.8489	19.3582	18.8490	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7884	18.9815	19.2917	19.6993	20.0567	20.2899	20.3346	20.3387	20.2508	19.8489	19.3582	18.8490	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9872	0.9827	0.9696	0.9377	0.8574	0.6612	0.4552	0.4627	0.7414	0.9253	0.9755	0.9891	(94)
Useful gains	527.2513	560.2079	581.7020	579.4814	521.5670	398.3199	261.2166	259.3694	408.5418	487.3384	500.2540	501.7823	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W													
	1283.8377	1229.1297	1100.2372	903.5852	667.1499	427.1001	265.0556	263.3581	458.6215	732.2322	988.5729	1235.3742	(97)
Space heating kWh													
	562.9003	449.5155	385.7902	233.3547	108.3137	0.0000	0.0000	0.0000	0.0000	182.2010	351.5896	545.7924	(98a)
Space heating requirement - total per year (kWh/year)												2819.4574	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	562.9003	449.5155	385.7902	233.3547	108.3137	0.0000	0.0000	0.0000	0.0000	182.2010	351.5896	545.7924	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2819.4574	
Space heating per m2											(98c) / (4) =	48.4276	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	562.9003	449.5155	385.7902	233.3547	108.3137	0.0000	0.0000	0.0000	0.0000	182.2010	351.5896	545.7924	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	562.9003	449.5155	385.7902	233.3547	108.3137	0.0000	0.0000	0.0000	0.0000	182.2010	351.5896	545.7924	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4419	13.9926	12.5988	9.2304	7.1298	5.8251	6.5041	8.4542	10.9812	14.4079	16.2737	17.9267	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-82.8698	-108.2650	-159.9175	-176.0639	-167.1768	-132.8203	-129.5564	-126.4491	-115.8685	-118.7084	-89.0352	-67.9778	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-34.5546	-63.8671	-141.5119	-245.9929	-337.4167	-406.4065	-388.8815	-331.8996	-239.5466	-117.1159	-50.1117	-25.0764	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2819.4574	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1857.5981	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												140.7664	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3857.0902	(233)
Wind generation												0.0000	(234)

Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	960.7317	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2819.4574	27.6700	780.1439	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	27.6700	513.9974	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	140.7664	27.6700	38.9501	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1474.7087	27.6700	-408.0519	
PV Unit electricity exported	-2382.3815	5.8100	-138.4164	
Total			-546.4683	(252)
Total energy cost			786.6230	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2819.4574	0.1551	437.2018	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1857.5981	0.1413	262.5684	(264)
Space and water heating			699.7702	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	140.7664	0.1443	20.3169	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1474.7087	0.1369	-201.8285	
PV Unit electricity exported	-2382.3815	0.1219	-290.4796	
Total			-492.3081	(269)
Total CO2, kg/year			227.7790	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2819.4574	1.5741	4438.1165	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	1.5227	2828.5219	(278)
Space and water heating			7266.6384	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	140.7664	1.5338	215.9122	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1474.7087	1.5060	-2220.8691	
PV Unit electricity exported	-2382.3815	0.4473	-1065.5229	
Total			-3286.3920	(283)
Total Primary energy kWh/year			4196.1587	(286)

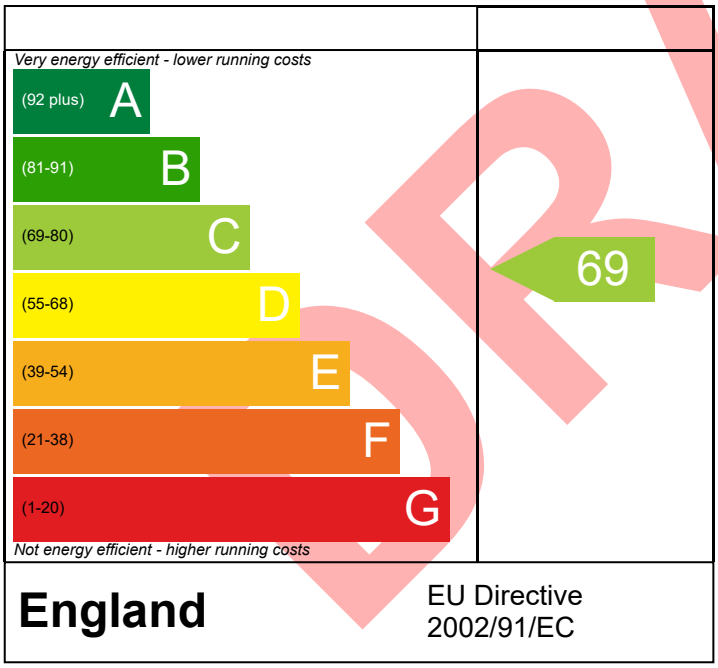
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.22 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

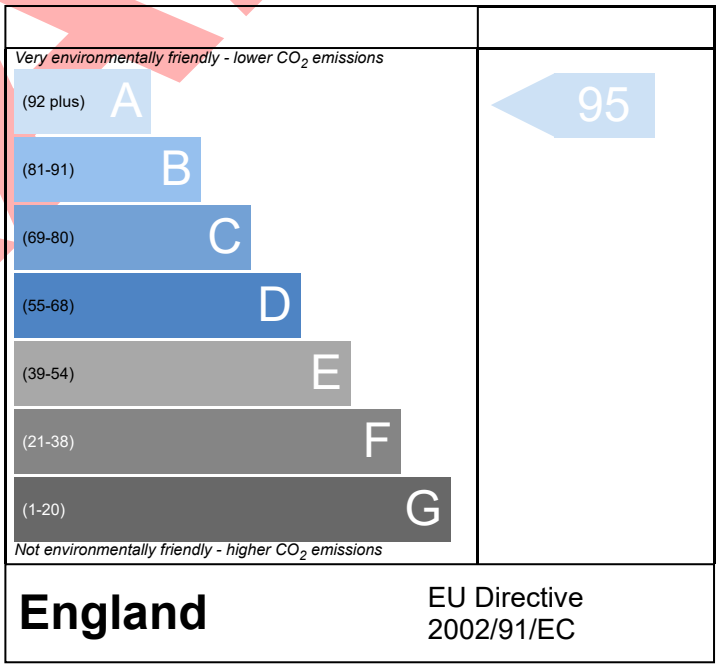
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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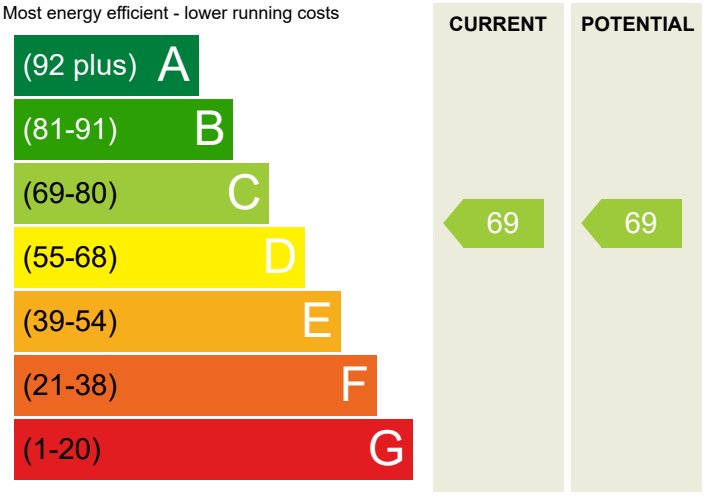
Energy Report

Dwelling Address	
Reference	Flat 2-Be Green
SAP Version	10.2
Assessment Date	12/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	58

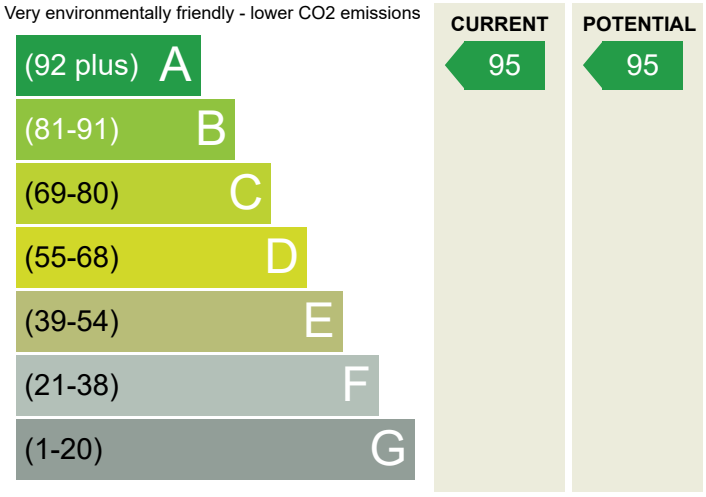
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

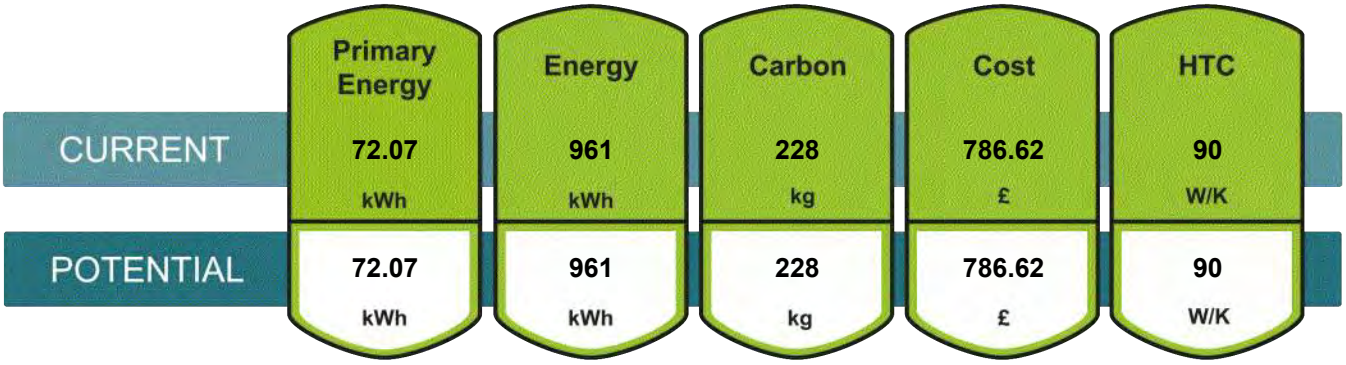


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£39	£39	You could save £0
Heating	£780	£780	
Hot Water	£514	£514	
New Technologies e.g. Impact of PV	-(£546)	-(£546)	
TOTAL	£787	£787	

Estimated energy use and potential savings

Space Heating
2819
kWh per year

Water Heating
1858
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 3	**Issued on Date**	15/06/2026
Assessment Reference	Be Green	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	58 D	**DER**	9.24	**TER**	
Environmental	92 A	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.54	**DFEE**	74.34	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	112.07	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	4	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	268.49	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	14.12 m	80.13 m²	2.50 m

8.0 Living Area	35.96	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	35.30	28.25	0.00	None	7.05	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	70.78	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	122.36

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	80.13	78.01	None	0.00	Enter Gross Area	2.12

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	80.13

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Rooflight	Manufacturer	Roof Light	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SE Windows	Windows	External Wall 1	South East	2.63	
Roof light	Rooflight	External Roof 1	North East	2.12	0
NE Windows	Windows	External Wall 1	North East	4.42	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	

22.0 Lighting

No Fixed Lighting	No

Name	Efficacy	Power	Capacity	Count
Lighting 1	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Independent
SAP Code	903
Fuel Type	Electricity

Summary for Input Data

elmhurst energy

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day

32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	No	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.08	South West	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 3	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	58 D	DER	9.24	TER	
Environmental	92 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.54	DFEE	74.34	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	112.07	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

			Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling								
Ground floor			80.1300	(1b)	x 2.5000	(2b) =	200.3250	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)		80.1300						
Dwelling volume					(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	200.3250	(5)

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2. Ventilation rate

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		m3 per hour		
Number of open chimneys		0 * 80 =	0.0000	(6a)
Number of open flues		0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000	(6d)
Number of flues attached to other heater		0 * 35 =	0.0000	(6e)
Number of blocked chimneys		0 * 20 =	0.0000	(6f)
Number of intermittent extract fans		2 * 10 =	20.0000	(7a)
Number of passive vents		0 * 10 =	0.0000	(7b)
Number of flueless gas fires		0 * 40 =	0.0000	(7c)
		Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =		20.0000 / (5) =	0.0998	(8)
Pressure test			No	
Pressure Test Method			Blower Door	
Measured/design AP50			15.0000	(17)
Infiltration rate			0.8498	(18)
Number of sides sheltered			4	(19)
Shelter factor		(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor		(21) = (18) x (20) =	0.5949	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7585	0.7436	0.7287	0.6544	0.6395	0.5651	0.5651	0.5503	0.5949	0.6395	0.6692	0.6990	(22b)
Effective ac	0.7876	0.7765	0.7655	0.7141	0.7045	0.6597	0.6597	0.6514	0.6769	0.7045	0.7239	0.7443	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.1800	14.4234	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.2600	7.3450	190.0000	5367.5000	(29a)
External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900	(30)
Total net area of external elements Aum(A, m2)			195.5600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.5817			(33)
Main dwelling								
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000	(32)
Internal Walls			122.3600			9.0000	1101.2400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		21513.8300	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							268.4866	(35)
Thermal bridges (Default value 0.200 * total exposed area)							39.1120	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		84.6937	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	51.3307	50.6070	47.2074	46.5714	43.6105	43.6105	43.0622	44.7510	46.5714	47.8581	49.2033	(38)

Heat transfer coeff

	136.7629	136.0245	135.3007	131.9012	131.2651	128.3042	128.3042	127.7559	129.4447	131.2651	132.5518	133.8970 (39)
Average = Sum(39)m / 12 =												131.8981

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7068	1.6975	1.6885	1.6461	1.6382	1.6012	1.6012	1.5944	1.6154	1.6382	1.6542	1.6710	(40)
HLP (average)												1.6461	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4653 (42)

Hot water usage for mixer showers

	61.4579	60.5343	59.1884	56.6134	54.7131	52.5938	51.3893	52.7249	54.1891	56.4645	59.0948	61.2224 (42a)

Hot water usage for baths

	28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183 (42b)

Hot water usage for other uses

	39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774 (42c)

Average daily hot water use (litres/day) 119.1659 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	129.6493	126.8551	123.4670	118.3501	114.1821	109.7063	108.0120	111.3858	114.9403	119.6358	124.8305	129.3181	(44)
Energy conte	205.3328	180.6400	189.7642	162.0153	153.7110	134.8966	130.6312	137.9189	141.7328	162.3446	177.8440	202.4809	(45)
Energy content (annual)										Total = Sum(45)m =		1979.3124	
Distribution loss (46)m = 0.15 x (45)m													
	30.7999	27.0960	28.4646	24.3023	23.0567	20.2345	19.5947	20.6878	21.2599	24.3517	26.6766	30.3721	(46)

Water storage loss (or HIU loss):

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 0.6800 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.4080 (55)

Total storage loss

	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)

If cylinder contains dedicated solar storage

	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(64)
										Total per year (kWh/year) = Sum(64)m =		2128.2324	(64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)

Heat gains from water heating, kWh/month

	78.3916	69.2020	73.2150	63.6621	61.2273	54.6451	53.5533	55.9764	56.9182	64.0980	68.9251	77.4433	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	28.1448	24.9980	20.3297	15.3909	11.5049	9.7129	10.4951	13.6420	18.3102	23.2490	27.1350	28.9270	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)

Water heating gains (Table 5)

	105.3650	102.9792	98.4073	88.4196	82.2948	75.8960	71.9802	75.2371	79.0530	86.1532	95.7293	104.0905	(72)

Total internal gains

	563.0019	560.8721	543.0568	509.8749	476.8199	446.9709	429.3682	432.3691	449.4284	479.7228	516.2291	548.0405	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	11.2829	0.4600	0.7000	0.7700	11.1284	(75)
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Northeast	2.1200	26.0000	0.4600	0.7000	1.0000	15.9738	(82)

Solar gains	48.6955	92.6100	150.1182	221.5380	277.8995	288.2653	272.8211	229.3534	174.8758	108.8830	60.1407	40.4693	(83)
Total gains	611.6975	653.4821	693.1750	731.4129	754.7194	735.2361	702.1893	661.7225	624.3042	588.6058	576.3698	588.5099	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	43.6965	43.9337	44.1688	45.3071	45.5267	46.5773	46.5773	46.7772	46.1669	45.5267	45.0847	44.6318	
alpha	3.9131	3.9289	3.9446	4.0205	4.0351	4.1052	4.1052	4.1185	4.0778	4.0351	4.0056	3.9755	
util living area													
	0.9958	0.9939	0.9893	0.9760	0.9398	0.8458	0.7082	0.7542	0.9166	0.9806	0.9934	0.9964	(86)
MIT	19.0683	19.2206	19.5239	19.9728	20.4036	20.7663	20.9211	20.8960	20.6244	20.0813	19.5231	19.0710	(87)
Th 2	19.5360	19.5426	19.5491	19.5797	19.5855	19.6125	19.6125	19.6175	19.6020	19.5855	19.5738	19.5617	(88)

util rest of house													
	0.9941	0.9915	0.9847	0.9642	0.9049	0.7469	0.5280	0.5849	0.8521	0.9687	0.9904	0.9951	(89)
MIT 2	17.3521	17.5509	17.9416	18.5286	19.0586	19.4711	19.5888	19.5813	19.3314	18.6739	17.9582	17.3719	(90)
Living area fraction										fLA = Living area / (4) =		0.4488	(91)
MIT	18.1222	18.3002	18.6517	19.1767	19.6622	20.0523	20.1867	20.1713	19.9117	19.3055	18.6605	18.1344	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1222	18.3002	18.6517	19.1767	19.6622	20.0523	20.1867	20.1713	19.9117	19.3055	18.6605	18.1344	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9918	0.9885	0.9806	0.9596	0.9073	0.7836	0.6103	0.6614	0.8701	0.9654	0.9875	0.9930	(94)
Useful gains	606.6741	645.9851	679.6981	701.8912	684.7631	576.1477	428.5433	437.6415	543.1870	568.2559	569.1585	584.3941	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1890.3691	1822.7552	1644.1296	1355.5062	1045.1636	699.5579	460.1876	481.8034	752.2917	1142.7279	1532.3662	1865.7710	(97)
Space heating kWh	955.0691	790.7895	717.5371	470.6028	268.1379	0.0000	0.0000	0.0000	0.0000	427.4072	693.5095	953.3444	(98a)
Space heating requirement - total per year (kWh/year)												5276.3975	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	955.0691	790.7895	717.5371	470.6028	268.1379	0.0000	0.0000	0.0000	0.0000	427.4072	693.5095	953.3444	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5276.3975	
Space heating per m2											(98c) / (4) =	65.8480	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	955.0691	790.7895	717.5371	470.6028	268.1379	0.0000	0.0000	0.0000	0.0000	427.4072	693.5095	953.3444	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	955.0691	790.7895	717.5371	470.6028	268.1379	0.0000	0.0000	0.0000	0.0000	427.4072	693.5095	953.3444	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.6350	19.7631	17.7945	13.0370	10.0701	8.2274	9.1863	11.9407	15.5098	20.3497	22.9850	25.3197	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-70.2243	-108.2231	-167.8100	-193.8394	-199.5511	-143.9315	-141.4085	-134.5372	-119.2347	-121.9986	-78.9966	-59.5527	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-19.7019	-45.9376	-103.8587	-180.5875	-269.8605	-319.8458	-315.3195	-260.3610	-183.1365	-77.7263	-28.5196	-15.1029	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5276.3975	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2128.2324	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	198.8183	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4244.1828	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	

Space heating - main system 1	5276.3975	16.4900	870.0779	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2128.2324	16.4900	350.9455	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	198.8183	16.4900	32.7851	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1539.3077	16.4900	-253.8318	
PV Unit electricity exported	-1819.9577	5.5900	-101.7356	
Total			-355.5675	(252)
Total energy cost			898.2411	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.5842	(257)
SAP value		58.1094	
SAP rating (Section 12)		58	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5276.3975	0.1541	812.9186	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2128.2324	0.1414	300.8843	(264)
Space and water heating			1113.8029	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	198.8183	0.1443	28.6956	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1539.3077	0.1360	-209.3073	
PV Unit electricity exported	-1819.9577	0.1203	-218.9998	
Total			-428.3071	(269)
Total CO2, kg/year			714.1915	(272)
CO2 emissions per m2			8.9100	(273)
EI value			92.3518	
EI rating			92	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	80.1300 (1b)	x	2.5000 (2b)	=	200.3250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	200.3250	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8498	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7585	0.6990	0.6841	0.6395	0.6395	0.5949	0.5949	0.5800	0.5949	0.6692	0.6544	0.6990	(22b)
Effective ac	0.7876	0.7443	0.7340	0.7045	0.7045	0.6769	0.6769	0.6682	0.6769	0.7239	0.7141	0.7443	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.1800	14.4234	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.2600	7.3450	190.0000	5367.5000	(29a)
External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900	(30)
Total net area of external elements Aum(A, m2)			195.5600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.5817			(33)
Main dwelling								
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000	(32)
Internal Walls			122.3600			9.0000	1101.2400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21513.8300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		268.4866 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.1120 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	84.6937 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	49.2033	48.5234	46.5714	46.5714	44.7510	44.7510	44.1734	44.7510	47.8581	47.2074	49.2033	(38)
Heat transfer coeff	136.7629	133.8970	133.2171	131.2651	131.2651	129.4447	129.4447	128.8672	129.4447	132.5518	131.9012	133.8970	(39)
Average = Sum(39)m / 12 =												131.8299	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7068	1.6710	1.6625	1.6382	1.6382	1.6154	1.6154	1.6082	1.6154	1.6542	1.6461	1.6710	(40)
HLP (average)												1.6452	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.4653 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	61.4579	60.5343	59.1884	56.6134	54.7131	52.5938	51.3893	52.7249	54.1891	56.4645	59.0948	61.2224	(42a)
Hot water usage for baths	28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183	(42b)
Hot water usage for other uses	39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774	(42c)
Average daily hot water use (litres/day)												119.1659	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.6493	126.8551	123.4670	118.3501	114.1821	109.7063	108.0120	111.3858	114.9403	119.6358	124.8305	129.3181	(44)
Energy conte	205.3328	180.6400	189.7642	162.0153	153.7110	134.8966	130.6312	137.9189	141.7328	162.3446	177.8440	202.4809	(45)
Energy content (annual)										Total = Sum(45)m =		1979.3124	
Distribution loss (46)m = 0.15 x (45)m	30.7999	27.0960	28.4646	24.3023	23.0567	20.2345	19.5947	20.6878	21.2599	24.3517	26.6766	30.3721	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(64)
									Total per year (kWh/year) = Sum(64)m =			2128.2324	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	78.3916	69.2020	73.2150	63.6621	61.2273	54.6451	53.5533	55.9764	56.9182	64.0980	68.9251	77.4433	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	28.1448	24.9980	20.3297	15.3909	11.5049	9.7129	10.4951	13.6420	18.3102	23.2490	27.1350	28.9270	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)	105.3650	102.9792	98.4073	88.4196	82.2948	75.8960	71.9802	75.2371	79.0530	86.1532	95.7293	104.0905	(72)
Total internal gains	563.0019	560.8721	543.0568	509.8749	476.8199	446.9709	429.3682	432.3691	449.4284	479.7228	516.2291	548.0405	(73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains

	m2	Table 6a W/m2	Specific data or Table 6b	Specific data or Table 6c	factor Table 6d	W	
Northeast	4.4200	15.0428	0.4600	0.7000	0.7700	14.8368	(75)
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)
Northeast	2.1200	35.0000	0.4600	0.7000	1.0000	21.5032	(82)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	63.5648	103.6851	167.6921	252.0822	301.6358	338.2744	312.6335	268.8103	207.2278	129.1161	77.8743	50.3850	(83)
Total gains	626.5667	664.5573	710.7489	761.9571	778.4557	785.2453	742.0017	701.1794	656.6561	608.8389	594.1035	598.4256	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	43.6965	44.6318	44.8596	45.5267	45.5267	46.1669	46.1669	46.3738	46.1669	45.0847	45.3071	44.6318	
alpha	3.9131	3.9755	3.9906	4.0351	4.0351	4.0778	4.0778	4.0916	4.0778	4.0056	4.0205	3.9755	
util living area	0.9941	0.9923	0.9857	0.9667	0.9127	0.7697	0.6024	0.6278	0.8641	0.9680	0.9897	0.9949	(86)
MIT	19.2577	19.3887	19.6939	20.1140	20.5428	20.8590	20.9626	20.9571	20.7552	20.2672	19.7493	19.2833	(87)
Th 2	19.5360	19.5617	19.5678	19.5855	19.5855	19.6020	19.6020	19.6073	19.6020	19.5738	19.5797	19.5617	(88)
util rest of house	0.9917	0.9891	0.9793	0.9498	0.8611	0.6363	0.3957	0.4167	0.7621	0.9464	0.9844	0.9928	(89)
MIT 2	17.5944	17.7775	18.1695	18.7072	19.2165	19.5356	19.5955	19.5995	19.4590	18.8960	18.2501	17.6436	(90)
Living area fraction									fLA = Living area / (4) =			0.4488	(91)
MIT	18.3408	18.5006	18.8536	19.3385	19.8117	20.1295	20.2090	20.2088	20.0407	19.5113	18.9229	18.3795	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3408	18.5006	18.8536	19.3385	19.8117	20.1295	20.2090	20.2088	20.0407	19.5113	18.9229	18.3795	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9888	0.9857	0.9748	0.9459	0.8712	0.6929	0.4912	0.5146	0.8005	0.9451	0.9809	0.9902	(94)
Useful gains	619.5656	655.0596	692.8489	720.7621	678.2007	544.0699	364.5025	360.8098	525.6533	575.4435	582.7332	592.5802	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1769.8220	1713.9565	1539.1384	1278.3314	946.6437	612.2085	376.5563	374.8424	652.4900	1022.1527	1387.9878	1724.5215	(97)
Space heating kWh	855.7908	711.5787	629.6394	401.4499	199.7216	0.0000	0.0000	0.0000	0.0000	332.3517	579.7833	842.1644	(98a)
Space heating requirement - total per year (kWh/year)												4552.4798	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	855.7908	711.5787	629.6394	401.4499	199.7216	0.0000	0.0000	0.0000	0.0000	332.3517	579.7833	842.1644	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4552.4798	
Space heating per m2										(98c) / (4) =		56.8137	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
Fraction of space heat from main system(s)	1.0000 (202)
Efficiency of main space heating system 1 (in %)	100.0000 (206)
Efficiency of main space heating system 2 (in %)	0.0000 (207)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	855.7908	711.5787	629.6394	401.4499	199.7216	0.0000	0.0000	0.0000	0.0000	332.3517	579.7833	842.1644	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	855.7908	711.5787	629.6394	401.4499	199.7216	0.0000	0.0000	0.0000	0.0000	332.3517	579.7833	842.1644	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.6350	19.7631	17.7945	13.0370	10.0701	8.2274	9.1863	11.9407	15.5098	20.3497	22.9850	25.3197	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-87.5306	-116.8774	-177.7333	-203.5357	-197.5643	-152.3811	-148.4051	-143.4023	-129.3606	-133.2902	-96.0009	-71.4974	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-29.8939	-55.2547	-123.6960	-218.5211	-307.0292	-386.8457	-370.0328	-314.9464	-226.0546	-102.5341	-43.1461	-21.5568	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4552.4798	(211)
Space heating fuel - main system 2												0.0000	(213)

Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2128.2324	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	198.8183	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	3022.4403	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4552.4798	27.6700	1259.6712	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2128.2324	27.6700	588.8819	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	198.8183	27.6700	55.0130	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1657.5788	27.6700	-458.6521	
PV Unit electricity exported	-2199.5114	5.8100	-127.7916	
Total			-586.4437	(252)
Total energy cost			1317.1224	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4552.4798	0.1545	703.4718	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2128.2324	0.1414	300.8843	(264)
Space and water heating			1004.3561	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	198.8183	0.1443	28.6956	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1657.5788	0.1365	-226.2246	
PV Unit electricity exported	-2199.5114	0.1209	-265.9377	
Total			-492.1622	(269)
Total CO2, kg/year			540.8895	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4552.4798	1.5721	7156.9917	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2128.2324	1.5228	3240.8438	(278)
Space and water heating			10397.8355	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	198.8183	1.5338	304.9542	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1657.5788	1.5045	-2493.9062	
PV Unit electricity exported	-2199.5114	0.4434	-975.2577	
Total			-3469.1639	(283)
Total Primary energy kWh/year			7233.6258	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating: D 58
Current environmental impact rating: A 92

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: D 58
Potential environmental impact rating: A 92

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1904	£1904	£0
Space heating	£1260	£1260	£0
Water heating	£589	£589	£0
Lighting	£55	£55	£0
Generated (PV)	-£586	-£586	£0
Total cost of fuels	£1318	£1318	£0
Total cost of uses	£1318	£1318	£0
Delivered energy	38 kWh/m²	38 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.5 tonnes	0.5 tonnes	0.0 tonnes
CO2 emissions per m²	7 kg/m²	7 kg/m²	0 kg/m²
Primary energy	90 kWh/m²	90 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	80.1300	(1b)	x 2.5000	(2b) =	200.3250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	200.3250	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8498 (18)
Number of sides sheltered		4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7585	0.7436	0.7287	0.6544	0.6395	0.5651	0.5651	0.5503	0.5949	0.6395	0.6692	0.6990	(22b)
Effective ac	0.7876	0.7765	0.7655	0.7141	0.7045	0.6597	0.6597	0.6514	0.6769	0.7045	0.7239	0.7443	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.1800	14.4234	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.2600	7.3450	190.0000	5367.5000	(29a)
External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900	(30)
Total net area of external elements Aum(A, m2)			195.5600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.5817			(33)
Main dwelling								
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000	(32)
Internal Walls			122.3600			9.0000	1101.2400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21513.8300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		268.4866 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.1120 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	84.6937 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	51.3307	50.6070	47.2074	46.5714	43.6105	43.6105	43.0622	44.7510	46.5714	47.8581	49.2033	(38)
Heat transfer coeff	136.7629	136.0245	135.3007	131.9012	131.2651	128.3042	128.3042	127.7559	129.4447	131.2651	132.5518	133.8970	(39)
Average = Sum(39)m / 12 =												131.8981	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7068	1.6975	1.6885	1.6461	1.6382	1.6012	1.6012	1.5944	1.6154	1.6382	1.6542	1.6710	(40)
HLP (average)												1.6461	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4653	(42)
Hot water usage for mixer showers													
	61.4579	60.5343	59.1884	56.6134	54.7131	52.5938	51.3893	52.7249	54.1891	56.4645	59.0948	61.2224	(42a)
Hot water usage for baths													
	28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183	(42b)
Hot water usage for other uses													
	39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774	(42c)
Average daily hot water use (litres/day)												119.1659	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	129.6493	126.8551	123.4670	118.3501	114.1821	109.7063	108.0120	111.3858	114.9403	119.6358	124.8305	129.3181	(44)
Energy conte	205.3328	180.6400	189.7642	162.0153	153.7110	134.8966	130.6312	137.9189	141.7328	162.3446	177.8440	202.4809	(45)
Energy content (annual)										Total = Sum(45)m =		1979.3124	
Distribution loss (46)m = 0.15 x (45)m													
	30.7999	27.0960	28.4646	24.3023	23.0567	20.2345	19.5947	20.6878	21.2599	24.3517	26.6766	30.3721	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(64)
									Total per year (kWh/year) = Sum(64)m =			2128.2324	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	78.3916	69.2020	73.2150	63.6621	61.2273	54.6451	53.5533	55.9764	56.9182	64.0980	68.9251	77.4433	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	28.1448	24.9980	20.3297	15.3909	11.5049	9.7129	10.4951	13.6420	18.3102	23.2490	27.1350	28.9270	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)													
	105.3650	102.9792	98.4073	88.4196	82.2948	75.8960	71.9802	75.2371	79.0530	86.1532	95.7293	104.0905	(72)
Total internal gains													
	563.0019	560.8721	543.0568	509.8749	476.8199	446.9709	429.3682	432.3691	449.4284	479.7228	516.2291	548.0405	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	11.2829	0.4600	0.7000	0.7700	11.1284	(75)
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Northeast	2.1200	26.0000	0.4600	0.7000	1.0000	15.9738	(82)

Solar gains	48.6955	92.6100	150.1182	221.5380	277.8995	288.2653	272.8211	229.3534	174.8758	108.8830	60.1407	40.4693	(83)
Total gains	611.6975	653.4821	693.1750	731.4129	754.7194	735.2361	702.1893	661.7225	624.3042	588.6058	576.3698	588.5099	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	43.6965	43.9337	44.1688	45.3071	45.5267	46.5773	46.5773	46.7772	46.1669	45.5267	45.0847	44.6318	
alpha	3.9131	3.9289	3.9446	4.0205	4.0351	4.1052	4.1052	4.1185	4.0778	4.0351	4.0056	3.9755	
util living area													
	0.9958	0.9939	0.9893	0.9760	0.9398	0.8458	0.7082	0.7542	0.9166	0.9806	0.9934	0.9964	(86)
MIT	19.0683	19.2206	19.5239	19.9728	20.4036	20.7663	20.9211	20.8960	20.6244	20.0813	19.5231	19.0710	(87)
Th 2	19.5360	19.5426	19.5491	19.5797	19.5855	19.6125	19.6125	19.6175	19.6020	19.5855	19.5738	19.5617	(88)
util rest of house													
	0.9941	0.9915	0.9847	0.9642	0.9049	0.7469	0.5280	0.5849	0.8521	0.9687	0.9904	0.9951	(89)
MIT 2	17.3521	17.5509	17.9416	18.5286	19.0586	19.4711	19.5888	19.5813	19.3314	18.6739	17.9582	17.3719	(90)
Living area fraction										fLA = Living area / (4) =		0.4488	(91)

MIT	18.1222	18.3002	18.6517	19.1767	19.6622	20.0523	20.1867	20.1713	19.9117	19.3055	18.6605	18.1344	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1222	18.3002	18.6517	19.1767	19.6622	20.0523	20.1867	20.1713	19.9117	19.3055	18.6605	18.1344	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9918	0.9885	0.9806	0.9596	0.9073	0.7836	0.6103	0.6614	0.8701	0.9654	0.9875	0.9930	(94)
Useful gains	606.6741	645.9851	679.6981	701.8912	684.7631	576.1477	428.5433	437.6415	543.1870	568.2559	569.1585	584.3941	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1890.3691	1822.7552	1644.1296	1355.5062	1045.1636	699.5579	460.1876	481.8034	752.2917	1142.7279	1532.3662	1865.7710	(97)
Space heating kWh	955.0691	790.7895	717.5371	470.6028	268.1379	0.0000	0.0000	0.0000	0.0000	427.4072	693.5095	953.3444	(98a)
Space heating requirement - total per year (kWh/year)												5276.3975	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	955.0691	790.7895	717.5371	470.6028	268.1379	0.0000	0.0000	0.0000	0.0000	427.4072	693.5095	953.3444	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5276.3975	
Space heating per m2											(98c) / (4) =	65.8480	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	955.0691	790.7895	717.5371	470.6028	268.1379	0.0000	0.0000	0.0000	0.0000	427.4072	693.5095	953.3444	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	955.0691	790.7895	717.5371	470.6028	268.1379	0.0000	0.0000	0.0000	0.0000	427.4072	693.5095	953.3444	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.6350	19.7631	17.7945	13.0370	10.0701	8.2274	9.1863	11.9407	15.5098	20.3497	22.9850	25.3197	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-70.2243	-108.2231	-167.8100	-193.8394	-199.5511	-143.9315	-141.4085	-134.5372	-119.2347	-121.9986	-78.9966	-59.5527	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-19.7019	-45.9376	-103.8587	-180.5875	-269.8605	-319.8458	-315.3195	-260.3610	-183.1365	-77.7263	-28.5196	-15.1029	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5276.3975	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2128.2324	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	198.8183	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4244.1828	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	5276.3975	16.4900	870.0779	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2128.2324	16.4900	350.9455	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	198.8183	16.4900	32.7851	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1539.3077	16.4900	-253.8318	
PV Unit electricity exported	-1819.9577	5.5900	-101.7356	
Total			-355.5675	(252)
Total energy cost			898.2411	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.5842	(257)
SAP value		58.1094	
SAP rating (Section 12)		58	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5276.3975	0.1541	812.9186	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2128.2324	0.1414	300.8843	(264)
Space and water heating			1113.8029	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	198.8183	0.1443	28.6956	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1539.3077	0.1360	-209.3073	
PV Unit electricity exported	-1819.9577	0.1203	-218.9998	
Total			-428.3071	(269)
Total CO2, kg/year			714.1915	(272)
CO2 emissions per m2			8.9100	(273)
EI value			92.3518	
EI rating			92	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		80.1300	(1b)	x 2.5000	(2b) =	200.3250	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.1300						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		200.3250	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0998	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8498	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5949	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7585	0.6990	0.6841	0.6395	0.6395	0.5949	0.5949	0.5800	0.5949	0.6692	0.6544	0.6990	(22b)
Effective ac	0.7876	0.7443	0.7340	0.7045	0.7045	0.6769	0.6769	0.6682	0.6769	0.7239	0.7141	0.7443	(25)

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3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Windows			7.0500	1.2357	8.7120			(27)
Rooflight			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			80.1300	0.1800	14.4234	20.0000	1602.6000	(28b)
External Wall 1	35.3000	7.0500	28.2500	0.2600	7.3450	190.0000	5367.5000	(29a)
External Roof 1	80.1300	2.1200	78.0100	0.1600	12.4816	9.0000	702.0900	(30)
Total net area of external elements Aum(A, m2)			195.5600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.5817			(33)
Main dwelling								
Party Wall 1			70.7800	0.0000	0.0000	180.0000	12740.4000	(32)
Internal Walls			122.3600			9.0000	1101.2400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	21513.8300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		268.4866 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.1120 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	84.6937 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	52.0691	49.2033	48.5234	46.5714	46.5714	44.7510	44.7510	44.1734	44.7510	47.8581	47.2074	49.2033	(38)
Heat transfer coeff	136.7629	133.8970	133.2171	131.2651	131.2651	129.4447	129.4447	128.8672	129.4447	132.5518	131.9012	133.8970	(39)
Average = Sum(39)m / 12 =												131.8299	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7068	1.6710	1.6625	1.6382	1.6382	1.6154	1.6154	1.6082	1.6154	1.6542	1.6461	1.6710	(40)
HLP (average)												1.6452	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.4653 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	61.4579	60.5343	59.1884	56.6134	54.7131	52.5938	51.3893	52.7249	54.1891	56.4645	59.0948	61.2224	(42a)
Hot water usage for baths	28.3141	27.8935	27.3014	26.2096	25.3920	24.4855	23.9958	24.5838	25.2241	26.1941	27.3084	28.2183	(42b)
Hot water usage for other uses	39.8774	38.4273	36.9772	35.5271	34.0770	32.6269	32.6269	34.0770	35.5271	36.9772	38.4273	39.8774	(42c)
Average daily hot water use (litres/day)												119.1659	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.6493	126.8551	123.4670	118.3501	114.1821	109.7063	108.0120	111.3858	114.9403	119.6358	124.8305	129.3181	(44)
Energy conte	205.3328	180.6400	189.7642	162.0153	153.7110	134.8966	130.6312	137.9189	141.7328	162.3446	177.8440	202.4809	(45)
Energy content (annual)										Total = Sum(45)m =		1979.3124	
Distribution loss (46)m = 0.15 x (45)m	30.7999	27.0960	28.4646	24.3023	23.0567	20.2345	19.5947	20.6878	21.2599	24.3517	26.6766	30.3721	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(64)
									Total per year (kWh/year) = Sum(64)m =			2128.2324	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	78.3916	69.2020	73.2150	63.6621	61.2273	54.6451	53.5533	55.9764	56.9182	64.0980	68.9251	77.4433	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	147.9194	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	28.1448	24.9980	20.3297	15.3909	11.5049	9.7129	10.4951	13.6420	18.3102	23.2490	27.1350	28.9270	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	327.9284	331.3313	322.7561	304.5007	281.4565	259.7982	245.3292	241.9263	250.5014	268.7568	291.8010	313.4593	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	52.2573	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	-98.6129	(71)
Water heating gains (Table 5)	105.3650	102.9792	98.4073	88.4196	82.2948	75.8960	71.9802	75.2371	79.0530	86.1532	95.7293	104.0905	(72)
Total internal gains	563.0019	560.8721	543.0568	509.8749	476.8199	446.9709	429.3682	432.3691	449.4284	479.7228	516.2291	548.0405	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.4200	15.0428	0.4600	0.7000	0.7700	14.8368	(75)

Southeast				2.6300	46.3896	0.4600	0.7000	0.7700				27.2248	(77)
Northeast				2.1200	35.0000	0.4600	0.7000	1.0000				21.5032	(82)
Solar gains	63.5648	103.6851	167.6921	252.0822	301.6358	338.2744	312.6335	268.8103	207.2278	129.1161	77.8743	50.3850	(83)
Total gains	626.5667	664.5573	710.7489	761.9571	778.4557	785.2453	742.0017	701.1794	656.6561	608.8389	594.1035	598.4256	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	43.6965	44.6318	44.8596	45.5267	45.5267	46.1669	46.1669	46.3738	46.1669	45.0847	45.3071	44.6318	
alpha	3.9131	3.9755	3.9906	4.0351	4.0351	4.0778	4.0778	4.0916	4.0778	4.0056	4.0205	3.9755	
util living area	0.9941	0.9923	0.9857	0.9667	0.9127	0.7697	0.6024	0.6278	0.8641	0.9680	0.9897	0.9949	(86)
MIT	19.2577	19.3887	19.6939	20.1140	20.5428	20.8590	20.9626	20.9571	20.7552	20.2672	19.7493	19.2833	(87)
Th 2	19.5360	19.5617	19.5678	19.5855	19.5855	19.6020	19.6020	19.6073	19.6020	19.5738	19.5797	19.5617	(88)
util rest of house	0.9917	0.9891	0.9793	0.9498	0.8611	0.6363	0.3957	0.4167	0.7621	0.9464	0.9844	0.9928	(89)
MIT 2	17.5944	17.7775	18.1695	18.7072	19.2165	19.5356	19.5955	19.5995	19.4590	18.8960	18.2501	17.6436	(90)
Living area fraction									fLA = Living area / (4) =			0.4488	(91)
MIT	18.3408	18.5006	18.8536	19.3385	19.8117	20.1295	20.2090	20.2088	20.0407	19.5113	18.9229	18.3795	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3408	18.5006	18.8536	19.3385	19.8117	20.1295	20.2090	20.2088	20.0407	19.5113	18.9229	18.3795	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9888	0.9857	0.9748	0.9459	0.8712	0.6929	0.4912	0.5146	0.8005	0.9451	0.9809	0.9902	(94)
Useful gains	619.5656	655.0596	692.8489	720.7621	678.2007	544.0699	364.5025	360.8098	525.6533	575.4435	582.7332	592.5802	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1769.8220	1713.9565	1539.1384	1278.3314	946.6437	612.2085	376.5563	374.8424	652.4900	1022.1527	1387.9878	1724.5215	(97)
Space heating kWh	855.7908	711.5787	629.6394	401.4499	199.7216	0.0000	0.0000	0.0000	0.0000	332.3517	579.7833	842.1644	(98a)
Space heating requirement - total per year (kWh/year)												4552.4798	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	855.7908	711.5787	629.6394	401.4499	199.7216	0.0000	0.0000	0.0000	0.0000	332.3517	579.7833	842.1644	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4552.4798	
Space heating per m2											(98c) / (4) =	56.8137	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement	855.7908	711.5787	629.6394	401.4499	199.7216	0.0000	0.0000	0.0000	0.0000	332.3517	579.7833	842.1644	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	855.7908	711.5787	629.6394	401.4499	199.7216	0.0000	0.0000	0.0000	0.0000	332.3517	579.7833	842.1644	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	217.9808	192.0640	202.4122	174.2553	166.3590	147.1366	143.2792	150.5669	153.9728	174.9926	190.0840	215.1289	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	24.6350	19.7631	17.7945	13.0370	10.0701	8.2274	9.1863	11.9407	15.5098	20.3497	22.9850	25.3197	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-87.5306	-116.8774	-177.7333	-203.5357	-197.5643	-152.3811	-148.4051	-143.4023	-129.3606	-133.2902	-96.0009	-71.4974	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-29.8939	-55.2547	-123.6960	-218.5211	-307.0292	-386.8457	-370.0328	-314.9464	-226.0546	-102.5341	-43.1461	-21.5568	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4552.4798	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2128.2324	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	198.8183	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	3022.4403	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4552.4798	27.6700	1259.6712	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2128.2324	27.6700	588.8819	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	198.8183	27.6700	55.0130	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1657.5788	27.6700	-458.6521	
PV Unit electricity exported	-2199.5114	5.8100	-127.7916	
Total			-586.4437	(252)
Total energy cost			1317.1224	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4552.4798	0.1545	703.4718	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2128.2324	0.1414	300.8843	(264)
Space and water heating			1004.3561	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	198.8183	0.1443	28.6956	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1657.5788	0.1365	-226.2246	
PV Unit electricity exported	-2199.5114	0.1209	-265.9377	
Total			-492.1622	(269)
Total CO2, kg/year			540.8895	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4552.4798	1.5721	7156.9917	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2128.2324	1.5228	3240.8438	(278)
Space and water heating			10397.8355	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	198.8183	1.5338	304.9542	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1657.5788	1.5045	-2493.9062	
PV Unit electricity exported	-2199.5114	0.4434	-975.2577	
Total			-3469.1639	(283)
Total Primary energy kWh/year			7233.6258	(286)

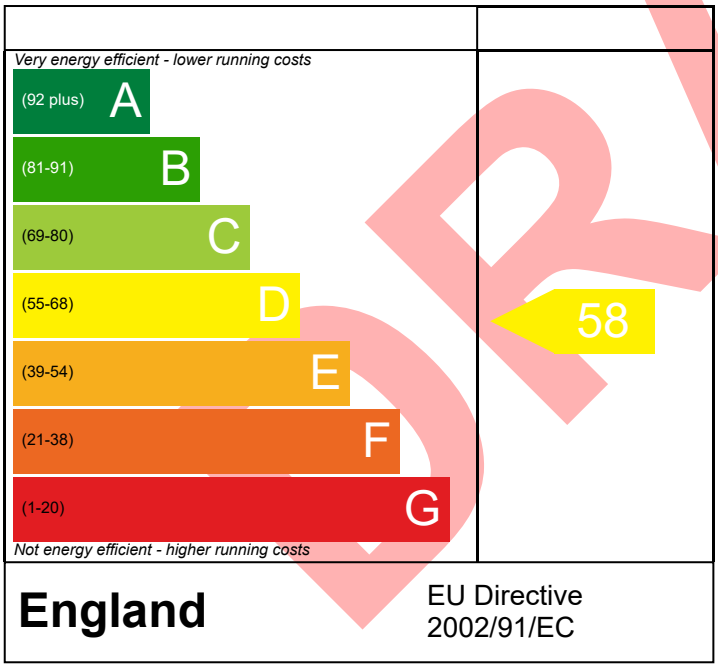
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	80.13 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

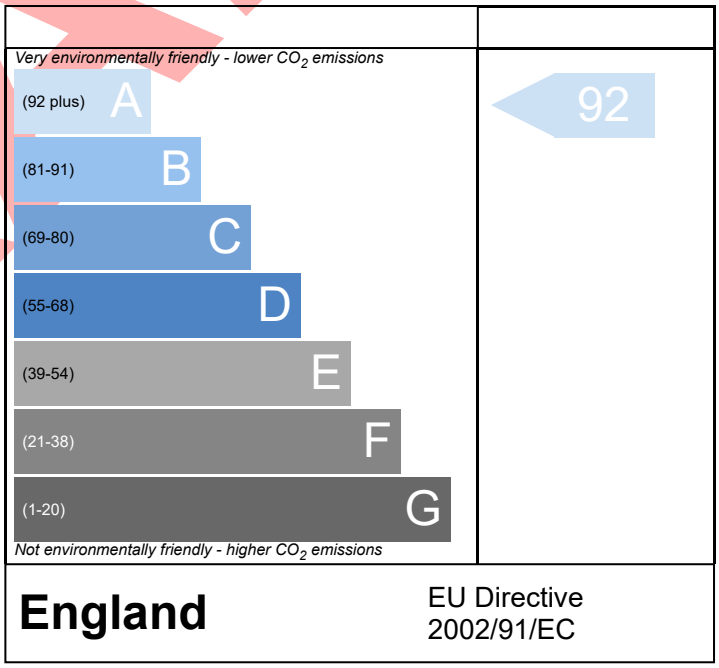
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

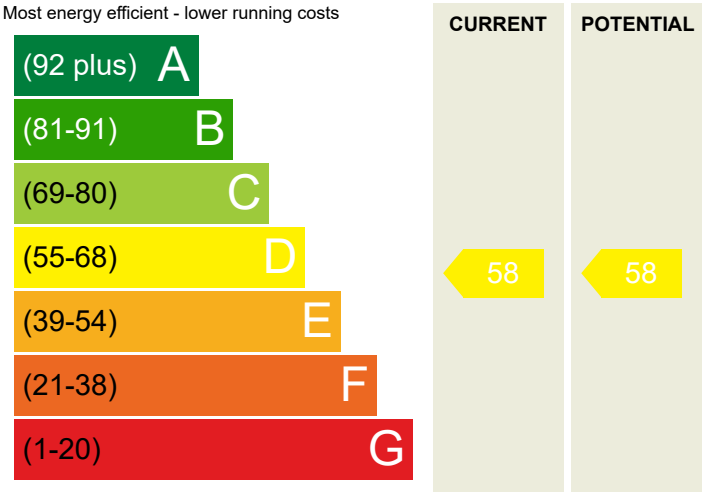
Energy Report

Dwelling Address	
Reference	Flat 3-Be Green
SAP Version	10.2
Assessment Date	12/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	80

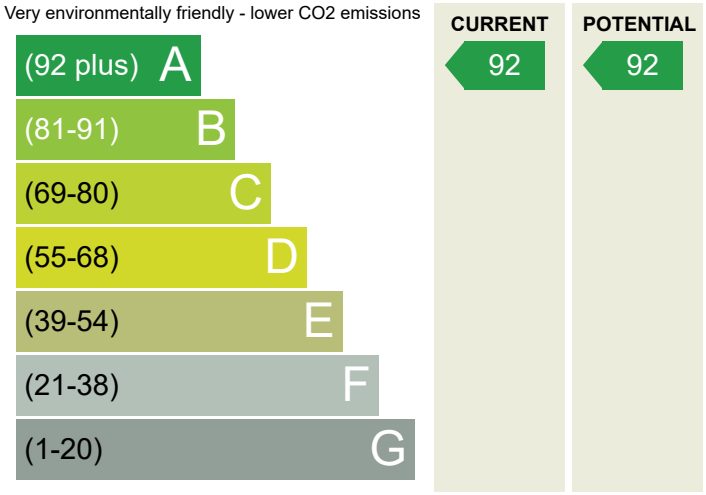
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

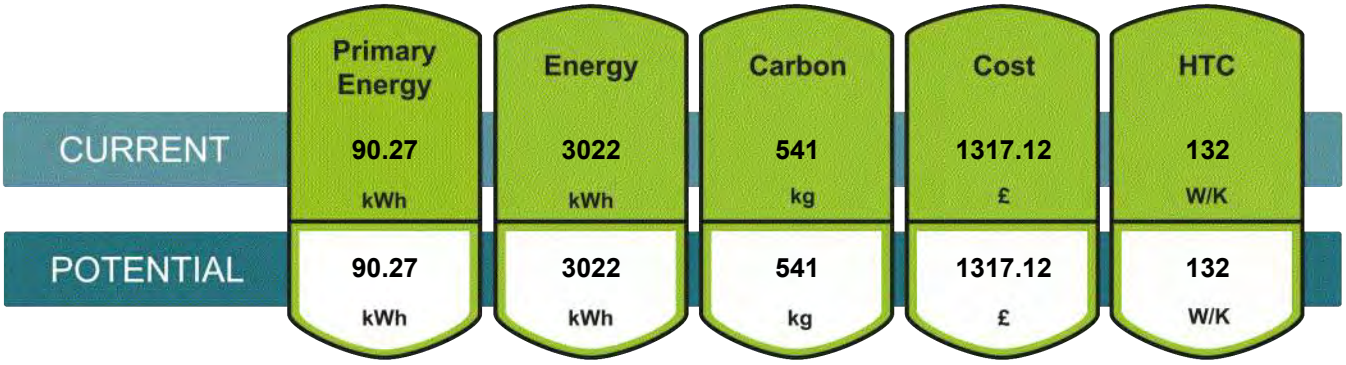


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£55	£55	
Heating	£1260	£1260	
Hot Water	£589	£589	
New Technologies e.g. Impact of PV	-(£586)	-(£586)	
TOTAL	£1317	£1317	

Estimated energy use and potential savings

Space Heating
4552
kWh per year

Water Heating
2128
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 4	**Issued on Date**	15/06/2026
Assessment Reference	Be Green	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	60 D	**DER**	8.80	**TER**	
Environmental	93 A	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.5	**DFEE**	71.66	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	107.91	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	4	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	255.57	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	13.60 m	79.14 m²	2.50 m

8.0 Living Area	40.57	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	34.00	26.95	0.00	None	7.05	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	65.33	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	118.86

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	79.14	77.02	None	0.00	Enter Gross Area	2.12

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	79.14

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Roof Light	Manufacturer	Roof Light	Double glazed			0.65		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SE Windows	Windows	External Wall 1	South East	2.63	
Rooflights	Roof Light	External Roof 1	North East	2.12	0
SW Windows	Windows	External Wall 1	South West	4.42	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	105.00	5.00	525.00	20

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	

Summary for Input Data

elmhurst energy

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day

32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	No	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.08	South West	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 4	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	60 D	DER	8.80	TER	
Environmental	93 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.5	DFEE	71.66	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	107.91	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		79.1400	(1b)	x 2.5000	(2b) =	197.8500	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	197.8500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8511	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7596	0.7447	0.7298	0.6553	0.6404	0.5660	0.5660	0.5511	0.5958	0.6404	0.6702	0.7000	(22b)
Effective ac	0.7885	0.7773	0.7663	0.7147	0.7051	0.6602	0.6602	0.6518	0.6775	0.7051	0.7246	0.7450	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.1800	14.2452	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.2600	7.0070	190.0000	5120.5000	(29a)
External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800	(30)
Total net area of external elements Aum(A, m2)			192.2800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.9071			(33)
Main dwelling								
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000	(32)
Internal Walls			118.8600			9.0000	1069.7400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	20225.6200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		255.5676	(35)
Thermal bridges (Default value 0.200 * total exposed area)		38.4560	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	83.3631	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	50.7496	50.0327	46.6653	46.0353	43.1023	43.1023	42.5592	44.2321	46.0353	47.3098	48.6423	(38)

Heat transfer coeff

	134.8442	134.1128	133.3958	130.0284	129.3984	126.4655	126.4655	125.9224	127.5952	129.3984	130.6729	132.0054 (39)
Average = Sum(39)m / 12 =												130.0254

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7039	1.6946	1.6856	1.6430	1.6351	1.5980	1.5980	1.5911	1.6123	1.6351	1.6512	1.6680	(40)
HLP (average)												1.6430	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4463	(42)
Hot water usage for mixer showers													
	61.1595	60.2404	58.9011	56.3385	54.4474	52.3385	51.1398	52.4690	53.9260	56.1903	58.8079	60.9252	(42a)
Hot water usage for baths													
	28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819	(42b)
Hot water usage for other uses													
	39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830	(42c)
Average daily hot water use (litres/day)												118.5871	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	129.0197	126.2391	122.8674	117.7753	113.6276	109.1735	107.4875	110.8448	114.3820	119.0548	124.2243	128.6901	(44)
Energy conte	204.3356	179.7627	188.8427	161.2285	152.9646	134.2415	129.9968	137.2491	141.0445	161.5562	176.9803	201.4975	(45)
Energy content (annual)										Total = Sum(45)m =		1969.7000	
Distribution loss (46)m = 0.15 x (45)m													
	30.6503	26.9644	28.3264	24.1843	22.9447	20.1362	19.4995	20.5874	21.1567	24.2334	26.5470	30.2246	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(64)
										Total per year (kWh/year) = Sum(64)m =		2118.6200	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	78.0600	68.9103	72.9086	63.4005	60.9791	54.4273	53.3423	55.7537	56.6893	63.8358	68.6379	77.1163	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	26.4644	23.5055	19.1159	14.4720	10.8180	9.1330	9.8685	12.8275	17.2170	21.8610	25.5150	27.1999	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)													
	104.9193	102.5451	97.9954	88.0562	81.9612	75.5935	71.6967	74.9378	78.7351	85.8008	95.3305	103.6510	(72)
Total internal gains													
	557.2615	555.2990	537.8657	505.1998	472.6246	443.1185	425.6250	428.4544	445.1353	474.9277	510.9375	542.3964	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Southwest	4.4200	36.7938	0.4600	0.7000	0.7700	36.2900	(79)
Northeast	2.1200	26.0000	0.6500	0.7000	1.0000	22.5716	(82)

Solar gains	80.4549	145.4762	218.2457	297.3739	353.9081	359.4993	343.2782	300.5229	245.9089	166.2676	97.9795	67.7670	(83)
Total gains	637.7164	700.7752	756.1114	802.5738	826.5327	802.6178	768.9032	728.9773	691.0441	641.1952	608.9170	610.1634	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6646	41.8918	42.1170	43.2077	43.4181	44.4250	44.4250	44.6166	44.0317	43.4181	42.9946	42.5606	
alpha	3.7776	3.7928	3.8078	3.8805	3.8945	3.9617	3.9617	3.9744	3.9354	3.8945	3.8663	3.8374	
util living area													
	0.9939	0.9905	0.9828	0.9627	0.9138	0.8018	0.6542	0.6985	0.8811	0.9700	0.9902	0.9949	(86)
MIT	19.0404	19.2230	19.5532	20.0206	20.4511	20.7956	20.9341	20.9136	20.6662	20.1136	19.5178	19.0380	(87)
Th 2	19.5381	19.5447	19.5512	19.5819	19.5877	19.6148	19.6148	19.6198	19.6043	19.5877	19.5760	19.5639	(88)

util rest of house													
	0.9917	0.9870	0.9759	0.9460	0.8701	0.6955	0.4798	0.5308	0.8038	0.9533	0.9860	0.9930	(89)
MIT 2	17.3277	17.5645	17.9878	18.5936	19.1139	19.4947	19.5953	19.5906	19.3727	18.7206	17.9617	17.3408	(90)
Living area fraction										fLA = Living area / (4) =		0.5126	(91)
MIT	18.2057	18.4147	18.7903	19.3251	19.7994	20.1616	20.2817	20.2688	20.0358	19.4347	18.7594	18.2108	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2057	18.4147	18.7903	19.3251	19.7994	20.1616	20.2817	20.2688	20.0358	19.4347	18.7594	18.2108	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9887	0.9831	0.9710	0.9422	0.8780	0.7426	0.5698	0.6167	0.8322	0.9509	0.9825	0.9904	(94)
Useful gains	630.5188	688.9553	734.1937	756.1486	725.7035	596.0635	438.1504	449.5351	575.0837	609.7216	598.2506	604.3356	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1875.1080	1812.4952	1639.4702	1355.5627	1048.0534	703.3507	465.6023	487.1711	757.3747	1143.1961	1523.5738	1849.5050	(97)
Space heating kWh	925.9743	755.0188	673.5257	431.5781	239.8284	0.0000	0.0000	0.0000	0.0000	396.9050	666.2327	926.4060	(98a)
Space heating requirement - total per year (kWh/year)												5015.4691	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	925.9743	755.0188	673.5257	431.5781	239.8284	0.0000	0.0000	0.0000	0.0000	396.9050	666.2327	926.4060	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5015.4691	
Space heating per m2											(98c) / (4) =	63.3746	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	925.9743	755.0188	673.5257	431.5781	239.8284	0.0000	0.0000	0.0000	0.0000	396.9050	666.2327	926.4060	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	925.9743	755.0188	673.5257	431.5781	239.8284	0.0000	0.0000	0.0000	0.0000	396.9050	666.2327	926.4060	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.1642	18.5831	16.7321	12.2586	9.4689	7.7362	8.6379	11.2278	14.5838	19.1348	21.6127	23.8080	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-70.0147	-107.5791	-166.0965	-190.6343	-195.3285	-143.2203	-140.6958	-133.8909	-118.7123	-120.7055	-78.6437	-59.3995	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-19.9115	-46.5816	-105.5722	-183.7925	-274.0832	-320.5570	-316.0322	-261.0072	-183.6589	-79.0194	-28.8725	-15.2561	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5015.4691	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2118.6200	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	186.9480	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	3961.7716	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	

Space heating - main system 1	5015.4691	16.4900	827.0508	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2118.6200	16.4900	349.3604	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	186.9480	16.4900	30.8277	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1524.9212	16.4900	-251.4595	
PV Unit electricity exported	-1834.3442	5.5900	-102.5398	
Total			-353.9994	(252)
Total energy cost			853.2396	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.4744	(257)
SAP value		59.8907	
SAP rating (Section 12)		60	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5015.4691	0.1543	773.7437	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2118.6200	0.1414	299.5234	(264)
Space and water heating			1073.2671	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	186.9480	0.1443	26.9824	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1524.9212	0.1360	-207.3375	
PV Unit electricity exported	-1834.3442	0.1205	-221.0250	
Total			-428.3625	(269)
Total CO2, kg/year			671.8870	(272)
CO2 emissions per m2			8.4900	(273)
EI value			92.7475	
EI rating			93	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	79.1400	(1b) x	2.5000	(2b) =	197.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		197.8500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8511	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7596	0.7000	0.6851	0.6404	0.6404	0.5958	0.5958	0.5809	0.5958	0.6702	0.6553	0.7000	(22b)
Effective ac	0.7885	0.7450	0.7347	0.7051	0.7051	0.6775	0.6775	0.6687	0.6775	0.7246	0.7147	0.7450	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.1800	14.2452	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.2600	7.0070	190.0000	5120.5000	(29a)
External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800	(30)
Total net area of external elements Aum(A, m2)			192.2800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	44.9071			(33)
Main dwelling								
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000	(32)
Internal Walls			118.8600			9.0000	1069.7400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	20225.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		255.5676 (35)
Thermal bridges (Default value 0.200 * total exposed area)		38.4560 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	83.3631 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	48.6423	47.9688	46.0353	46.0353	44.2321	44.2321	43.6600	44.2321	47.3098	46.6653	48.6423	(38)
Heat transfer coeff	134.8442	132.0054	131.3319	129.3984	129.3984	127.5952	127.5952	127.0231	127.5952	130.6729	130.0284	132.0054	(39)
Average = Sum(39)m / 12 =												129.9578	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7039	1.6680	1.6595	1.6351	1.6351	1.6123	1.6123	1.6050	1.6123	1.6512	1.6430	1.6680	(40)
HLP (average)												1.6421	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.4463 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
61.1595	60.2404	58.9011	56.3385	54.4474	52.3385	51.1398	52.4690	53.9260	56.1903	58.8079	60.9252	(42a)

Hot water usage for baths

28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819	(42b)

Hot water usage for other uses

39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830	(42c)
Average daily hot water use (litres/day)												118.5871 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.0197	126.2391	122.8674	117.7753	113.6276	109.1735	107.4875	110.8448	114.3820	119.0548	124.2243	128.6901	(44)
Energy conte	204.3356	179.7627	188.8427	161.2285	152.9646	134.2415	129.9968	137.2491	141.0445	161.5562	176.9803	201.4975	(45)
Energy content (annual)										Total = Sum(45)m =		1969.7000	
Distribution loss (46)m = 0.15 x (45)m													
	30.6503	26.9644	28.3264	24.1843	22.9447	20.1362	19.4995	20.5874	21.1567	24.2334	26.5470	30.2246	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(64)
										Total per year (kWh/year) = Sum(64)m =		2118.6200	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	78.0600	68.9103	72.9086	63.4005	60.9791	54.4273	53.3423	55.7537	56.6893	63.8358	68.6379	77.1163	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	26.4644	23.5055	19.1159	14.4720	10.8180	9.1330	9.8685	12.8275	17.2170	21.8610	25.5150	27.1999	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)													
	104.9193	102.5451	97.9954	88.0562	81.9612	75.5935	71.6967	74.9378	78.7351	85.8008	95.3305	103.6510	(72)
Total internal gains													
	557.2615	555.2990	537.8657	505.1998	472.6246	443.1185	425.6250	428.4544	445.1353	474.9277	510.9375	542.3964	(73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains

	m2	Table 6a W/m2	Specific data or Table 6b	Specific data or Table 6c	factor Table 6d	W	
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)
Southwest	4.4200	46.3896	0.4600	0.7000	0.7700	45.7543	(79)
Northeast	2.1200	35.0000	0.6500	0.7000	1.0000	30.3849	(82)

Solar gains	103.3641	159.9970	239.3210	332.9034	379.1689	417.1577	388.6708	346.9830	286.2118	193.5711	124.7874	83.0968	(83)
Total gains	660.6255	715.2960	777.1867	838.1032	851.7935	860.2762	814.2957	775.4373	731.3470	668.4987	635.7250	625.4933	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6646	42.5606	42.7788	43.4181	43.4181	44.0317	44.0317	44.2300	44.0317	42.9946	43.2077	42.5606	
alpha	3.7776	3.8374	3.8519	3.8945	3.8945	3.9354	3.9354	3.9487	3.9354	3.8663	3.8805	3.8374	
util living area	0.9913	0.9879	0.9772	0.9490	0.8798	0.7176	0.5492	0.5700	0.8152	0.9513	0.9843	0.9926	(86)
MIT	19.2456	19.4005	19.7316	20.1675	20.5866	20.8805	20.9694	20.9656	20.7918	20.3083	19.7614	19.2639	(87)
Th 2	19.5381	19.5639	19.5700	19.5877	19.5877	19.6043	19.6043	19.6096	19.6043	19.5760	19.5819	19.5639	(88)
util rest of house	0.9880	0.9833	0.9679	0.9261	0.8187	0.5831	0.3569	0.3732	0.7023	0.9221	0.9769	0.9897	(89)
MIT 2	17.5898	17.8026	18.2250	18.7764	19.2627	19.5493	19.5989	19.6034	19.4878	18.9495	18.2746	17.6296	(90)
Living area fraction									fLA = Living area / (4) =			0.5126	(91)
MIT	18.4386	18.6217	18.9974	19.4895	19.9414	20.2318	20.3015	20.3017	20.1563	19.6461	19.0368	18.4674	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4386	18.6217	18.9974	19.4895	19.9414	20.2318	20.3015	20.3017	20.1563	19.6461	19.0368	18.4674	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9844	0.9790	0.9628	0.9240	0.8367	0.6488	0.4572	0.4761	0.7532	0.9239	0.9729	0.9866	(94)
Useful gains	650.3104	700.2780	748.3036	774.4450	712.6567	558.1613	372.2950	369.1733	550.8380	617.6340	618.5120	617.0933	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1758.1821	1705.7388	1536.2402	1279.6848	949.9664	616.5083	382.9734	381.2832	657.9160	1025.2696	1383.0876	1711.7681	(97)
Space heating kWh	824.2565	675.6696	586.2248	363.7727	176.5584	0.0000	0.0000	0.0000	0.0000	303.2809	550.4944	814.4381	(98a)
Space heating requirement - total per year (kWh/year)												4294.6954	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	824.2565	675.6696	586.2248	363.7727	176.5584	0.0000	0.0000	0.0000	0.0000	303.2809	550.4944	814.4381	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4294.6954	
Space heating per m2											(98c) / (4) =	54.2671	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	824.2565	675.6696	586.2248	363.7727	176.5584	0.0000	0.0000	0.0000	0.0000	303.2809	550.4944	814.4381	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	824.2565	675.6696	586.2248	363.7727	176.5584	0.0000	0.0000	0.0000	0.0000	303.2809	550.4944	814.4381	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.1642	18.5831	16.7321	12.2586	9.4689	7.7362	8.6379	11.2278	14.5838	19.1348	21.6127	23.8080	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-87.1728	-116.0606	-175.6094	-199.6208	-193.3022	-151.5680	-147.6073	-142.6591	-128.7451	-131.5208	-95.3885	-71.2589	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-30.2517	-56.0715	-125.8199	-222.4360	-311.2914	-387.6588	-370.8306	-315.6896	-226.6701	-104.3035	-43.7584	-21.7953	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4294.6954	(211)
Space heating fuel - main system 2												0.0000	(213)

Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2118.6200	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	186.9480	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	2743.1731	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4294.6954	27.6700	1188.3422	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2118.6200	27.6700	586.2221	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	186.9480	27.6700	51.7285	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1640.5134	27.6700	-453.9301	
PV Unit electricity exported	-2216.5768	5.8100	-128.7831	
Total			-582.7132	(252)
Total energy cost			1243.5797	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4294.6954	0.1547	664.6028	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2118.6200	0.1414	299.5234	(264)
Space and water heating			964.1262	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	186.9480	0.1443	26.9824	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1640.5134	0.1365	-223.8717	
PV Unit electricity exported	-2216.5768	0.1211	-268.3745	
Total			-492.2463	(269)
Total CO2, kg/year			498.8623	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4294.6954	1.5729	6755.2791	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2118.6200	1.5228	3226.1988	(278)
Space and water heating			9981.4780	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	186.9480	1.5338	286.7470	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1640.5134	1.5045	-2468.1375	
PV Unit electricity exported	-2216.5768	0.4440	-984.2488	
Total			-3452.3864	(283)
Total Primary energy kWh/year			6815.8386	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating: D 60
Current environmental impact rating: A 93

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: D 60
Potential environmental impact rating: A 93

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1826	£1826	£0
Space heating	£1188	£1188	£0
Water heating	£586	£586	£0
Lighting	£52	£52	£0
Generated (PV)	-£583	-£583	£0
Total cost of fuels	£1243	£1243	£0
Total cost of uses	£1243	£1243	£0
Delivered energy	35 kWh/m²	35 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.5 tonnes	0.5 tonnes	0.0 tonnes
CO2 emissions per m²	6 kg/m²	6 kg/m²	0 kg/m²
Primary energy	86 kWh/m²	86 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	79.1400	(1b)	x 2.5000	(2b) =	197.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	197.8500	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8511 (18)
Number of sides sheltered		4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.7596	0.7447	0.7298	0.6553	0.6404	0.5660	0.5660	0.5511	0.5958	0.6404	0.6702	0.7000	(22b)
Effective ac	0.7885	0.7773	0.7663	0.7147	0.7051	0.6602	0.6602	0.6518	0.6775	0.7051	0.7246	0.7450	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.1800	14.2452	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.2600	7.0070	190.0000	5120.5000	(29a)
External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800	(30)
Total net area of external elements Aum(A, m2)			192.2800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.9071			(33)
Main dwelling								
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000	(32)
Internal Walls			118.8600			9.0000	1069.7400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	20225.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		255.5676 (35)
Thermal bridges (Default value 0.200 * total exposed area)		38.4560 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	83.3631 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	50.7496	50.0327	46.6653	46.0353	43.1023	43.1023	42.5592	44.2321	46.0353	47.3098	48.6423	(38)
Heat transfer coeff	134.8442	134.1128	133.3958	130.0284	129.3984	126.4655	126.4655	125.9224	127.5952	129.3984	130.6729	132.0054	(39)
Average = Sum(39)m / 12 =												130.0254	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7039	1.6946	1.6856	1.6430	1.6351	1.5980	1.5980	1.5911	1.6123	1.6351	1.6512	1.6680	(40)
HLP (average)												1.6430	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy											2.4463	(42)
Hot water usage for mixer showers												
61.1595	60.2404	58.9011	56.3385	54.4474	52.3385	51.1398	52.4690	53.9260	56.1903	58.8079	60.9252	(42a)
Hot water usage for baths												
28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819	(42b)
Hot water usage for other uses												
39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830	(42c)
Average daily hot water use (litres/day)												118.5871	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	129.0197	126.2391	122.8674	117.7753	113.6276	109.1735	107.4875	110.8448	114.3820	119.0548	124.2243	128.6901	(44)
Energy conte	204.3356	179.7627	188.8427	161.2285	152.9646	134.2415	129.9968	137.2491	141.0445	161.5562	176.9803	201.4975	(45)
Energy content (annual)										Total = Sum(45)m =		1969.7000	
Distribution loss (46)m = 0.15 x (45)m													
	30.6503	26.9644	28.3264	24.1843	22.9447	20.1362	19.4995	20.5874	21.1567	24.2334	26.5470	30.2246	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(64)
										Total per year (kWh/year) = Sum(64)m =		2118.6200	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
							Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					0.0000	(64a)
Heat gains from water heating, kWh/month													
	78.0600	68.9103	72.9086	63.4005	60.9791	54.4273	53.3423	55.7537	56.6893	63.8358	68.6379	77.1163	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	26.4644	23.5055	19.1159	14.4720	10.8180	9.1330	9.8685	12.8275	17.2170	21.8610	25.5150	27.1999	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)													
	104.9193	102.5451	97.9954	88.0562	81.9612	75.5935	71.6967	74.9378	78.7351	85.8008	95.3305	103.6510	(72)
Total internal gains													
	557.2615	555.2990	537.8657	505.1998	472.6246	443.1185	425.6250	428.4544	445.1353	474.9277	510.9375	542.3964	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	36.7938	0.4600	0.7000	0.7700	21.5933	(77)
Southwest	4.4200	36.7938	0.4600	0.7000	0.7700	36.2900	(79)
Northeast	2.1200	26.0000	0.6500	0.7000	1.0000	22.5716	(82)

Solar gains	80.4549	145.4762	218.2457	297.3739	353.9081	359.4993	343.2782	300.5229	245.9089	166.2676	97.9795	67.7670	(83)
Total gains	637.7164	700.7752	756.1114	802.5738	826.5327	802.6178	768.9032	728.9773	691.0441	641.1952	608.9170	610.1634	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)											21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6646	41.8918	42.1170	43.2077	43.4181	44.4250	44.4250	44.6166	44.0317	43.4181	42.9946	42.5606	
alpha	3.7776	3.7928	3.8078	3.8805	3.8945	3.9617	3.9617	3.9744	3.9354	3.8945	3.8663	3.8374	
util living area													
	0.9939	0.9905	0.9828	0.9627	0.9138	0.8018	0.6542	0.6985	0.8811	0.9700	0.9902	0.9949	(86)
MIT	19.0404	19.2230	19.5532	20.0206	20.4511	20.7956	20.9341	20.9136	20.6662	20.1136	19.5178	19.0380	(87)
Th 2	19.5381	19.5447	19.5512	19.5819	19.5877	19.6148	19.6148	19.6198	19.6043	19.5877	19.5760	19.5639	(88)
util rest of house													
	0.9917	0.9870	0.9759	0.9460	0.8701	0.6955	0.4798	0.5308	0.8038	0.9533	0.9860	0.9930	(89)
MIT 2	17.3277	17.5645	17.9878	18.5936	19.1139	19.4947	19.5953	19.5906	19.3727	18.7206	17.9617	17.3408	(90)
Living area fraction										fLA = Living area / (4) =		0.5126	(91)

MIT	18.2057	18.4147	18.7903	19.3251	19.7994	20.1616	20.2817	20.2688	20.0358	19.4347	18.7594	18.2108	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2057	18.4147	18.7903	19.3251	19.7994	20.1616	20.2817	20.2688	20.0358	19.4347	18.7594	18.2108	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9887	0.9831	0.9710	0.9422	0.8780	0.7426	0.5698	0.6167	0.8322	0.9509	0.9825	0.9904	(94)
Useful gains	630.5188	688.9553	734.1937	756.1486	725.7035	596.0635	438.1504	449.5351	575.0837	609.7216	598.2506	604.3356	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1875.1080	1812.4952	1639.4702	1355.5627	1048.0534	703.3507	465.6023	487.1711	757.3747	1143.1961	1523.5738	1849.5050	(97)
Space heating kWh													
	925.9743	755.0188	673.5257	431.5781	239.8284	0.0000	0.0000	0.0000	0.0000	396.9050	666.2327	926.4060	(98a)
Space heating requirement - total per year (kWh/year)												5015.4691	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	925.9743	755.0188	673.5257	431.5781	239.8284	0.0000	0.0000	0.0000	0.0000	396.9050	666.2327	926.4060	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5015.4691	
Space heating per m2											(98c) / (4) =	63.3746	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	925.9743	755.0188	673.5257	431.5781	239.8284	0.0000	0.0000	0.0000	0.0000	396.9050	666.2327	926.4060	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	925.9743	755.0188	673.5257	431.5781	239.8284	0.0000	0.0000	0.0000	0.0000	396.9050	666.2327	926.4060	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.1642	18.5831	16.7321	12.2586	9.4689	7.7362	8.6379	11.2278	14.5838	19.1348	21.6127	23.8080	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-70.0147	-107.5791	-166.0965	-190.6343	-195.3285	-143.2203	-140.6958	-133.8909	-118.7123	-120.7055	-78.6437	-59.3995	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-19.9115	-46.5816	-105.5722	-183.7925	-274.0832	-320.5570	-316.0322	-261.0072	-183.6589	-79.0194	-28.8725	-15.2561	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5015.4691	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2118.6200	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	186.9480	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	3961.7716	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	5015.4691	16.4900	827.0508	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2118.6200	16.4900	349.3604	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	186.9480	16.4900	30.8277	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1524.9212	16.4900	-251.4595	
PV Unit electricity exported	-1834.3442	5.5900	-102.5398	
Total			-353.9994	(252)
Total energy cost			853.2396	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.4744	(257)
SAP value		59.8907	
SAP rating (Section 12)		60	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5015.4691	0.1543	773.7437	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2118.6200	0.1414	299.5234	(264)
Space and water heating			1073.2671	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	186.9480	0.1443	26.9824	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1524.9212	0.1360	-207.3375	
PV Unit electricity exported	-1834.3442	0.1205	-221.0250	
Total			-428.3625	(269)
Total CO2, kg/year			671.8870	(272)
CO2 emissions per m2			8.4900	(273)
EI value			92.7475	
EI rating			93	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		79.1400	(1b)	x 2.5000	(2b) =	197.8500	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.1400						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		197.8500	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1011	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8511	(18)
Number of sides sheltered		4	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.5958	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.7596	0.7000	0.6851	0.6404	0.6404	0.5958	0.5958	0.5809	0.5958	0.6702	0.6553	0.7000	(22b)
Effective ac	0.7885	0.7450	0.7347	0.7051	0.7051	0.6775	0.6775	0.6687	0.6775	0.7246	0.7147	0.7450	(25)

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3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Windows			7.0500	1.2357	8.7120			(27)
Roof Light			2.1200	1.2357	2.6198			(27a)
Heatloss Floor 1			79.1400	0.1800	14.2452	20.0000	1582.8000	(28b)
External Wall 1	34.0000	7.0500	26.9500	0.2600	7.0070	190.0000	5120.5000	(29a)
External Roof 1	79.1400	2.1200	77.0200	0.1600	12.3232	9.0000	693.1800	(30)
Total net area of external elements Aum(A, m2)			192.2800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	44.9071			(33)
Main dwelling								
Party Wall 1			65.3300	0.0000	0.0000	180.0000	11759.4000	(32)
Internal Walls			118.8600			9.0000	1069.7400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	20225.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		255.5676 (35)
Thermal bridges (Default value 0.200 * total exposed area)		38.4560 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	83.3631 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.4810	48.6423	47.9688	46.0353	46.0353	44.2321	44.2321	43.6600	44.2321	47.3098	46.6653	48.6423	(38)
Heat transfer coeff	134.8442	132.0054	131.3319	129.3984	129.3984	127.5952	127.5952	127.0231	127.5952	130.6729	130.0284	132.0054	(39)
Average = Sum(39)m / 12 =												129.9578	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7039	1.6680	1.6595	1.6351	1.6351	1.6123	1.6123	1.6050	1.6123	1.6512	1.6430	1.6680	(40)
HLP (average)												1.6421	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.4463 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
61.1595	60.2404	58.9011	56.3385	54.4474	52.3385	51.1398	52.4690	53.9260	56.1903	58.8079	60.9252	(42a)

Hot water usage for baths

28.1772	27.7587	27.1694	26.0829	25.2693	24.3671	23.8798	24.4650	25.1021	26.0675	27.1764	28.0819	(42b)

Hot water usage for other uses

39.6830	38.2400	36.7969	35.3539	33.9109	32.4679	32.4679	33.9109	35.3539	36.7969	38.2400	39.6830	(42c)

Average daily hot water use (litres/day)		118.5871 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.0197	126.2391	122.8674	117.7753	113.6276	109.1735	107.4875	110.8448	114.3820	119.0548	124.2243	128.6901	(44)
Energy conte	204.3356	179.7627	188.8427	161.2285	152.9646	134.2415	129.9968	137.2491	141.0445	161.5562	176.9803	201.4975	(45)
Energy content (annual)										Total = Sum(45)m =		1969.7000	
Distribution loss (46)m = 0.15 x (45)m													
	30.6503	26.9644	28.3264	24.1843	22.9447	20.1362	19.4995	20.5874	21.1567	24.2334	26.5470	30.2246	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(64)
										Total per year (kWh/year) = Sum(64)m =		2118.6200	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	78.0600	68.9103	72.9086	63.4005	60.9791	54.4273	53.3423	55.7537	56.6893	63.8358	68.6379	77.1163	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	146.7804	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	26.4644	23.5055	19.1159	14.4720	10.8180	9.1330	9.8685	12.8275	17.2170	21.8610	25.5150	27.1999	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	324.8265	328.1972	319.7032	301.6204	278.7942	257.3408	243.0086	239.6379	248.1319	266.2147	289.0409	310.4943	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	52.1244	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	-97.8536	(71)
Water heating gains (Table 5)													
	104.9193	102.5451	97.9954	88.0562	81.9612	75.5935	71.6967	74.9378	78.7351	85.8008	95.3305	103.6510	(72)
Total internal gains													
	557.2615	555.2990	537.8657	505.1998	472.6246	443.1185	425.6250	428.4544	445.1353	474.9277	510.9375	542.3964	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	2.6300	46.3896	0.4600	0.7000	0.7700	27.2248	(77)

Southwest			4.4200		46.3896		0.4600		0.7000		0.7700		45.7543 (79)
Northeast			2.1200		35.0000		0.6500		0.7000		1.0000		30.3849 (82)
Solar gains	103.3641	159.9970	239.3210	332.9034	379.1689	417.1577	388.6708	346.9830	286.2118	193.5711	124.7874	83.0968	(83)
Total gains	660.6255	715.2960	777.1867	838.1032	851.7935	860.2762	814.2957	775.4373	731.3470	668.4987	635.7250	625.4933	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.6646	42.5606	42.7788	43.4181	43.4181	44.0317	44.0317	44.2300	44.0317	42.9946	43.2077	42.5606	
alpha	3.7776	3.8374	3.8519	3.8945	3.8945	3.9354	3.9354	3.9487	3.9354	3.8663	3.8805	3.8374	
util living area	0.9913	0.9879	0.9772	0.9490	0.8798	0.7176	0.5492	0.5700	0.8152	0.9513	0.9843	0.9926	(86)
MIT	19.2456	19.4005	19.7316	20.1675	20.5866	20.8805	20.9694	20.9656	20.7918	20.3083	19.7614	19.2639	(87)
Th 2	19.5381	19.5639	19.5700	19.5877	19.5877	19.6043	19.6043	19.6096	19.6043	19.5760	19.5819	19.5639	(88)
util rest of house	0.9880	0.9833	0.9679	0.9261	0.8187	0.5831	0.3569	0.3732	0.7023	0.9221	0.9769	0.9897	(89)
MIT 2	17.5898	17.8026	18.2250	18.7764	19.2627	19.5493	19.5989	19.6034	19.4878	18.9495	18.2746	17.6296	(90)
Living area fraction										fLA = Living area / (4) =		0.5126	(91)
MIT	18.4386	18.6217	18.9974	19.4895	19.9414	20.2318	20.3015	20.3017	20.1563	19.6461	19.0368	18.4674	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4386	18.6217	18.9974	19.4895	19.9414	20.2318	20.3015	20.3017	20.1563	19.6461	19.0368	18.4674	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9844	0.9790	0.9628	0.9240	0.8367	0.6488	0.4572	0.4761	0.7532	0.9239	0.9729	0.9866	(94)
Useful gains	650.3104	700.2780	748.3036	774.4450	712.6567	558.1613	372.2950	369.1733	550.8380	617.6340	618.5120	617.0933	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1758.1821	1705.7388	1536.2402	1279.6848	949.9664	616.5083	382.9734	381.2832	657.9160	1025.2696	1383.0876	1711.7681	(97)
Space heating kWh	824.2565	675.6696	586.2248	363.7727	176.5584	0.0000	0.0000	0.0000	0.0000	303.2809	550.4944	814.4381	(98a)
Space heating requirement - total per year (kWh/year)												4294.6954	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	824.2565	675.6696	586.2248	363.7727	176.5584	0.0000	0.0000	0.0000	0.0000	303.2809	550.4944	814.4381	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4294.6954	
Space heating per m2											(98c) / (4) =	54.2671	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement	824.2565	675.6696	586.2248	363.7727	176.5584	0.0000	0.0000	0.0000	0.0000	303.2809	550.4944	814.4381	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	824.2565	675.6696	586.2248	363.7727	176.5584	0.0000	0.0000	0.0000	0.0000	303.2809	550.4944	814.4381	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	216.9836	191.1867	201.4907	173.4685	165.6126	146.4815	142.6448	149.8971	153.2845	174.2042	189.2203	214.1455	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.1642	18.5831	16.7321	12.2586	9.4689	7.7362	8.6379	11.2278	14.5838	19.1348	21.6127	23.8080	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-87.1728	-116.0606	-175.6094	-199.6208	-193.3022	-151.5680	-147.6073	-142.6591	-128.7451	-131.5208	-95.3885	-71.2589	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-30.2517	-56.0715	-125.8199	-222.4360	-311.2914	-387.6588	-370.8306	-315.6896	-226.6701	-104.3035	-43.7584	-21.7953	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4294.6954	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2118.6200	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	186.9480	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	2743.1731	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4294.6954	27.6700	1188.3422	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2118.6200	27.6700	586.2221	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	186.9480	27.6700	51.7285	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1640.5134	27.6700	-453.9301	
PV Unit electricity exported	-2216.5768	5.8100	-128.7831	
Total			-582.7132	(252)
Total energy cost			1243.5797	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4294.6954	0.1547	664.6028	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2118.6200	0.1414	299.5234	(264)
Space and water heating			964.1262	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	186.9480	0.1443	26.9824	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1640.5134	0.1365	-223.8717	
PV Unit electricity exported	-2216.5768	0.1211	-268.3745	
Total			-492.2463	(269)
Total CO2, kg/year			498.8623	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4294.6954	1.5729	6755.2791	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2118.6200	1.5228	3226.1988	(278)
Space and water heating			9981.4780	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	186.9480	1.5338	286.7470	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1640.5134	1.5045	-2468.1375	
PV Unit electricity exported	-2216.5768	0.4440	-984.2488	
Total			-3452.3864	(283)
Total Primary energy kWh/year			6815.8386	(286)

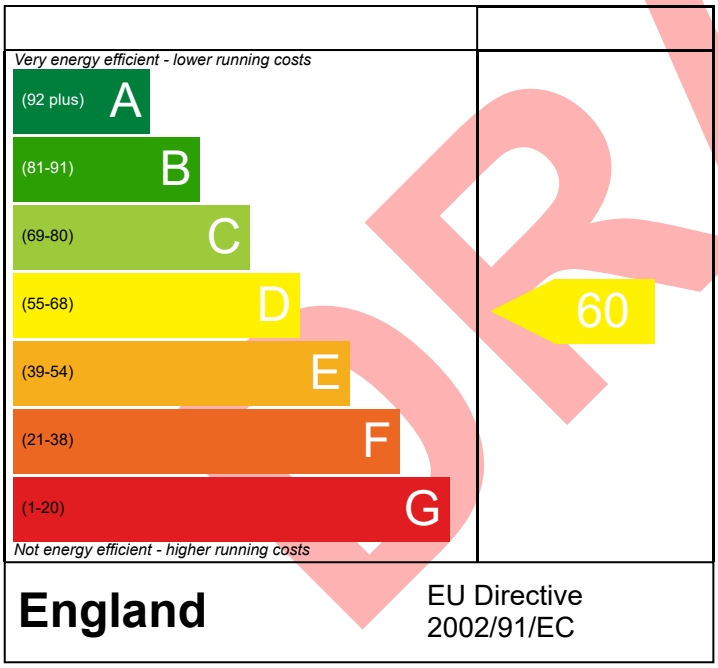
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	79.14 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

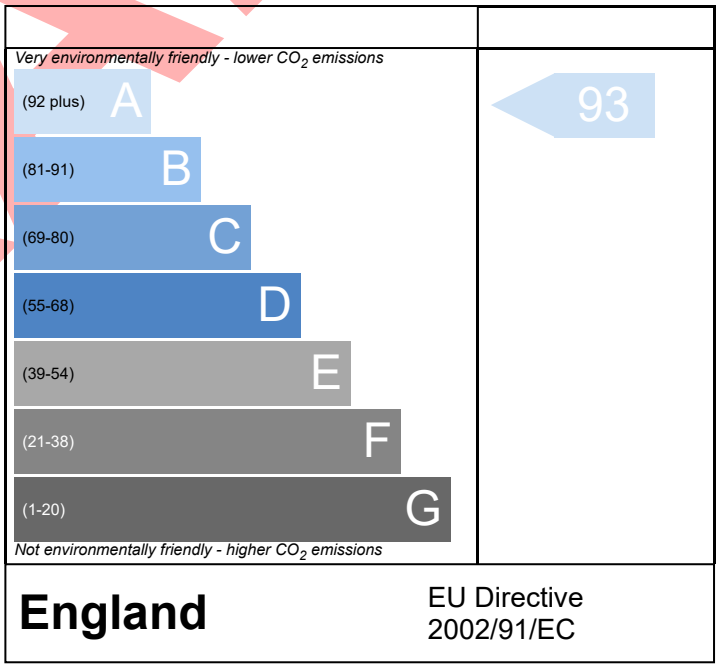
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

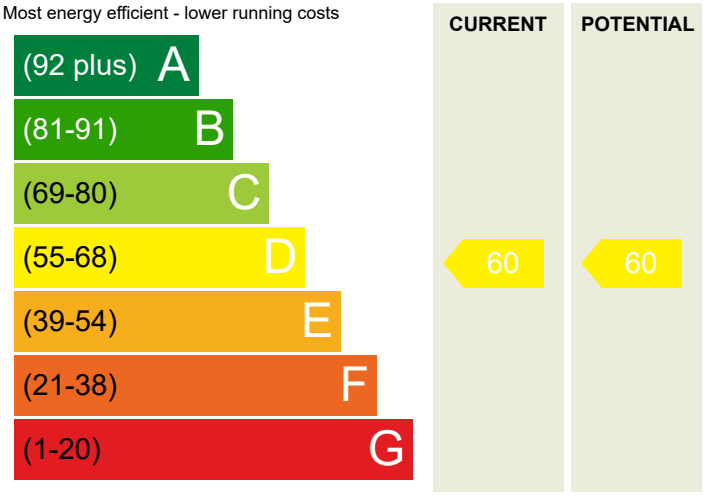
Energy Report

Dwelling Address	
Reference	Flat 4-Be Green
SAP Version	10.2
Assessment Date	12/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	79

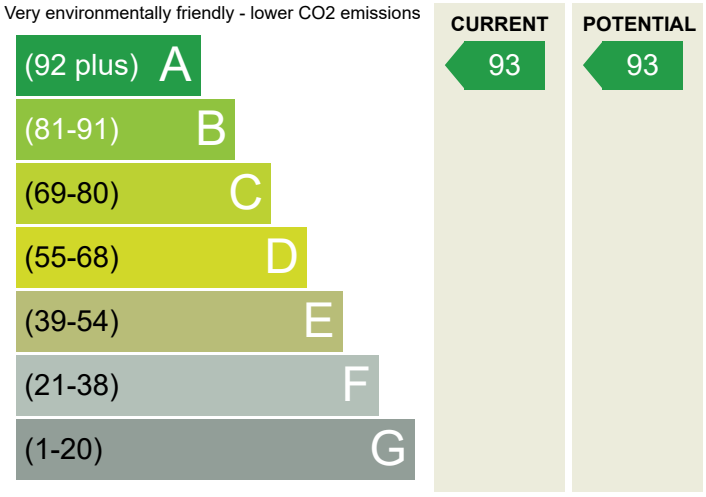
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

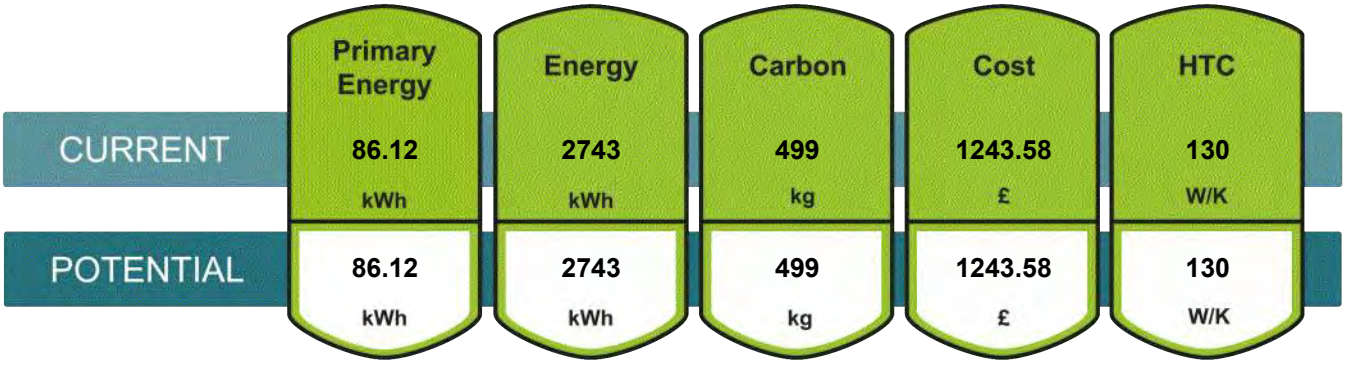


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£52	£52	
Heating	£1188	£1188	
Hot Water	£586	£586	
New Technologies e.g. Impact of PV	-(£583)	-(£583)	
TOTAL	£1244	£1244	

Estimated energy use and potential savings

Space Heating
4295
kWh per year

Water Heating
2119
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 5	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	68 D	DER	7.17	TER	
Environmental	95 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.23	DFEE	70.92	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	102.23	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	245.46	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	6.21 m	53.92 m²	2.50 m

8.0 Living Area 24.65 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	15.53	11.43	0.00	None	4.10	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Single plasterboard on both sides, dense cellular blocks, cavity	0.00	70.00	23.48	0.00	None
Party Wall to Adj Flat	Filled Cavity with Edge Sealing	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	38.80	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	98.00

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	53.92	52.86	None	0.00	Enter Gross Area	1.06

11.0 Heat Loss Floors

Summary for Input Data

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	53.92

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Roof light	Manufacturer	Roof Light	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
NE Windows	Windows	External Wall 1	North East	4.10	
Rooflights	Roof light	External Roof 1	North East	1.06	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Independent

Summary for Input Data

SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day

32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	No	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.08	South West	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 5	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	68 D	DER	7.17	TER	
Environmental	95 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.23	DFEE	70.92	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	102.23	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area		Storey height		Volume	
Main dwelling		(m2)		(m)		(m3)	
Ground floor		53.9200	(1b)	x 2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	134.8000	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8984	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8877	0.8703	0.8529	0.7659	0.7485	0.6614	0.6614	0.6440	0.6962	0.7485	0.7833	0.8181	(22b)
Effective ac	0.8940	0.8787	0.8637	0.7933	0.7801	0.7187	0.7187	0.7074	0.7424	0.7801	0.8068	0.8346	(25)

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3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.1800	9.7056	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.2600	2.9718	190.0000	2171.7000	(29a)
External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400	(30)
Total net area of external elements Aum(A, m2)			123.3700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.5114			(33)
Main dwelling								
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000	(32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000	(32)
Internal Walls			98.0000			9.0000	882.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644	(35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	52.1854	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

(38)m	39.7689	39.0883	38.4212	35.2878	34.7016	31.9725	31.9725	31.4671	33.0237	34.7016	35.8875	37.1274	(38)
Heat transfer coeff													
	91.9544	91.2738	90.6067	87.4732	86.8870	84.1579	84.1579	83.6525	85.2091	86.8870	88.0730	89.3129	(39)
Average = Sum(39)m / 12 =												87.4704	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7054	1.6928	1.6804	1.6223	1.6114	1.5608	1.5608	1.5514	1.5803	1.6114	1.6334	1.6564	(40)
HLP (average)												1.6222	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8057	(42)
Hot water usage for mixer showers													
	51.0884	50.3207	49.2019	47.0613	45.4816	43.7200	42.7187	43.8290	45.0461	46.9376	49.1241	50.8927	(42a)
Hot water usage for baths													
	23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779	(42b)
Hot water usage for other uses													
	33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217	(42c)
Average daily hot water use (litres/day)												99.0540	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	107.7677	105.4456	102.6298	98.3763	94.9120	91.1917	89.7830	92.5869	95.5411	99.4441	103.7622	107.4923	(44)
Energy conte	170.6777	150.1532	157.7381	134.6723	127.7698	112.1308	108.5847	114.6420	117.8118	134.9447	147.8283	168.3070	(45)
Energy content (annual)										Total = Sum(45)m =		1645.2604	
Distribution loss (46)m = 0.15 x (45)m													
	25.6017	22.5230	23.6607	20.2008	19.1655	16.8196	16.2877	17.1963	17.6718	20.2417	22.1742	25.2460	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(64)
									Total per year (kWh/year) = Sum(64)m =			1794.1804	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.8687	59.0651	62.5663	54.5705	52.6019	47.0755	46.2228	48.2369	48.9644	54.9875	58.9449	66.0805	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.9728	17.7397	14.4269	10.9221	8.1644	6.8927	7.4478	9.6810	12.9938	16.4986	19.2563	20.5279	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)													
	89.8773	87.8945	84.0945	75.7924	70.7014	65.3826	62.1274	64.8345	68.0061	73.9080	81.8679	88.8178	(72)
Total internal gains													
	428.5252	426.7471	413.4912	388.6064	364.2492	342.1431	329.0776	331.5800	344.2076	366.6921	393.9182	417.6555	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	446.8349	464.3475	480.8386	496.8573	506.8016	492.6777	470.4845	446.2548	425.6640	412.6451	417.0441	432.5365	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.9819	40.2800	40.5766	42.0301	42.3137	43.6859	43.6859	43.9498	43.1469	42.3137	41.7439	41.1644	
alpha	3.6655	3.6853	3.7051	3.8020	3.8209	3.9124	3.9124	3.9300	3.8765	3.8209	3.7829	3.7443	
util living area													
	0.9923	0.9902	0.9846	0.9693	0.9299	0.8303	0.6921	0.7343	0.9005	0.9722	0.9887	0.9932	(86)
MIT	19.0020	19.1490	19.4563	19.9299	20.3741	20.7572	20.9162	20.8928	20.6176	20.0662	19.4967	19.0249	(87)
Th 2	19.5370	19.5460	19.5549	19.5970	19.6050	19.6422	19.6422	19.6492	19.6278	19.6050	19.5889	19.5722	(88)

util rest of house													
	0.9896	0.9867	0.9786	0.9556	0.8933	0.7331	0.5200	0.5719	0.8331	0.9570	0.9840	0.9909	(89)
MIT 2	17.2861	17.4792	17.8758	18.4999	19.0467	19.4903	19.6149	19.6092	19.3487	18.6808	17.9506	17.3373	(90)
Living area fraction										fLA = Living area / (4) =		0.4572	(91)
MIT	18.0706	18.2426	18.5983	19.1536	19.6535	20.0695	20.2098	20.1960	19.9288	19.3142	18.6574	18.1088	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.0706	18.2426	18.5983	19.1536	19.6535	20.0695	20.2098	20.1960	19.9288	19.3142	18.6574	18.1088	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9857	0.9821	0.9729	0.9498	0.8949	0.7685	0.5989	0.6453	0.8513	0.9527	0.9795	0.9874	(94)
Useful gains	440.4325	456.0320	467.8275	471.9370	453.5367	378.6293	281.7857	287.9720	362.3739	393.1328	408.5051	427.0726	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1266.2628	1217.8274	1096.1896	896.9180	691.0558	460.2994	303.7935	317.5446	496.6696	757.1465	1017.8951	1242.2330	(97)
Space heating kWh													
	614.4178	511.9265	467.5014	305.9863	176.7142	0.0000	0.0000	0.0000	0.0000	270.8262	438.7608	606.4794	(98a)
Space heating requirement - total per year (kWh/year)												3392.6126	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	614.4178	511.9265	467.5014	305.9863	176.7142	0.0000	0.0000	0.0000	0.0000	270.8262	438.7608	606.4794	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3392.6126	
Space heating per m2											(98c) / (4) =	62.9194	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	614.4178	511.9265	467.5014	305.9863	176.7142	0.0000	0.0000	0.0000	0.0000	270.8262	438.7608	606.4794	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	614.4178	511.9265	467.5014	305.9863	176.7142	0.0000	0.0000	0.0000	0.0000	270.8262	438.7608	606.4794	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4821	14.0248	12.6278	9.2516	7.1462	5.8385	6.5190	8.4737	11.0065	14.4411	16.3112	17.9680	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-66.6819	-100.6475	-152.4945	-170.8903	-171.8981	-122.6537	-120.5104	-116.2509	-105.0449	-110.7707	-74.0531	-56.7414	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-23.2443	-53.5132	-119.1742	-203.5366	-297.5135	-341.1236	-336.2176	-278.6472	-197.3263	-88.9542	-33.4631	-17.9141	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3392.6126	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1794.1804	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	141.0905	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	1968.6181	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	

Space heating - main system 1	3392.6126	16.4900	559.4418	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1794.1804	16.4900	295.8603	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	141.0905	16.4900	23.2658	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1368.6375	16.4900	-225.6883	
PV Unit electricity exported	-1990.6279	5.5900	-111.2761	
Total			-336.9644	(252)
Total energy cost			541.6036	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.9711	(257)
SAP value		68.0491	
SAP rating (Section 12)		68	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3392.6126	0.1540	522.6098	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1794.1804	0.1413	253.5898	(264)
Space and water heating			776.1996	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	141.0905	0.1443	20.3637	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1368.6375	0.1365	-186.8586	
PV Unit electricity exported	-1990.6279	0.1212	-241.2704	
Total			-428.1291	(269)
Total CO2, kg/year			368.4342	(272)
CO2 emissions per m2			6.8300	(273)
EI value			95.0091	
EI rating			95	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		53.9200	(1b)	x 2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		134.8000	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8984	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8877	0.8181	0.8007	0.7485	0.7485	0.6962	0.6962	0.6788	0.6962	0.7833	0.7659	0.8181	(22b)
Effective ac	0.8940	0.8346	0.8205	0.7801	0.7801	0.7424	0.7424	0.7304	0.7424	0.8068	0.7933	0.8346	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.1800	9.7056	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.2600	2.9718	190.0000	2171.7000	(29a)
External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400	(30)
Total net area of external elements Aum(A, m2)			123.3700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.5114			(33)
Main dwelling								
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000	(32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000	(32)
Internal Walls			98.0000			9.0000	882.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	52.1854 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.7689	37.1274	36.5007	34.7016	34.7016	33.0237	33.0237	32.4913	33.0237	35.8875	35.2878	37.1274	(38)
Heat transfer coeff	91.9544	89.3129	88.6862	86.8870	86.8870	85.2091	85.2091	84.6767	85.2091	88.0730	87.4732	89.3129	(39)
Average = Sum(39)m / 12 =												87.4075	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7054	1.6564	1.6448	1.6114	1.6114	1.5803	1.5803	1.5704	1.5803	1.6334	1.6223	1.6564	(40)
HLP (average)												1.6211	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.8057 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
51.0884	50.3207	49.2019	47.0613	45.4816	43.7200	42.7187	43.8290	45.0461	46.9376	49.1241	50.8927	(42a)

Hot water usage for baths

23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779	(42b)

Hot water usage for other uses

33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217	(42c)

Average daily hot water use (litres/day)		99.0540 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.7677	105.4456	102.6298	98.3763	94.9120	91.1917	89.7830	92.5869	95.5411	99.4441	103.7622	107.4923	(44)
Energy conte	170.6777	150.1532	157.7381	134.6723	127.7698	112.1308	108.5847	114.6420	117.8118	134.9447	147.8283	168.3070	(45)
Energy content (annual)										Total = Sum(45)m =		1645.2604	
Distribution loss (46)m = 0.15 x (45)m													
	25.6017	22.5230	23.6607	20.2008	19.1655	16.8196	16.2877	17.1963	17.6718	20.2417	22.1742	25.2460	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(64)
									Total per year (kWh/year) = Sum(64)m =			1794.1804	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	66.8687	59.0651	62.5663	54.5705	52.6019	47.0755	46.2228	48.2369	48.9644	54.9875	58.9449	66.0805	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.9728	17.7397	14.4269	10.9221	8.1644	6.8927	7.4478	9.6810	12.9938	16.4986	19.2563	20.5279	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)	89.8773	87.8945	84.0945	75.7924	70.7014	65.3826	62.1274	64.8345	68.0061	73.9080	81.8679	88.8178	(72)
Total internal gains	428.5252	426.7471	413.4912	388.6064	364.2492	342.1431	329.0776	331.5800	344.2076	366.6921	393.9182	417.6555	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	15.0428	0.4600	0.7000	0.7700	13.7627	(75)
Northeast	1.0600	35.0000	0.4600	0.7000	1.0000	10.7516	(82)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	453.0395	469.8977	490.3374	513.7250	520.7191	520.4337	492.7626	467.8337	442.5944	422.4931	424.6320	436.6558	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.9819	41.1644	41.4553	42.3137	42.3137	43.1469	43.1469	43.4182	43.1469	41.7439	42.0301	41.1644	
alpha	3.6655	3.7443	3.7637	3.8209	3.8209	3.8765	3.8765	3.8945	3.8765	3.7829	3.8020	3.7443	
util living area	0.9899	0.9879	0.9801	0.9591	0.9019	0.7591	0.5938	0.6157	0.8480	0.9574	0.9835	0.9909	(86)
MIT	19.1963	19.3358	19.6428	20.0748	20.5163	20.8466	20.9576	20.9527	20.7460	20.2486	19.7301	19.2447	(87)
Th 2	19.5370	19.5722	19.5807	19.6050	19.6050	19.6278	19.6278	19.6351	19.6278	19.5889	19.5970	19.5722	(88)
util rest of house	0.9862	0.9834	0.9721	0.9405	0.8495	0.6308	0.3954	0.4140	0.7467	0.9319	0.9760	0.9875	(89)
MIT 2	17.5344	17.7336	18.1283	18.6840	19.2083	19.5512	19.6194	19.6254	19.4748	18.8945	18.2520	17.6182	(90)
Living area fraction										fLA = Living area / (4) =		0.4572	(91)
MIT	18.2942	18.4661	18.8206	19.3199	19.8063	20.1434	20.2312	20.2322	20.0559	19.5136	18.9277	18.3617	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2942	18.4661	18.8206	19.3199	19.8063	20.1434	20.2312	20.2322	20.0559	19.5136	18.9277	18.3617	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9816	0.9784	0.9662	0.9355	0.8586	0.6847	0.4882	0.5086	0.7841	0.9301	0.9709	0.9833	(94)
Useful gains	444.7136	459.7496	473.7446	480.5913	447.1102	356.3541	240.5873	237.9395	347.0252	392.9565	412.2733	429.3444	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1185.6735	1140.1725	1021.7223	844.5285	626.1340	404.1805	249.7622	248.2876	430.8096	679.3556	920.8956	1148.7191	(97)
Space heating kWh	551.2741	457.2441	407.6954	262.0348	133.1937	0.0000	0.0000	0.0000	0.0000	213.0810	366.2081	535.2148	(98a)
Space heating requirement - total per year (kWh/year)												2925.9459	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	551.2741	457.2441	407.6954	262.0348	133.1937	0.0000	0.0000	0.0000	0.0000	213.0810	366.2081	535.2148	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2925.9459	
Space heating per m2											(98c) / (4) =	54.2646	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	551.2741	457.2441	407.6954	262.0348	133.1937	0.0000	0.0000	0.0000	0.0000	213.0810	366.2081	535.2148	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	551.2741	457.2441	407.6954	262.0348	133.1937	0.0000	0.0000	0.0000	0.0000	213.0810	366.2081	535.2148	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4821	14.0248	12.6278	9.2516	7.1462	5.8385	6.5190	8.4737	11.0065	14.4411	16.3112	17.9680	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-82.3941	-107.9648	-160.1502	-177.7052	-169.1314	-128.2015	-125.1271	-122.4872	-112.7292	-119.9205	-88.9812	-67.6360	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-35.0303	-64.1673	-141.2792	-244.3516	-335.4622	-411.0253	-393.3107	-335.8615	-242.6860	-115.9037	-50.1658	-25.4182	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2925.9459	(211)
Space heating fuel - main system 2												0.0000	(213)

Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1794.1804	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	141.0905	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	1004.1266	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2925.9459	27.6700	809.6092	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1794.1804	27.6700	496.4497	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	141.0905	27.6700	39.0397	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1462.4283	27.6700	-404.6539	
PV Unit electricity exported	-2394.6619	5.8100	-139.1299	
Total			-543.7838	(252)
Total energy cost			801.3149	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2925.9459	0.1545	451.9631	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1794.1804	0.1413	253.5898	(264)
Space and water heating			705.5530	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	141.0905	0.1443	20.3637	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1462.4283	0.1371	-200.4596	
PV Unit electricity exported	-2394.6619	0.1218	-291.6060	
Total			-492.0656	(269)
Total CO2, kg/year			233.8511	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2925.9459	1.5719	4599.2801	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1794.1804	1.5226	2731.9027	(278)
Space and water heating			7331.1828	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	141.0905	1.5338	216.4093	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1462.4283	1.5068	-2203.5539	
PV Unit electricity exported	-2394.6619	0.4466	-1069.5755	
Total			-3273.1294	(283)
Total Primary energy kWh/year			4274.4627	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating: D 68
Current environmental impact rating: A 95

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: D 68
Potential environmental impact rating: A 95

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1345	£1345	£0
Space heating	£810	£810	£0
Water heating	£496	£496	£0
Lighting	£39	£39	£0
Generated (PV)	-£544	-£544	£0
Total cost of fuels	£801	£801	£0
Total cost of uses	£801	£801	£0
Delivered energy	19 kWh/m²	19 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.2 tonnes	0.2 tonnes	0.0 tonnes
CO2 emissions per m²	4 kg/m²	4 kg/m²	0 kg/m²
Primary energy	79 kWh/m²	79 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.9200	(1b) x	2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	134.8000	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8984 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8877	0.8703	0.8529	0.7659	0.7485	0.6614	0.6614	0.6440	0.6962	0.7485	0.7833	0.8181	(22b)
Effective ac	0.8940	0.8787	0.8637	0.7933	0.7801	0.7187	0.7187	0.7074	0.7424	0.7801	0.8068	0.8346	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.1800	9.7056	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.2600	2.9718	190.0000	2171.7000	(29a)
External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400	(30)
Total net area of external elements Aum(A, m2)			123.3700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.5114			(33)
Main dwelling								
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000	(32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000	(32)
Internal Walls			98.0000			9.0000	882.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	52.1854 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.7689	39.0883	38.4212	35.2878	34.7016	31.9725	31.9725	31.4671	33.0237	34.7016	35.8875	37.1274	(38)
Heat transfer coeff	91.9544	91.2738	90.6067	87.4732	86.8870	84.1579	84.1579	83.6525	85.2091	86.8870	88.0730	89.3129	(39)
Average = Sum(39)m / 12 =												87.4704	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7054	1.6928	1.6804	1.6223	1.6114	1.5608	1.5608	1.5514	1.5803	1.6114	1.6334	1.6564	(40)
HLP (average)												1.6222	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8057	(42)
Hot water usage for mixer showers													
	51.0884	50.3207	49.2019	47.0613	45.4816	43.7200	42.7187	43.8290	45.0461	46.9376	49.1241	50.8927	(42a)
Hot water usage for baths													
	23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779	(42b)
Hot water usage for other uses													
	33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217	(42c)
Average daily hot water use (litres/day)												99.0540	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	107.7677	105.4456	102.6298	98.3763	94.9120	91.1917	89.7830	92.5869	95.5411	99.4441	103.7622	107.4923	(44)
Energy conte	170.6777	150.1532	157.7381	134.6723	127.7698	112.1308	108.5847	114.6420	117.8118	134.9447	147.8283	168.3070	(45)
Energy content (annual)										Total = Sum(45)m =		1645.2604	
Distribution loss (46)m = 0.15 x (45)m													
	25.6017	22.5230	23.6607	20.2008	19.1655	16.8196	16.2877	17.1963	17.6718	20.2417	22.1742	25.2460	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(64)
										Total per year (kWh/year) = Sum(64)m =		1794.1804	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.8687	59.0651	62.5663	54.5705	52.6019	47.0755	46.2228	48.2369	48.9644	54.9875	58.9449	66.0805	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.9728	17.7397	14.4269	10.9221	8.1644	6.8927	7.4478	9.6810	12.9938	16.4986	19.2563	20.5279	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)													
	89.8773	87.8945	84.0945	75.7924	70.7014	65.3826	62.1274	64.8345	68.0061	73.9080	81.8679	88.8178	(72)
Total internal gains													
	428.5252	426.7471	413.4912	388.6064	364.2492	342.1431	329.0776	331.5800	344.2076	366.6921	393.9182	417.6555	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	446.8349	464.3475	480.8386	496.8573	506.8016	492.6777	470.4845	446.2548	425.6640	412.6451	417.0441	432.5365	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.9819	40.2800	40.5766	42.0301	42.3137	43.6859	43.6859	43.9498	43.1469	42.3137	41.7439	41.1644	
alpha	3.6655	3.6853	3.7051	3.8020	3.8209	3.9124	3.9124	3.9300	3.8765	3.8209	3.7829	3.7443	
util living area													
	0.9923	0.9902	0.9846	0.9693	0.9299	0.8303	0.6921	0.7343	0.9005	0.9722	0.9887	0.9932	(86)
MIT	19.0020	19.1490	19.4563	19.9299	20.3741	20.7572	20.9162	20.8928	20.6176	20.0662	19.4967	19.0249	(87)
Th 2	19.5370	19.5460	19.5549	19.5970	19.6050	19.6422	19.6422	19.6492	19.6278	19.6050	19.5889	19.5722	(88)
util rest of house													
	0.9896	0.9867	0.9786	0.9556	0.8933	0.7331	0.5200	0.5719	0.8331	0.9570	0.9840	0.9909	(89)
MIT 2	17.2861	17.4792	17.8758	18.4999	19.0467	19.4903	19.6149	19.6092	19.3487	18.6808	17.9506	17.3373	(90)
Living area fraction										fLA = Living area / (4) =		0.4572	(91)

MIT	18.0706	18.2426	18.5983	19.1536	19.6535	20.0695	20.2098	20.1960	19.9288	19.3142	18.6574	18.1088	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.0706	18.2426	18.5983	19.1536	19.6535	20.0695	20.2098	20.1960	19.9288	19.3142	18.6574	18.1088	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9857	0.9821	0.9729	0.9498	0.8949	0.7685	0.5989	0.6453	0.8513	0.9527	0.9795	0.9874	(94)
Useful gains	440.4325	456.0320	467.8275	471.9370	453.5367	378.6293	281.7857	287.9720	362.3739	393.1328	408.5051	427.0726	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1266.2628	1217.8274	1096.1896	896.9180	691.0558	460.2994	303.7935	317.5446	496.6696	757.1465	1017.8951	1242.2330	(97)
Space heating kWh													
	614.4178	511.9265	467.5014	305.9863	176.7142	0.0000	0.0000	0.0000	0.0000	270.8262	438.7608	606.4794	(98a)
Space heating requirement - total per year (kWh/year)												3392.6126	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	614.4178	511.9265	467.5014	305.9863	176.7142	0.0000	0.0000	0.0000	0.0000	270.8262	438.7608	606.4794	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3392.6126	
Space heating per m2											(98c) / (4) =	62.9194	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	614.4178	511.9265	467.5014	305.9863	176.7142	0.0000	0.0000	0.0000	0.0000	270.8262	438.7608	606.4794	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	614.4178	511.9265	467.5014	305.9863	176.7142	0.0000	0.0000	0.0000	0.0000	270.8262	438.7608	606.4794	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4821	14.0248	12.6278	9.2516	7.1462	5.8385	6.5190	8.4737	11.0065	14.4411	16.3112	17.9680	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-66.6819	-100.6475	-152.4945	-170.8903	-171.8981	-122.6537	-120.5104	-116.2509	-105.0449	-110.7707	-74.0531	-56.7414	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-23.2443	-53.5132	-119.1742	-203.5366	-297.5135	-341.1236	-336.2176	-278.6472	-197.3263	-88.9542	-33.4631	-17.9141	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3392.6126	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1794.1804	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	141.0905	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	1968.6181	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3392.6126	16.4900	559.4418	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1794.1804	16.4900	295.8603	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	141.0905	16.4900	23.2658	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1368.6375	16.4900	-225.6883	
PV Unit electricity exported	-1990.6279	5.5900	-111.2761	
Total			-336.9644	(252)
Total energy cost			541.6036	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.9711 (257)
SAP value		68.0491
SAP rating (Section 12)		68 (258)
SAP band		D

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3392.6126	0.1540	522.6098	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1794.1804	0.1413	253.5898	(264)
Space and water heating			776.1996	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	141.0905	0.1443	20.3637	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1368.6375	0.1365	-186.8586	
PV Unit electricity exported	-1990.6279	0.1212	-241.2704	
Total			-428.1291	(269)
Total CO2, kg/year			368.4342	(272)
CO2 emissions per m2			6.8300	(273)
EI value			95.0091	
EI rating			95	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		53.9200	(1b)	x 2.5000	(2b) =	134.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.9200						(4)
Dwelling volume					(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	134.8000	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1484	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8984	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6962	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8877	0.8181	0.8007	0.7485	0.7485	0.6962	0.6962	0.6788	0.6962	0.7833	0.7659	0.8181	(22b)
Effective ac	0.8940	0.8346	0.8205	0.7801	0.7801	0.7424	0.7424	0.7304	0.7424	0.8068	0.7933	0.8346	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			53.9200	0.1800	9.7056	20.0000	1078.4000	(28b)
External Wall 1	15.5300	4.1000	11.4300	0.2600	2.9718	190.0000	2171.7000	(29a)
External Roof 1	53.9200	1.0600	52.8600	0.1600	8.4576	9.0000	475.7400	(30)
Total net area of external elements Aum(A, m2)			123.3700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.5114			(33)
Main dwelling								
Party Wall to Adj Property			23.4800	0.0000	0.0000	70.0000	1643.6000	(32)
Party Wall to Adj Flat			38.8000	0.0000	0.0000	180.0000	6984.0000	(32)
Internal Walls			98.0000			9.0000	882.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13235.4400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		245.4644 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.6740 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	52.1854 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.7689	37.1274	36.5007	34.7016	34.7016	33.0237	33.0237	32.4913	33.0237	35.8875	35.2878	37.1274	(38)
Heat transfer coeff	91.9544	89.3129	88.6862	86.8870	86.8870	85.2091	85.2091	84.6767	85.2091	88.0730	87.4732	89.3129	(39)
Average = Sum(39)m / 12 =												87.4075	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7054	1.6564	1.6448	1.6114	1.6114	1.5803	1.5803	1.5704	1.5803	1.6334	1.6223	1.6564	(40)
HLP (average)												1.6211	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8057 (42)
Hot water usage for mixer showers	51.0884	50.3207	49.2019	47.0613	45.4816	43.7200	42.7187	43.8290	45.0461	46.9376	49.1241	50.8927 (42a)
Hot water usage for baths	23.5576	23.2077	22.7150	21.8066	21.1264	20.3722	19.9648	20.4540	20.9867	21.7937	22.7209	23.4779 (42b)
Hot water usage for other uses	33.1217	31.9172	30.7128	29.5084	28.3040	27.0995	27.0995	28.3040	29.5084	30.7128	31.9172	33.1217 (42c)
Average daily hot water use (litres/day)												99.0540 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.7677	105.4456	102.6298	98.3763	94.9120	91.1917	89.7830	92.5869	95.5411	99.4441	103.7622	107.4923	(44)
Energy conte	170.6777	150.1532	157.7381	134.6723	127.7698	112.1308	108.5847	114.6420	117.8118	134.9447	147.8283	168.3070	(45)
Energy content (annual)										Total = Sum(45)m =		1645.2604	
Distribution loss (46)m = 0.15 x (45)m	25.6017	22.5230	23.6607	20.2008	19.1655	16.8196	16.2877	17.1963	17.6718	20.2417	22.1742	25.2460	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(64)
									Total per year (kWh/year) = Sum(64)m =			1794.1804	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	66.8687	59.0651	62.5663	54.5705	52.6019	47.0755	46.2228	48.2369	48.9644	54.9875	58.9449	66.0805	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	108.3390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.9728	17.7397	14.4269	10.9221	8.1644	6.8927	7.4478	9.6810	12.9938	16.4986	19.2563	20.5279	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	234.9225	237.3603	231.2172	218.1393	201.6309	186.1152	175.7498	173.3120	179.4551	192.5330	209.0415	224.5571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	47.6396	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	-72.2260	(71)
Water heating gains (Table 5)	89.8773	87.8945	84.0945	75.7924	70.7014	65.3826	62.1274	64.8345	68.0061	73.9080	81.8679	88.8178	(72)
Total internal gains	428.5252	426.7471	413.4912	388.6064	364.2492	342.1431	329.0776	331.5800	344.2076	366.6921	393.9182	417.6555	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W

Northeast			4.1000		15.0428		0.4600		0.7000		0.7700		13.7627 (75)
Northeast			1.0600		35.0000		0.4600		0.7000		1.0000		10.7516 (82)
Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	453.0395	469.8977	490.3374	513.7250	520.7191	520.4337	492.7626	467.8337	442.5944	422.4931	424.6320	436.6558	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.9819	41.1644	41.4553	42.3137	42.3137	43.1469	43.1469	43.4182	43.1469	41.7439	42.0301	41.1644	
alpha	3.6655	3.7443	3.7637	3.8209	3.8209	3.8765	3.8765	3.8945	3.8765	3.7829	3.8020	3.7443	
util living area	0.9899	0.9879	0.9801	0.9591	0.9019	0.7591	0.5938	0.6157	0.8480	0.9574	0.9835	0.9909	(86)
MIT	19.1963	19.3358	19.6428	20.0748	20.5163	20.8466	20.9576	20.9527	20.7460	20.2486	19.7301	19.2447	(87)
Th 2	19.5370	19.5722	19.5807	19.6050	19.6050	19.6278	19.6278	19.6351	19.6278	19.5889	19.5970	19.5722	(88)
util rest of house	0.9862	0.9834	0.9721	0.9405	0.8495	0.6308	0.3954	0.4140	0.7467	0.9319	0.9760	0.9875	(89)
MIT 2	17.5344	17.7336	18.1283	18.6840	19.2083	19.5512	19.6194	19.6254	19.4748	18.8945	18.2520	17.6182	(90)
Living area fraction										fLA = Living area / (4) =		0.4572	(91)
MIT	18.2942	18.4661	18.8206	19.3199	19.8063	20.1434	20.2312	20.2322	20.0559	19.5136	18.9277	18.3617	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2942	18.4661	18.8206	19.3199	19.8063	20.1434	20.2312	20.2322	20.0559	19.5136	18.9277	18.3617	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9816	0.9784	0.9662	0.9355	0.8586	0.6847	0.4882	0.5086	0.7841	0.9301	0.9709	0.9833	(94)
Useful gains	444.7136	459.7496	473.7446	480.5913	447.1102	356.3541	240.5873	237.9395	347.0252	392.9565	412.2733	429.3444	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1185.6735	1140.1725	1021.7223	844.5285	626.1340	404.1805	249.7622	248.2876	430.8096	679.3556	920.8956	1148.7191	(97)
Space heating kWh	551.2741	457.2441	407.6954	262.0348	133.1937	0.0000	0.0000	0.0000	0.0000	213.0810	366.2081	535.2148	(98a)
Space heating requirement - total per year (kWh/year)												2925.9459	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	551.2741	457.2441	407.6954	262.0348	133.1937	0.0000	0.0000	0.0000	0.0000	213.0810	366.2081	535.2148	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2925.9459	
Space heating per m2											(98c) / (4) =	54.2646	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	551.2741	457.2441	407.6954	262.0348	133.1937	0.0000	0.0000	0.0000	0.0000	213.0810	366.2081	535.2148	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	551.2741	457.2441	407.6954	262.0348	133.1937	0.0000	0.0000	0.0000	0.0000	213.0810	366.2081	535.2148	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	183.3257	161.5772	170.3861	146.9123	140.4178	124.3708	121.2327	127.2900	130.0518	147.5927	160.0683	180.9550	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4821	14.0248	12.6278	9.2516	7.1462	5.8385	6.5190	8.4737	11.0065	14.4411	16.3112	17.9680	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-82.3941	-107.9648	-160.1502	-177.7052	-169.1314	-128.2015	-125.1271	-122.4872	-112.7292	-119.9205	-88.9812	-67.6360	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-35.0303	-64.1673	-141.2792	-244.3516	-335.4622	-411.0253	-393.3107	-335.8615	-242.6860	-115.9037	-50.1658	-25.4182	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2925.9459	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1794.1804	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	141.0905	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	1004.1266	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2925.9459	27.6700	809.6092	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1794.1804	27.6700	496.4497	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	141.0905	27.6700	39.0397	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1462.4283	27.6700	-404.6539	
PV Unit electricity exported	-2394.6619	5.8100	-139.1299	
Total			-543.7838	(252)
Total energy cost			801.3149	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2925.9459	0.1545	451.9631	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1794.1804	0.1413	253.5898	(264)
Space and water heating			705.5530	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	141.0905	0.1443	20.3637	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1462.4283	0.1371	-200.4596	
PV Unit electricity exported	-2394.6619	0.1218	-291.6060	
Total			-492.0656	(269)
Total CO2, kg/year			233.8511	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2925.9459	1.5719	4599.2801	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1794.1804	1.5226	2731.9027	(278)
Space and water heating			7331.1828	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	141.0905	1.5338	216.4093	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1462.4283	1.5068	-2203.5539	
PV Unit electricity exported	-2394.6619	0.4466	-1069.5755	
Total			-3273.1294	(283)
Total Primary energy kWh/year			4274.4627	(286)

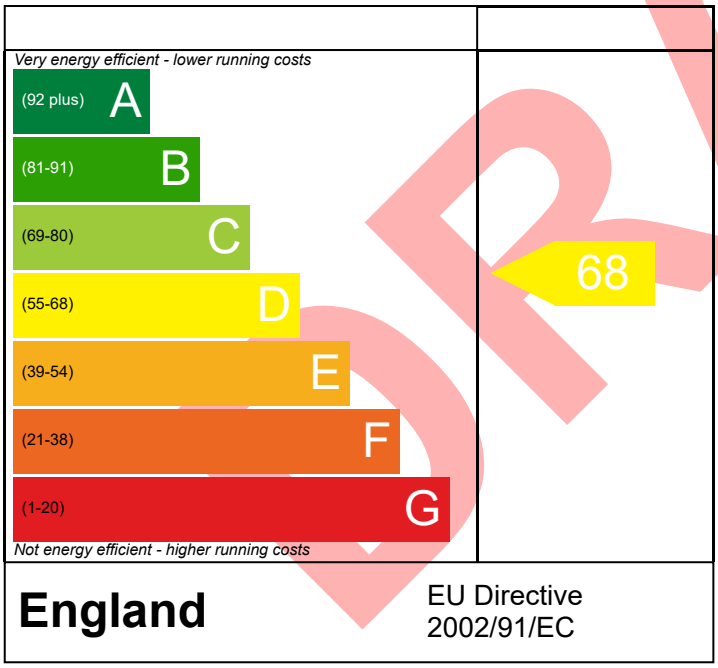
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	53.92 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

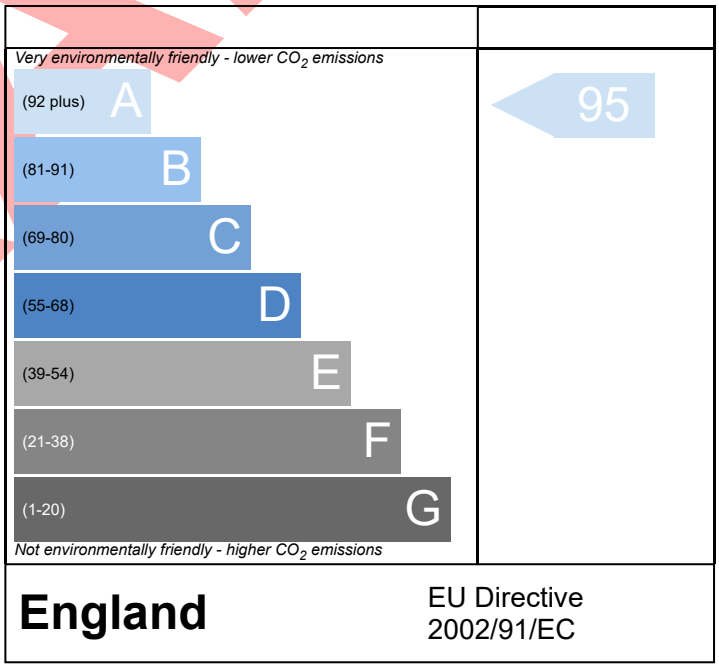
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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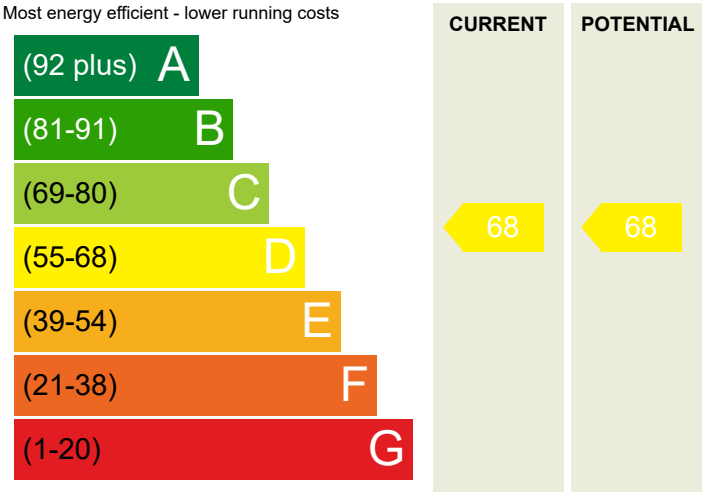
Energy Report

Dwelling Address	
Reference	Flat 5-Be Green
SAP Version	10.2
Assessment Date	12/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	54

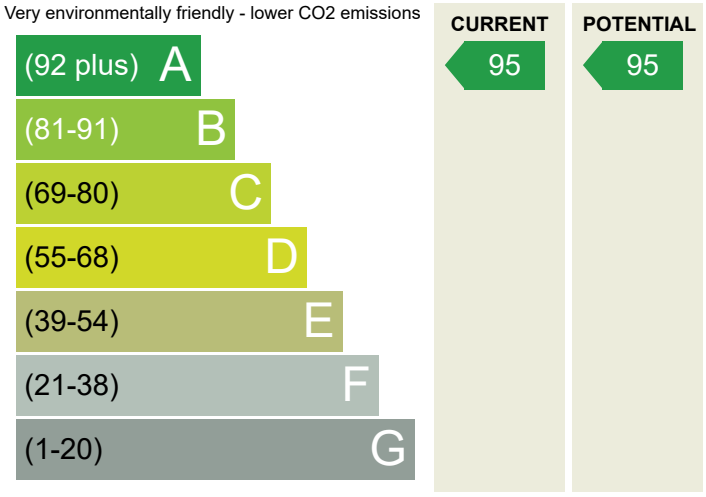
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

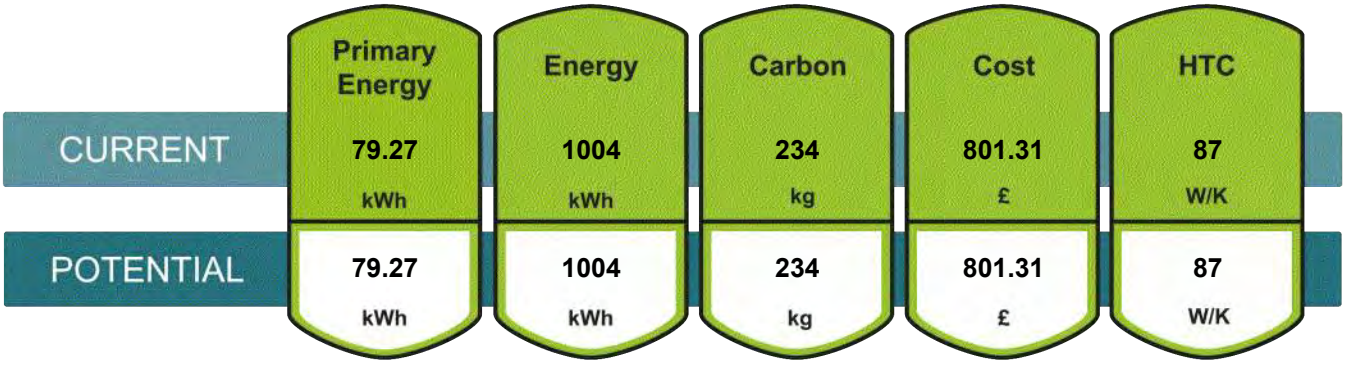


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£39	£39	
Heating	£810	£810	
Hot Water	£496	£496	
New Technologies e.g. Impact of PV	-(£544)	-(£544)	
TOTAL	£801	£801	

Estimated energy use and potential savings

Space Heating
2926
kWh per year

Water Heating
1794
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 6	**Issued on Date**	15/06/2026
Assessment Reference	Be Green	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	57 D	**DER**	10.00	**TER**	
Environmental	92 A	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.47	**DFEE**	83.19	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	124.73	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	300.66	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	15.42 m	65.07 m²	2.50 m

8.0 Living Area 31.33 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	38.55	34.45	0.00	None	4.10	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	56.90	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	99.90

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	65.07	64.01	None	0.00	Enter Gross Area	1.06

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	65.07

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30
Roof Light	Manufacturer	Roof Light	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
NE Windows	Windows	External Wall 1	North East	4.10	
Rooflights	Roof Light	External Roof 1	North East	1.06	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	

22.0 Lighting

No Fixed Lighting	No				
	Name	**Efficacy**	**Power**	**Capacity**	**Count**
	Lighting 1	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Independent
SAP Code	903
Fuel Type	Electricity

Summary for Input Data

elmhurst energy

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day

32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	No	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.08	South West	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 6	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	57 D	DER	10.00	TER	
Environmental	92 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.47	DFEE	83.19	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	124.73	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700 (1b)	x	2.5000 (2b)	=	162.6750	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	162.6750	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8729	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9461	0.9275	0.9090	0.8162	0.7977	0.7049	0.7049	0.6864	0.7420	0.7977	0.8348	0.8719	(22b)
Effective ac	0.9475	0.9301	0.9131	0.8331	0.8181	0.7484	0.7484	0.7355	0.7753	0.8181	0.8484	0.8801	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.1800	11.7126	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.2600	8.9570	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)
Total net area of external elements Aum(A, m2)			168.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		37.2876			(33)
Main dwelling								
Party Wall 1			56.9000	0.0000	0.0000	180.0000	10242.0000	(32)
Internal Wall 1			99.9000			9.0000	899.1000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19564.0900	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		300.6622	(35)
Thermal bridges (Default value 0.200 * total exposed area)		33.7380	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	71.0256	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	49.9320	49.0176	44.7228	43.9192	40.1785	40.1785	39.4858	41.6194	43.9192	45.5448	47.2443	(38)

Heat transfer coeff

	121.8905	120.9576	120.0432	115.7484	114.9448	111.2042	111.2042	110.5114	112.6450	114.9448	116.5704	118.2699 (39)
Average = Sum(39)m / 12 =												115.7445

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8732	1.8589	1.8448	1.7788	1.7665	1.7090	1.7090	1.6983	1.7311	1.7665	1.7915	1.8176	(40)
HLP (average)												1.7788	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.1208 (42)

Hot water usage for mixer showers

	56.0419	55.1997	53.9724	51.6243	49.8914	47.9590	46.8606	48.0785	49.4136	51.4885	53.8871	55.8272 (42a)

Hot water usage for baths

	25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424 (42b)

Hot water usage for other uses

	36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488 (42c)

Average daily hot water use (litres/day) 108.6613 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	118.2204	115.6728	112.5836	107.9177	104.1172	100.0360	98.4909	101.5671	104.8080	109.0896	113.8265	117.9184	(44)
Energy conte	187.2323	164.7166	173.0368	147.7339	140.1618	123.0059	119.1162	125.7612	129.2388	148.0335	162.1667	184.6317	(45)
Energy content (annual)										Total = Sum(45)m =		1804.8355	
Distribution loss (46)m = 0.15 x (45)m													
	28.0848	24.7075	25.9555	22.1601	21.0243	18.4509	17.8674	18.8642	19.3858	22.2050	24.3250	27.6948	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(64)
										Total per year (kWh/year) = Sum(64)m =		1953.7555	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	72.3731	63.9075	67.6531	58.9135	56.7222	50.6915	49.7245	51.9340	52.7639	59.3395	63.7124	71.5084	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	24.4465	21.7131	17.6583	13.3685	9.9931	8.4366	9.1160	11.8494	15.9042	20.1940	23.5694	25.1259	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)
Water heating gains (Table 5)													
	97.2757	95.1004	90.9316	81.8243	76.2395	70.4048	66.8341	69.8038	73.2832	79.7575	88.4895	96.1135	(72)
Total internal gains													
	490.8925	488.8573	473.3927	444.5803	416.1611	390.4812	375.3719	378.2015	392.9767	419.1561	450.7225	478.1917	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	509.2021	526.4577	540.7401	552.8312	558.7135	541.0157	516.7788	492.8763	474.4332	465.1091	473.8484	493.0727	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.5848	44.9287	45.2709	46.9507	47.2789	48.8693	48.8693	49.1756	48.2442	47.2789	46.6196	45.9497	
alpha	3.9723	3.9952	4.0181	4.1300	4.1519	4.2580	4.2580	4.2784	4.2163	4.1519	4.1080	4.0633	
util living area													
	0.9969	0.9961	0.9937	0.9869	0.9665	0.9023	0.7871	0.8229	0.9474	0.9878	0.9955	0.9974	(86)
MIT	19.0517	19.1817	19.4594	19.8951	20.3152	20.7082	20.8922	20.8656	20.5735	20.0471	19.5182	19.0784	(87)
Th 2	19.4192	19.4291	19.4388	19.4849	19.4936	19.5344	19.5344	19.5420	19.5186	19.4936	19.4760	19.4577	(88)
util rest of house													

	0.9956	0.9943	0.9906	0.9791	0.9419	0.8155	0.5954	0.6493	0.8947	0.9789	0.9930	0.9963	(89)
MIT 2	17.2333	17.4059	17.7671	18.3508	18.8796	19.3543	19.5032	19.4964	19.2082	18.5517	17.8668	17.2918	(90)
Living area fraction										fLA = Living area / (4) =		0.4815	(91)
MIT	18.1088	18.2610	18.5819	19.0943	19.5708	20.0062	20.1720	20.1556	19.8656	19.2717	18.6619	18.1520	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1088	18.2610	18.5819	19.0943	19.5708	20.0062	20.1720	20.1556	19.8656	19.2717	18.6619	18.1520	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9939	0.9923	0.9880	0.9763	0.9436	0.8499	0.6912	0.7352	0.9110	0.9770	0.9911	0.9948	(94)
Useful gains	506.1190	522.4243	534.2571	539.7358	527.1975	459.8189	357.2168	362.3608	432.2073	454.4239	469.6348	490.5136	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1683.1615	1616.1093	1450.3524	1179.9746	904.7079	601.1864	397.2179	415.0411	649.4629	996.7690	1347.7791	1650.1037	(97)
Space heating kWh	875.7196	734.9564	681.5749	460.9719	280.8677	0.0000	0.0000	0.0000	0.0000	403.5048	632.2639	862.7350	(98a)
Space heating requirement - total per year (kWh/year)												4932.5941	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	875.7196	734.9564	681.5749	460.9719	280.8677	0.0000	0.0000	0.0000	0.0000	403.5048	632.2639	862.7350	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4932.5941	
Space heating per m2											(98c) / (4) =	75.8044	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	875.7196	734.9564	681.5749	460.9719	280.8677	0.0000	0.0000	0.0000	0.0000	403.5048	632.2639	862.7350	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	875.7196	734.9564	681.5749	460.9719	280.8677	0.0000	0.0000	0.0000	0.0000	403.5048	632.2639	862.7350	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	21.3978	17.1661	15.4562	11.3239	8.7469	7.1463	7.9792	10.3717	13.4718	17.6757	19.9647	21.9925	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-69.3155	-106.3842	-164.4208	-189.2410	-194.7991	-133.0719	-130.7480	-125.2581	-112.0874	-119.1807	-77.6604	-58.7883	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-20.6107	-47.7765	-107.2479	-185.1859	-274.6125	-330.7054	-325.9800	-269.6400	-190.2838	-80.5442	-29.8558	-15.8673	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4932.5941	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1953.7555	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	172.6928	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	3699.7769	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4932.5941	16.4900	813.3848	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1953.7555	16.4900	322.1743	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	172.6928	16.4900	28.4770	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1480.9554	16.4900	-244.2095	
PV Unit electricity exported	-1878.3100	5.5900	-104.9975	
Total			-349.2071	(252)
Total energy cost			814.8290	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.6650	(257)
SAP value		56.8001	
SAP rating (Section 12)		57	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4932.5941	0.1538	758.5841	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1953.7555	0.1414	276.1822	(264)
Space and water heating			1034.7663	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	172.6928	0.1443	24.9249	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1480.9554	0.1364	-201.9542	
PV Unit electricity exported	-1878.3100	0.1203	-225.9833	
Total			-427.9376	(269)
Total CO2, kg/year			631.7536	(272)
CO2 emissions per m2			9.7100	(273)
EI value			92.3090	
EI rating			92	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700	(1b) x	2.5000	(2b) =	162.6750	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	162.6750	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8729	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9461	0.8719	0.8533	0.7977	0.7977	0.7420	0.7420	0.7235	0.7420	0.8348	0.8162	0.8719	(22b)
Effective ac	0.9475	0.8801	0.8641	0.8181	0.8181	0.7753	0.7753	0.7617	0.7753	0.8484	0.8331	0.8801	(25)

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3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.1800	11.7126	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.2600	8.9570	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)
Total net area of external elements Aum(A, m2)			168.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		37.2876			(33)
Main dwelling								
Party Wall 1			56.9000	0.0000	0.0000	180.0000	10242.0000	(32)
Internal Wall 1			99.9000			9.0000	899.1000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19564.0900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		300.6622 (35)
Thermal bridges (Default value 0.200 * total exposed area)		33.7380 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	71.0256 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	47.2443	46.3853	43.9192	43.9192	41.6194	41.6194	40.8897	41.6194	45.5448	44.7228	47.2443	(38)
Heat transfer coeff	121.8905	118.2699	117.4109	114.9448	114.9448	112.6450	112.6450	111.9153	112.6450	116.5704	115.7484	118.2699	(39)
Average = Sum(39)m / 12 =												115.6583	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8732	1.8176	1.8044	1.7665	1.7665	1.7311	1.7311	1.7199	1.7311	1.7915	1.7788	1.8176	(40)
HLP (average)												1.7774	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.1208 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
56.0419	55.1997	53.9724	51.6243	49.8914	47.9590	46.8606	48.0785	49.4136	51.4885	53.8871	55.8272	(42a)

Hot water usage for baths

25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424	(42b)

Hot water usage for other uses

36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488	(42c)

Average daily hot water use (litres/day)	108.6613 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	118.2204	115.6728	112.5836	107.9177	104.1172	100.0360	98.4909	101.5671	104.8080	109.0896	113.8265	117.9184	(44)
Energy conte	187.2323	164.7166	173.0368	147.7339	140.1618	123.0059	119.1162	125.7612	129.2388	148.0335	162.1667	184.6317	(45)
Energy content (annual)										Total = Sum(45)m =		1804.8355	

Distribution loss (46)m = 0.15 x (45)m

28.0848	24.7075	25.9555	22.1601	21.0243	18.4509	17.8674	18.8642	19.3858	22.2050	24.3250	27.6948	(46)

Water storage loss (or HIU loss):	
Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	0.6800 (48)
Temperature factor from Table 2b	0.6000 (49)
Enter (49) or (54) in (55)	0.4080 (55)

Total storage loss

12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)

If cylinder contains dedicated solar storage

12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter -0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(64)
									Total per year (kWh/year) = Sum(64)m =		1953.7555	(64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

72.3731	63.9075	67.6531	58.9135	56.7222	50.6915	49.7245	51.9340	52.7639	59.3395	63.7124	71.5084	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

24.4465	21.7131	17.6583	13.3685	9.9931	8.4366	9.1160	11.8494	15.9042	20.1940	23.5694	25.1259	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)

Water heating gains (Table 5)

97.2757	95.1004	90.9316	81.8243	76.2395	70.4048	66.8341	69.8038	73.2832	79.7575	88.4895	96.1135	(72)

Total internal gains

490.8925	488.8573	473.3927	444.5803	416.1611	390.4812	375.3719	378.2015	392.9767	419.1561	450.7225	478.1917	(73)

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6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
	m2	Table 6a	Specific data	Specific data	factor	W

					W/m2	or Table 6b		or Table 6c		Table 6d			
Northeast					4.1000	15.0428		0.4600	0.7000	0.7700		13.7627	(75)
Northeast					1.0600	35.0000		0.4600	0.7000	1.0000		10.7516	(82)
Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	515.4067	532.0078	550.2389	569.6989	572.6310	568.7718	539.0569	514.4551	491.3636	474.9571	481.4362	497.1920	(84)

7. Mean internal temperature (heating season)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
tau	44.5848	45.9497	46.2859	47.2789	47.2789	48.2442	48.2442	48.5588	48.2442	46.6196	46.9507	45.9497	
alpha	3.9723	4.0633	4.0857	4.1519	4.1519	4.2163	4.2163	4.2373	4.2163	4.1080	4.1300	4.0633	
util living area	0.9959	0.9951	0.9917	0.9820	0.9501	0.8477	0.6929	0.7127	0.9122	0.9801	0.9931	0.9964	(86)
MIT	19.2298	19.3547	19.6314	20.0278	20.4543	20.8065	20.9437	20.9382	20.7038	20.2170	19.7331	19.2806	(87)
Th 2	19.4192	19.4577	19.4669	19.4936	19.4936	19.5186	19.5186	19.5266	19.5186	19.4760	19.4849	19.4577	(88)
util rest of house	0.9940	0.9928	0.9874	0.9709	0.9114	0.7184	0.4537	0.4725	0.8223	0.9638	0.9890	0.9947	(89)
MIT 2	17.4614	17.6453	18.0043	18.5232	19.0442	19.4262	19.5097	19.5164	19.3433	18.7525	18.1467	17.5508	(90)
Living area fraction										fLA = Living area / (4) =		0.4815	(91)
MIT	18.3129	18.4684	18.7877	19.2476	19.7232	20.0908	20.2001	20.2010	19.9984	19.4577	18.9105	18.3837	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3129	18.4684	18.7877	19.2476	19.7232	20.0908	20.2001	20.2010	19.9984	19.4577	18.9105	18.3837	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9920	0.9906	0.9847	0.9684	0.9191	0.7774	0.5748	0.5947	0.8590	0.9635	0.9867	0.9929	(94)
Useful gains	511.2800	527.0138	541.7953	551.6774	526.2769	442.1742	309.8740	305.9511	422.0818	457.6278	475.0571	493.6428	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1573.9579	1510.1155	1348.7864	1108.9458	818.7698	528.3951	326.6860	324.6625	563.0399	892.6559	1216.5777	1523.7532	(97)
Space heating kWh	790.6324	660.6444	600.4014	401.2333	217.6147	0.0000	0.0000	0.0000	0.0000	323.6609	533.8948	766.4022	(98a)
Space heating requirement - total per year (kWh/year)												4294.4841	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	790.6324	660.6444	600.4014	401.2333	217.6147	0.0000	0.0000	0.0000	0.0000	323.6609	533.8948	766.4022	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4294.4841	
Space heating per m2											(98c) / (4) =	65.9979	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	790.6324	660.6444	600.4014	401.2333	217.6147	0.0000	0.0000	0.0000	0.0000	323.6609	533.8948	766.4022	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	790.6324	660.6444	600.4014	401.2333	217.6147	0.0000	0.0000	0.0000	0.0000	323.6609	533.8948	766.4022	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	21.3978	17.1661	15.4562	11.3239	8.7469	7.1463	7.9792	10.3717	13.4718	17.6757	19.9647	21.9925	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-86.2384	-114.6587	-173.7949	-198.6635	-192.6687	-140.0018	-136.4994	-132.7591	-120.9607	-130.1366	-94.1303	-70.4569	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-31.1861	-57.4734	-127.6344	-223.3934	-311.9249	-399.2250	-381.9384	-325.5896	-234.4544	-105.6876	-45.0166	-22.5973	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4294.4841	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	

Water heating fuel used	1953.7555	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	172.6928	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	2563.8422	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4294.4841	27.6700	1188.2838	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1953.7555	27.6700	540.6041	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	172.6928	27.6700	47.7841	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1590.9691	27.6700	-440.2211	
PV Unit electricity exported	-2266.1212	5.8100	-131.6616	
Total			-571.8828	(252)
Total energy cost			1204.7892	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4294.4841	0.1542	662.0987	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1953.7555	0.1414	276.1822	(264)
Space and water heating			938.2808	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	172.6928	0.1443	24.9249	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1590.9691	0.1369	-217.8086	
PV Unit electricity exported	-2266.1212	0.1209	-273.9563	
Total			-491.7649	(269)
Total CO2, kg/year			471.4408	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4294.4841	1.5708	6745.8123	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1953.7555	1.5227	2975.0214	(278)
Space and water heating			9720.8337	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	172.6928	1.5338	264.8820	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1590.9691	1.5061	-2396.2300	
PV Unit electricity exported	-2266.1212	0.4433	-1004.6237	
Total			-3400.8536	(283)
Total Primary energy kWh/year			6584.8620	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating: D 57
Current environmental impact rating: A 92

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: D 57
Potential environmental impact rating: A 92

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1777	£1777	£0
Space heating	£1188	£1188	£0
Water heating	£541	£541	£0
Lighting	£48	£48	£0
Generated (PV)	-£572	-£572	£0
Total cost of fuels	£1205	£1205	£0
Total cost of uses	£1205	£1205	£0
Delivered energy	39 kWh/m²	39 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.5 tonnes	0.5 tonnes	0.0 tonnes
CO2 emissions per m²	7 kg/m²	7 kg/m²	0 kg/m²
Primary energy	101 kWh/m²	101 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	65.0700	(1b)	x 2.5000	(2b) =	162.6750	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	162.6750	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8729 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9461	0.9275	0.9090	0.8162	0.7977	0.7049	0.7049	0.6864	0.7420	0.7977	0.8348	0.8719	(22b)
Effective ac	0.9475	0.9301	0.9131	0.8331	0.8181	0.7484	0.7484	0.7355	0.7753	0.8181	0.8484	0.8801	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)
Roof Light			1.0600	1.2357	1.3099			(27a)
Heatloss Floor 1			65.0700	0.1800	11.7126	20.0000	1301.4000	(28b)
External Wall 1	38.5500	4.1000	34.4500	0.2600	8.9570	190.0000	6545.5000	(29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900	(30)
Total net area of external elements Aum(A, m2)			168.6900					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	37.2876			(33)
Main dwelling								
Party Wall 1			56.9000	0.0000	0.0000	180.0000	10242.0000	(32)
Internal Wall 1			99.9000			9.0000	899.1000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19564.0900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		300.6622 (35)
Thermal bridges (Default value 0.200 * total exposed area)		33.7380 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	71.0256 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	49.9320	49.0176	44.7228	43.9192	40.1785	40.1785	39.4858	41.6194	43.9192	45.5448	47.2443	(38)
Heat transfer coeff	121.8905	120.9576	120.0432	115.7484	114.9448	111.2042	111.2042	110.5114	112.6450	114.9448	116.5704	118.2699	(39)
Average = Sum(39)m / 12 =												115.7445	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8732	1.8589	1.8448	1.7788	1.7665	1.7090	1.7090	1.6983	1.7311	1.7665	1.7915	1.8176	(40)

HLP (average)												1.7788	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1208	(42)
Hot water usage for mixer showers													
	56.0419	55.1997	53.9724	51.6243	49.8914	47.9590	46.8606	48.0785	49.4136	51.4885	53.8871	55.8272	(42a)
Hot water usage for baths													
	25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424	(42b)
Hot water usage for other uses													
	36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488	(42c)
Average daily hot water use (litres/day)												108.6613	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	118.2204	115.6728	112.5836	107.9177	104.1172	100.0360	98.4909	101.5671	104.8080	109.0896	113.8265	117.9184	(44)
Energy conte	187.2323	164.7166	173.0368	147.7339	140.1618	123.0059	119.1162	125.7612	129.2388	148.0335	162.1667	184.6317	(45)
Energy content (annual)										Total = Sum(45)m =		1804.8355	
Distribution loss (46)m = 0.15 x (45)m													
	28.0848	24.7075	25.9555	22.1601	21.0243	18.4509	17.8674	18.8642	19.3858	22.2050	24.3250	27.6948	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(64)
										Total per year (kWh/year) = Sum(64)m =		1953.7555	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	72.3731	63.9075	67.6531	58.9135	56.7222	50.6915	49.7245	51.9340	52.7639	59.3395	63.7124	71.5084	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	24.4465	21.7131	17.6583	13.3685	9.9931	8.4366	9.1160	11.8494	15.9042	20.1940	23.5694	25.1259	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)
Water heating gains (Table 5)													
	97.2757	95.1004	90.9316	81.8243	76.2395	70.4048	66.8341	69.8038	73.2832	79.7575	88.4895	96.1135	(72)
Total internal gains													
	490.8925	488.8573	473.3927	444.5803	416.1611	390.4812	375.3719	378.2015	392.9767	419.1561	450.7225	478.1917	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	11.2829	0.4600	0.7000	0.7700	10.3227	(75)
Northeast	1.0600	26.0000	0.4600	0.7000	1.0000	7.9869	(82)

Solar gains	18.3096	37.6004	67.3474	108.2509	142.5524	150.5345	141.4069	114.6748	81.4564	45.9530	23.1259	14.8810	(83)
Total gains	509.2021	526.4577	540.7401	552.8312	558.7135	541.0157	516.7788	492.8763	474.4332	465.1091	473.8484	493.0727	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.5848	44.9287	45.2709	46.9507	47.2789	48.8693	48.8693	49.1756	48.2442	47.2789	46.6196	45.9497	
alpha	3.9723	3.9952	4.0181	4.1300	4.1519	4.2580	4.2580	4.2784	4.2163	4.1519	4.1080	4.0633	
util living area													
	0.9969	0.9961	0.9937	0.9869	0.9665	0.9023	0.7871	0.8229	0.9474	0.9878	0.9955	0.9974	(86)
MIT	19.0517	19.1817	19.4594	19.8951	20.3152	20.7082	20.8922	20.8656	20.5735	20.0471	19.5182	19.0784	(87)
Th 2	19.4192	19.4291	19.4388	19.4849	19.4936	19.5344	19.5344	19.5420	19.5186	19.4936	19.4760	19.4577	(88)
util rest of house													
	0.9956	0.9943	0.9906	0.9791	0.9419	0.8155	0.5954	0.6493	0.8947	0.9789	0.9930	0.9963	(89)
MIT 2	17.2333	17.4059	17.7671	18.3508	18.8796	19.3543	19.5032	19.4964	19.2082	18.5517	17.8668	17.2918	(90)
Living area fraction										fLA = Living area / (4) =		0.4815	(91)
MIT	18.1088	18.2610	18.5819	19.0943	19.5708	20.0062	20.1720	20.1556	19.8656	19.2717	18.6619	18.1520	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1088	18.2610	18.5819	19.0943	19.5708	20.0062	20.1720	20.1556	19.8656	19.2717	18.6619	18.1520	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9939	0.9923	0.9880	0.9763	0.9436	0.8499	0.6912	0.7352	0.9110	0.9770	0.9911	0.9948	(94)
Useful gains	506.1190	522.4243	534.2571	539.7358	527.1975	459.8189	357.2168	362.3608	432.2073	454.4239	469.6348	490.5136	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1683.1615	1616.1093	1450.3524	1179.9746	904.7079	601.1864	397.2179	415.0411	649.4629	996.7690	1347.7791	1650.1037	(97)
Space heating kWh	875.7196	734.9564	681.5749	460.9719	280.8677	0.0000	0.0000	0.0000	0.0000	403.5048	632.2639	862.7350	(98a)
Space heating requirement - total per year (kWh/year)												4932.5941	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	875.7196	734.9564	681.5749	460.9719	280.8677	0.0000	0.0000	0.0000	0.0000	403.5048	632.2639	862.7350	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4932.5941	
Space heating per m2											(98c) / (4) =	75.8044	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	875.7196	734.9564	681.5749	460.9719	280.8677	0.0000	0.0000	0.0000	0.0000	403.5048	632.2639	862.7350	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	875.7196	734.9564	681.5749	460.9719	280.8677	0.0000	0.0000	0.0000	0.0000	403.5048	632.2639	862.7350	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	21.3978	17.1661	15.4562	11.3239	8.7469	7.1463	7.9792	10.3717	13.4718	17.6757	19.9647	21.9925	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-69.3155	-106.3842	-164.4208	-189.2410	-194.7991	-133.0719	-130.7480	-125.2581	-112.0874	-119.1807	-77.6604	-58.7883	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-20.6107	-47.7765	-107.2479	-185.1859	-274.6125	-330.7054	-325.9800	-269.6400	-190.2838	-80.5442	-29.8558	-15.8673	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4932.5941	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1953.7555	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	172.6928	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	3699.7769	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4932.5941	16.4900	813.3848	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1953.7555	16.4900	322.1743	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	172.6928	16.4900	28.4770	(250)
Additional standing charges			0.0000	(251)

Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1480.9554	16.4900	-244.2095	
PV Unit electricity exported	-1878.3100	5.5900	-104.9975	
Total			-349.2071	(252)
Total energy cost			814.8290	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.6650	(257)
SAP value		56.8001	
SAP rating (Section 12)		57	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4932.5941	0.1538	758.5841	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1953.7555	0.1414	276.1822	(264)
Space and water heating			1034.7663	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	172.6928	0.1443	24.9249	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1480.9554	0.1364	-201.9542	
PV Unit electricity exported	-1878.3100	0.1203	-225.9833	
Total			-427.9376	(269)
Total CO2, kg/year			631.7536	(272)
CO2 emissions per m2			9.7100	(273)
EI value			92.3090	
EI rating			92	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	65.0700 (1b)	x 2.5000 (2b)	= 162.6750	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.0700			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	162.6750	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1229	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8729	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7420	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.9461	0.8719	0.8533	0.7977	0.7977	0.7420	0.7420	0.7235	0.7420	0.8348	0.8162	0.8719	(22b)
Effective ac	0.9475	0.8801	0.8641	0.8181	0.8181	0.7753	0.7753	0.7617	0.7753	0.8484	0.8331	0.8801	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			4.1000	1.2357	5.0665			(27)

Roof Light			1.0600	1.2357	1.3099		(27a)
Heatloss Floor 1			65.0700	0.1800	11.7126	20.0000	1301.4000 (28b)
External Wall 1	38.5500	4.1000	34.4500	0.2600	8.9570	190.0000	6545.5000 (29a)
External Roof 1	65.0700	1.0600	64.0100	0.1600	10.2416	9.0000	576.0900 (30)
Total net area of external elements Aum(A, m2)			168.6900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		37.2876		(33)
Main dwelling							
Party Wall 1			56.9000	0.0000	0.0000	180.0000	10242.0000 (32)
Internal Wall 1			99.9000			9.0000	899.1000 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 19564.0900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	300.6622 (35)
Thermal bridges (Default value 0.200 * total exposed area)	33.7380 (36)
Point Thermal bridges	(36a) = 0.0000
Total fabric heat loss	(33) + (36) + (36a) = 71.0256 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.8649	47.2443	46.3853	43.9192	43.9192	41.6194	41.6194	40.8897	41.6194	45.5448	44.7228	47.2443	(38)
Heat transfer coeff	121.8905	118.2699	117.4109	114.9448	114.9448	112.6450	112.6450	111.9153	112.6450	116.5704	115.7484	118.2699	(39)
Average = Sum(39)m / 12 =												115.6583	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8732	1.8176	1.8044	1.7665	1.7665	1.7311	1.7311	1.7199	1.7311	1.7915	1.7788	1.8176	(40)
HLP (average)												1.7774	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1208	(42)
Hot water usage for mixer showers	56.0419	55.1997	53.9724	51.6243	49.8914	47.9590	46.8606	48.0785	49.4136	51.4885	53.8871	55.8272	(42a)
Hot water usage for baths	25.8297	25.4461	24.9059	23.9099	23.1641	22.3371	21.8904	22.4268	23.0109	23.8958	24.9123	25.7424	(42b)
Hot water usage for other uses	36.3488	35.0271	33.7053	32.3835	31.0617	29.7400	29.7400	31.0617	32.3835	33.7053	35.0271	36.3488	(42c)
Average daily hot water use (litres/day)												108.6613	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	118.2204	115.6728	112.5836	107.9177	104.1172	100.0360	98.4909	101.5671	104.8080	109.0896	113.8265	117.9184	(44)
Energy conte	187.2323	164.7166	173.0368	147.7339	140.1618	123.0059	119.1162	125.7612	129.2388	148.0335	162.1667	184.6317	(45)
Energy content (annual)										Total = Sum(45)m =		1804.8355	
Distribution loss (46)m = 0.15 x (45)m	28.0848	24.7075	25.9555	22.1601	21.0243	18.4509	17.8674	18.8642	19.3858	22.2050	24.3250	27.6948	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(64)
									Total per year (kWh/year) = Sum(64)m =			1953.7555	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	72.3731	63.9075	67.6531	58.9135	56.7222	50.6915	49.7245	51.9340	52.7639	59.3395	63.7124	71.5084	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	127.2464	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	24.4465	21.7131	17.6583	13.3685	9.9931	8.4366	9.1160	11.8494	15.9042	20.1940	23.5694	25.1259	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	276.9094	279.7829	272.5419	257.1266	237.6676	219.3789	207.1609	204.2875	211.5285	226.9438	246.4027	264.6914	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	49.8454	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	-84.8309	(71)
Water heating gains (Table 5)	97.2757	95.1004	90.9316	81.8243	76.2395	70.4048	66.8341	69.8038	73.2832	79.7575	88.4895	96.1135	(72)
Total internal gains	490.8925	488.8573	473.3927	444.5803	416.1611	390.4812	375.3719	378.2015	392.9767	419.1561	450.7225	478.1917	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	4.1000	15.0428	0.4600	0.7000	0.7700	13.7627	(75)
Northeast	1.0600	35.0000	0.4600	0.7000	1.0000	10.7516	(82)

Solar gains	24.5142	43.1506	76.8462	125.1186	156.4699	178.2905	163.6850	136.2536	98.3869	55.8010	30.7137	19.0003	(83)
Total gains	515.4067	532.0078	550.2389	569.6989	572.6310	568.7718	539.0569	514.4551	491.3636	474.9571	481.4362	497.1920	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	44.5848	45.9497	46.2859	47.2789	47.2789	48.2442	48.2442	48.5588	48.2442	46.6196	46.9507	45.9497	
alpha	3.9723	4.0633	4.0857	4.1519	4.1519	4.2163	4.2163	4.2373	4.2163	4.1080	4.1300	4.0633	
util living area	0.9959	0.9951	0.9917	0.9820	0.9501	0.8477	0.6929	0.7127	0.9122	0.9801	0.9931	0.9964	(86)
MIT	19.2298	19.3547	19.6314	20.0278	20.4543	20.8065	20.9437	20.9382	20.7038	20.2170	19.7331	19.2806	(87)
Th 2	19.4192	19.4577	19.4669	19.4936	19.4936	19.5186	19.5186	19.5266	19.5186	19.4760	19.4849	19.4577	(88)
util rest of house	0.9940	0.9928	0.9874	0.9709	0.9114	0.7184	0.4537	0.4725	0.8223	0.9638	0.9890	0.9947	(89)
MIT 2	17.4614	17.6453	18.0043	18.5232	19.0442	19.4262	19.5097	19.5164	19.3433	18.7525	18.1467	17.5508	(90)
Living area fraction										fLA = Living area / (4) =		0.4815	(91)
MIT	18.3129	18.4684	18.7877	19.2476	19.7232	20.0908	20.2001	20.2010	19.9984	19.4577	18.9105	18.3837	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3129	18.4684	18.7877	19.2476	19.7232	20.0908	20.2001	20.2010	19.9984	19.4577	18.9105	18.3837	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9920	0.9906	0.9847	0.9684	0.9191	0.7774	0.5748	0.5947	0.8590	0.9635	0.9867	0.9929	(94)
Useful gains	511.2800	527.0138	541.7953	551.6774	526.2769	442.1742	309.8740	305.9511	422.0818	457.6278	475.0571	493.6428	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1573.9579	1510.1155	1348.7864	1108.9458	818.7698	528.3951	326.6860	324.6625	563.0399	892.6559	1216.5777	1523.7532	(97)
Space heating kWh	790.6324	660.6444	600.4014	401.2333	217.6147	0.0000	0.0000	0.0000	0.0000	323.6609	533.8948	766.4022	(98a)
Space heating requirement - total per year (kWh/year)												4294.4841	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	790.6324	660.6444	600.4014	401.2333	217.6147	0.0000	0.0000	0.0000	0.0000	323.6609	533.8948	766.4022	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4294.4841	
Space heating per m2											(98c) / (4) =	65.9979	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	790.6324	660.6444	600.4014	401.2333	217.6147	0.0000	0.0000	0.0000	0.0000	323.6609	533.8948	766.4022	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	790.6324	660.6444	600.4014	401.2333	217.6147	0.0000	0.0000	0.0000	0.0000	323.6609	533.8948	766.4022	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	199.8803	176.1406	185.6848	159.9739	152.8098	135.2459	131.7642	138.4092	141.4788	160.6815	174.4067	197.2797	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	21.3978	17.1661	15.4562	11.3239	8.7469	7.1463	7.9792	10.3717	13.4718	17.6757	19.9647	21.9925	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-86.2384	-114.6587	-173.7949	-198.6635	-192.6687	-140.0018	-136.4994	-132.7591	-120.9607	-130.1366	-94.1303	-70.4569	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-31.1861	-57.4734	-127.6344	-223.3934	-311.9249	-399.2250	-381.9384	-325.5896	-234.4544	-105.6876	-45.0166	-22.5973	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4294.4841	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1953.7555	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												172.6928	(232)

Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	2563.8422	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4294.4841	27.6700	1188.2838	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1953.7555	27.6700	540.6041	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	172.6928	27.6700	47.7841	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1590.9691	27.6700	-440.2211	
PV Unit electricity exported	-2266.1212	5.8100	-131.6616	
Total			-571.8828	(252)
Total energy cost			1204.7892	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4294.4841	0.1542	662.0987	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1953.7555	0.1414	276.1822	(264)
Space and water heating			938.2808	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	172.6928	0.1443	24.9249	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1590.9691	0.1369	-217.8086	
PV Unit electricity exported	-2266.1212	0.1209	-273.9563	
Total			-491.7649	(269)
Total CO2, kg/year			471.4408	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4294.4841	1.5708	6745.8123	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1953.7555	1.5227	2975.0214	(278)
Space and water heating			9720.8337	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	172.6928	1.5338	264.8820	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1590.9691	1.5061	-2396.2300	
PV Unit electricity exported	-2266.1212	0.4433	-1004.6237	
Total			-3400.8536	(283)
Total Primary energy kWh/year			6584.8620	(286)

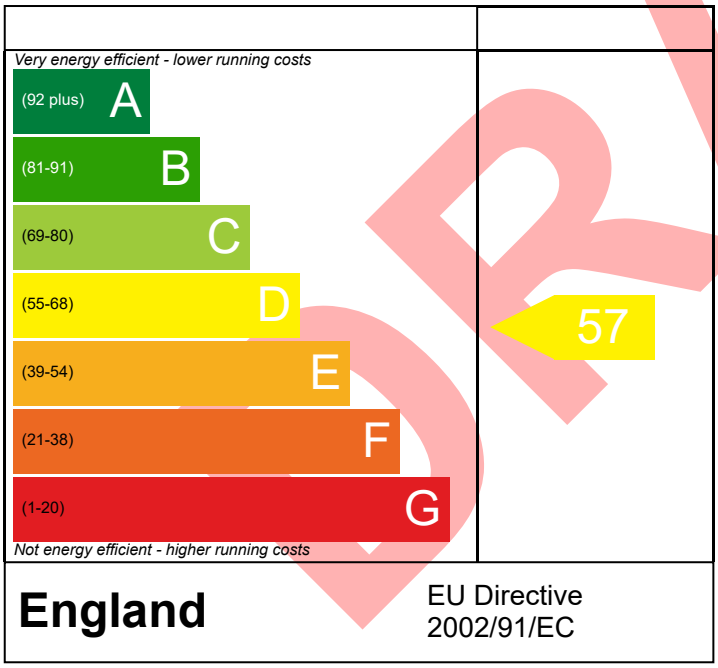
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	65.07 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

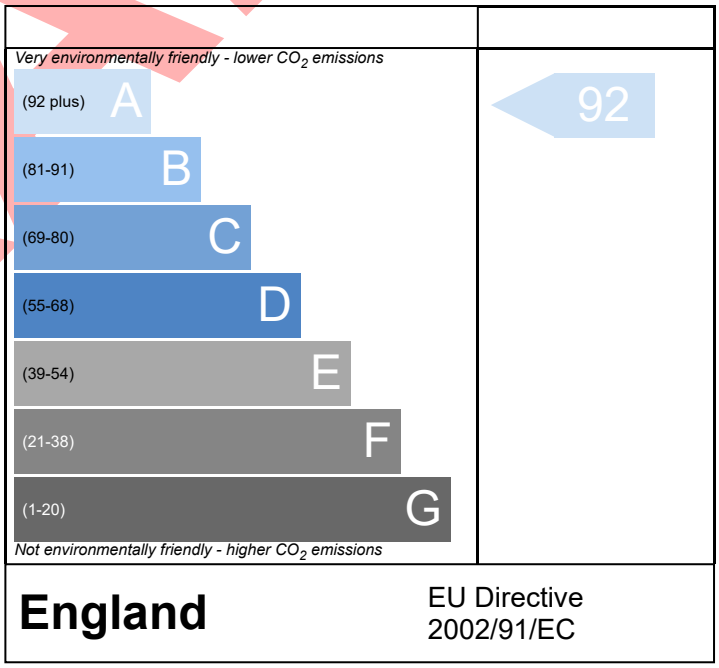
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

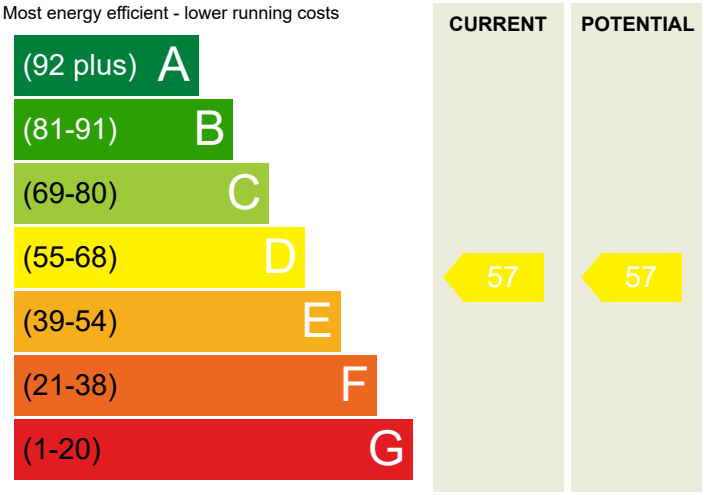
Energy Report

Dwelling Address	
Reference	Flat 6-Be Green
SAP Version	10.2
Assessment Date	12/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	65

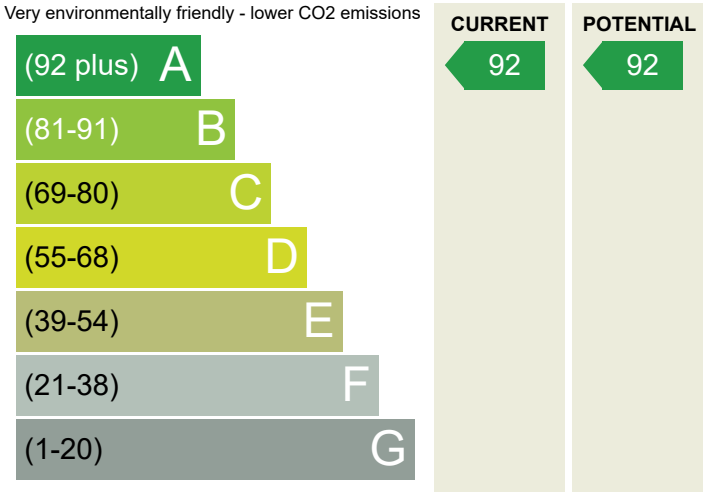
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

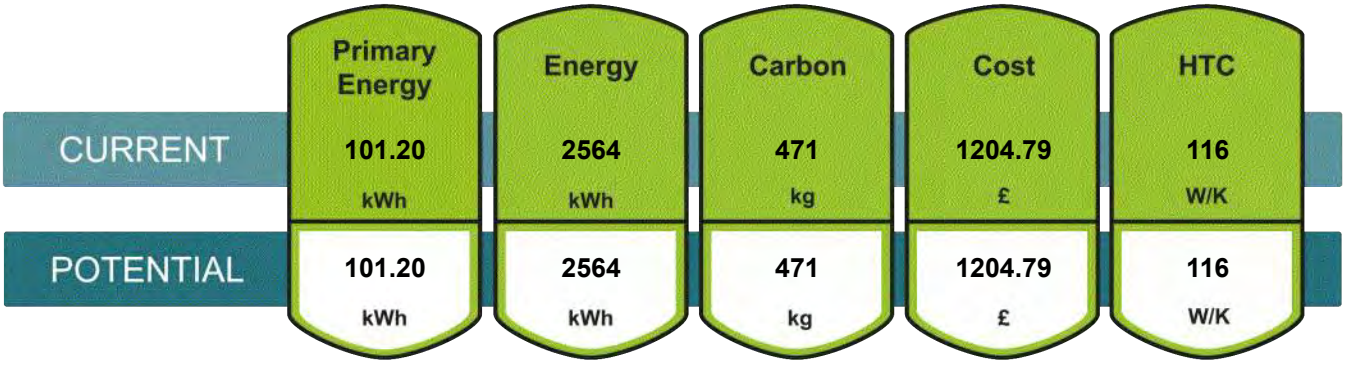


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.18 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£48	£48	
Heating	£1188	£1188	
Hot Water	£541	£541	
New Technologies e.g. Impact of PV	-(£572)	-(£572)	
TOTAL	£1205	£1205	

Estimated energy use and potential savings

Space Heating
4294
kWh per year

Water Heating
1954
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 7	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	84 B	DER	2.45	TER	
Environmental	98 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0	DFEE	36.40	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	52.99	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	382.71	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	10.07 m	58.22 m²	2.73 m

8.0 Living Area	29.09	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	27.49	21.94	0.00	None	5.55	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	33.47	0.00	None
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	45.43	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	111.06

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling	Timber I-joists, carpeted	20.00	58.22

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)

Summary for Input Data

elmhurst energy

Party Floor 1	Lowest occupied	Timber I-joists, carpeted		30.00	58.22

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	4.45	
NW Windows	Windows	External Wall 1	North East	1.10	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System	No
22.0 Pressure Testing	No

22.0 Lighting

No Fixed Lighting	No

Name	Efficacy	Power	Capacity	Count
Lighting 1	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Independent
SAP Code	903

Summary for Input Data

Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day

32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	No	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.08	South West	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 7	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	84 B	DER	2.45	TER	
Environmental	98 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0	DFEE	36.40	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	52.99	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		58.2200	(1b)	x 2.7300	(2b)	= 158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)		= 158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80	= 0.0000	(6a)
Number of open flues	0 * 20	= 0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10	= 0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20	= 0.0000	(6d)
Number of flues attached to other heater	0 * 35	= 0.0000	(6e)
Number of blocked chimneys	0 * 20	= 0.0000	(6f)
Number of intermittent extract fans	2 * 10	= 20.0000	(7a)
Number of passive vents	0 * 10	= 0.0000	(7b)
Number of flueless gas fires	0 * 40	= 0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5)	= 0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)]	= 0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20)	= 0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8654	0.8485	0.8315	0.7466	0.7297	0.6448	0.6448	0.6279	0.6788	0.7297	0.7636	0.7976	(22b)
Effective ac	0.8745	0.8599	0.8457	0.7787	0.7662	0.7079	0.7079	0.6971	0.7304	0.7662	0.7916	0.8180	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		12.5628			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Party Ceiling			58.2200			20.0000	1164.4000	(32b)
Internal Walls			111.0600			9.0000	999.5400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		22281.1400	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							382.7059	(35)
Thermal bridges (Default value 0.200 * total exposed area)							5.4980	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		18.0608	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	45.1045	44.3568	40.8453	40.1883	37.1299	37.1299	36.5635	38.3079	40.1883	41.5174	42.9069	(38)

Heat transfer coeff

	63.9279	63.1652	62.4176	58.9061	58.2491	55.1906	55.1906	54.6242	56.3687	58.2491	59.5782	60.9677 (39)
Average = Sum(39)m / 12 =												58.9029
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0980	1.0849	1.0721	1.0118	1.0005	0.9480	0.9480	0.9382	0.9682	1.0005	1.0233	1.0472 (40)
HLP (average)												1.0117
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309 (42)
Hot water usage for mixer showers												
	53.0570	52.2597	51.0978	48.8747	47.2342	45.4046	44.3647	45.5178	46.7818	48.7462	51.0170	52.8537 (42a)
Hot water usage for baths												
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)
Hot water usage for other uses												
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)
Average daily hot water use (litres/day)												102.8721 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	111.9218	109.5101	106.5856	102.1682	98.5703	94.7066	93.2436	96.1558	99.2239	103.2774	107.7619	111.6358	(44)
Energy conte	177.2567	155.9409	163.8181	139.8632	132.6946	116.4528	112.7701	119.0609	122.3530	140.1464	153.5266	174.7947	(45)
Energy content (annual)										Total = Sum(45)m =		1708.6781	
Distribution loss (46)m = 0.15 x (45)m													
	26.5885	23.3911	24.5727	20.9795	19.9042	17.4679	16.9155	17.8591	18.3530	21.0220	23.0290	26.2192	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
										Total per year (kWh/year) = Sum(64)m =		1857.5981	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	69.0563	60.9896	64.5879	56.2965	54.2394	48.5125	47.6145	49.7062	50.4744	56.7171	60.8396	68.2376	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	92.8176	90.7583	86.8117	78.1896	72.9024	67.3785	63.9979	66.8094	70.1033	76.2326	84.4994	91.7172	(72)
Total internal gains													
	452.9240	451.0611	436.9622	410.5591	384.6267	361.1255	347.2522	349.8671	363.3135	387.2238	416.1357	441.3309	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	492.2297	518.9333	532.2714	532.7475	525.2262	502.3526	482.7258	471.3539	467.8918	462.8959	463.3825	474.8601	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	96.8153	97.9844	99.1580	105.0691	106.2542	112.1423	112.1423	113.3051	109.7986	106.2542	103.8838	101.5162	
alpha	7.4544	7.5323	7.6105	8.0046	8.0836	8.4762	8.4762	8.5537	8.3199	8.0836	7.9256	7.7677	
util living area													
	0.9983	0.9969	0.9927	0.9735	0.9032	0.6922	0.5023	0.5319	0.7946	0.9706	0.9956	0.9986	(86)
MIT	20.2477	20.3465	20.5065	20.7437	20.9109	20.9927	20.9995	20.9993	20.9772	20.7931	20.5164	20.2771	(87)
Th 2	20.0024	20.0132	20.0237	20.0735	20.0829	20.1269	20.1269	20.1351	20.1099	20.0829	20.0639	20.0442	(88)
util rest of house													

	0.9975	0.9953	0.9887	0.9588	0.8548	0.6037	0.4031	0.4327	0.7097	0.9514	0.9930	0.9980	(89)
MIT 2	19.1432	19.2779	19.4894	19.8238	20.0162	20.1239	20.1268	20.1350	20.0985	19.8929	19.5357	19.2143	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.6951	19.8118	19.9976	20.2834	20.4633	20.5580	20.5629	20.5668	20.5375	20.3427	20.0257	19.7453	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.6951	19.8118	19.9976	20.2834	20.4633	20.5580	20.5629	20.5668	20.5375	20.3427	20.0257	19.7453	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9971	0.9949	0.9886	0.9627	0.8768	0.6482	0.4528	0.4824	0.7524	0.9579	0.9928	0.9977	(94)
Useful gains	490.8198	516.3030	526.2058	512.8825	460.5159	325.6397	218.5679	227.3769	352.0336	443.3959	460.0527	473.7527	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	984.1747	941.9099	842.4877	670.5519	510.4515	328.8257	218.7137	227.6097	362.8762	567.5031	770.0895	947.7608	(97)
Space heating kWh	367.0561	286.0078	235.3137	113.5220	37.1521	0.0000	0.0000	0.0000	0.0000	92.3358	223.2265	352.6620	(98a)
Space heating requirement - total per year (kWh/year)												1707.2759	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	367.0561	286.0078	235.3137	113.5220	37.1521	0.0000	0.0000	0.0000	0.0000	92.3358	223.2265	352.6620	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1707.2759	
Space heating per m2											(98c) / (4) =	29.3246	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	367.0561	286.0078	235.3137	113.5220	37.1521	0.0000	0.0000	0.0000	0.0000	92.3358	223.2265	352.6620	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	367.0561	286.0078	235.3137	113.5220	37.1521	0.0000	0.0000	0.0000	0.0000	92.3358	223.2265	352.6620	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-63.9580	-94.3614	-138.9334	-148.4470	-146.4572	-126.8774	-124.6586	-119.9045	-107.9074	-99.7875	-69.7439	-54.4845	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-25.9682	-59.7992	-132.7353	-225.9798	-322.9545	-336.8999	-332.0694	-274.9937	-194.4638	-99.9374	-37.7723	-20.1710	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	1707.2759	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1857.5981	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	152.4072	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	358.0157	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1707.2759	16.4900	281.5298	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	16.4900	306.3179	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	16.4900	25.1319	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1295.5208	16.4900	-213.6314	
PV Unit electricity exported	-2063.7446	5.5900	-115.3633	
Total			-328.9947	(252)
Total energy cost			283.9850	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	0.9905	(257)
SAP value		83.9448	
SAP rating (Section 12)		84	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1707.2759	0.1561	266.4809	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1857.5981	0.1413	262.5684	(264)
Space and water heating			529.0493	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1295.5208	0.1358	-175.9799	
PV Unit electricity exported	-2063.7446	0.1227	-253.2921	
Total			-429.2720	(269)
Total CO2, kg/year			121.7743	(272)
CO2 emissions per m2			2.0900	(273)
EI value			98.4191	
EI rating			98	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b) x	2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n) 58.2200						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8654	0.7976	0.7806	0.7297	0.7297	0.6788	0.6788	0.6618	0.6788	0.7636	0.7466	0.7976	(22b)
Effective ac	0.8745	0.8180	0.8047	0.7662	0.7662	0.7304	0.7304	0.7190	0.7304	0.7916	0.7787	0.8180	(25)

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3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	12.5628			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Party Ceiling			58.2200			20.0000	1164.4000	(32b)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	22281.1400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		382.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)		5.4980 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	18.0608 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	42.9069	42.2046	40.1883	40.1883	38.3079	38.3079	37.7113	38.3079	41.5174	40.8453	42.9069	(38)
Heat transfer coeff	63.9279	60.9677	60.2654	58.2491	58.2491	56.3687	56.3687	55.7721	56.3687	59.5782	58.9061	60.9677	(39)
Average = Sum(39)m / 12 =												58.8324	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0980	1.0472	1.0351	1.0005	1.0005	0.9682	0.9682	0.9580	0.9682	1.0233	1.0118	1.0472	(40)
HLP (average)												1.0105	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.9309	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
53.0570	52.2597	51.0978	48.8747	47.2342	45.4046	44.3647	45.5178	46.7818	48.7462	51.0170	52.8537	(42a)

Hot water usage for baths

24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day)	102.8721	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	111.9218	109.5101	106.5856	102.1682	98.5703	94.7066	93.2436	96.1558	99.2239	103.2774	107.7619	111.6358	(44)
Energy conte	177.2567	155.9409	163.8181	139.8632	132.6946	116.4528	112.7701	119.0609	122.3530	140.1464	153.5266	174.7947	(45)
Energy content (annual)										Total = Sum(45)m =		1708.6781	
Distribution loss (46)m = 0.15 x (45)m	26.5885	23.3911	24.5727	20.9795	19.9042	17.4679	16.9155	17.8591	18.3530	21.0220	23.0290	26.2192	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
										Total per year (kWh/year) = Sum(64)m =		1857.5981	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	69.0563	60.9896	64.5879	56.2965	54.2394	48.5125	47.6145	49.7062	50.4744	56.7171	60.8396	68.2376	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	92.8176	90.7583	86.8117	78.1896	72.9024	67.3785	63.9979	66.8094	70.1033	76.2326	84.4994	91.7172	(72)
Total internal gains	452.9240	451.0611	436.9622	410.5591	384.6267	361.1255	347.2522	349.8671	363.3135	387.2238	416.1357	441.3309	(73)

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6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
	m2	Table 6a	Specific data	Specific data	factor	W

					W/m2	or Table 6b		or Table 6c		Table 6d			
Northeast					1.1000	15.0428		0.4600	0.7000	0.7700		3.6924	(75)
Southwest					4.4500	46.3896		0.4600	0.7000	0.7700		46.0649	(79)
Solar gains	49.7573	73.4838	102.9654	135.2716	149.5616	163.0044	152.4518	138.9511	120.0610	86.7229	59.2696	40.5283	(83)
Total gains	502.6812	524.5449	539.9276	545.8307	534.1883	524.1299	499.7040	488.8182	483.3745	473.9467	475.4053	481.8592	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	96.8153	101.5162	102.6992	106.2542	106.2542	109.7986	109.7986	110.9731	109.7986	103.8838	105.0691	101.5162	
alpha	7.4544	7.7677	7.8466	8.0836	8.0836	8.3199	8.3199	8.3982	8.3199	7.9256	8.0046	7.7677	
util living area	0.9970	0.9950	0.9874	0.9561	0.8471	0.5987	0.4172	0.4220	0.6885	0.9412	0.9896	0.9974	(86)
MIT	20.3522	20.4599	20.6149	20.8120	20.9513	20.9975	20.9999	20.9999	20.9928	20.8655	20.6412	20.3896	(87)
Th 2	20.0024	20.0442	20.0542	20.0829	20.0829	20.1099	20.1099	20.1185	20.1099	20.0639	20.0735	20.0442	(88)
util rest of house	0.9954	0.9924	0.9805	0.9329	0.7815	0.5057	0.3170	0.3216	0.5926	0.9041	0.9833	0.9960	(89)
MIT 2	19.2767	19.4472	19.6501	19.9109	20.0517	20.1091	20.1099	20.1185	20.1072	19.9559	19.7005	19.3581	(90)
Living area fraction									fLA = Living area / (4) =			0.4997	(91)
MIT	19.8141	19.9532	20.1322	20.3611	20.5012	20.5530	20.5546	20.5589	20.5497	20.4104	20.1705	19.8735	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8141	19.9532	20.1322	20.3611	20.5012	20.5530	20.5546	20.5589	20.5497	20.4104	20.1705	19.8735	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9950	0.9920	0.9812	0.9410	0.8133	0.5524	0.3671	0.3718	0.6410	0.9198	0.9841	0.9957	(94)
Useful gains	500.1722	520.3744	529.7829	513.6154	434.4799	289.5114	183.4292	181.7272	309.8231	435.9305	467.8658	479.7654	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	921.4653	868.9854	773.3349	626.8258	460.2380	290.4693	183.4570	181.7553	312.8306	512.9907	693.3554	876.3198	(97)
Space heating kWh	313.4421	234.2666	181.2026	81.5115	19.1640	0.0000	0.0000	0.0000	0.0000	57.3328	162.3525	295.0365	(98a)
Space heating requirement - total per year (kWh/year)												1344.3086	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	313.4421	234.2666	181.2026	81.5115	19.1640	0.0000	0.0000	0.0000	0.0000	57.3328	162.3525	295.0365	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1344.3086	
Space heating per m2											(98c) / (4) =	23.0902	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	313.4421	234.2666	181.2026	81.5115	19.1640	0.0000	0.0000	0.0000	0.0000	57.3328	162.3525	295.0365	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	313.4421	234.2666	181.2026	81.5115	19.1640	0.0000	0.0000	0.0000	0.0000	57.3328	162.3525	295.0365	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-78.3173	-100.1437	-143.7271	-152.1128	-146.0213	-132.9762	-129.7276	-126.6464	-116.0694	-107.1506	-82.5294	-64.4624	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-39.1072	-71.9884	-157.7022	-269.9440	-358.5723	-406.2506	-388.7103	-331.7022	-239.3458	-128.6736	-56.6176	-28.5918	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1344.3086	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	

Water heating fuel used	1857.5981	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	152.4072	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	-502.7764	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1344.3086	27.6700	371.9702	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	27.6700	513.9974	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	27.6700	42.1711	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1379.8842	27.6700	-381.8140	
PV Unit electricity exported	-2477.2060	5.8100	-143.9257	
Total			-525.7396	(252)
Total energy cost			402.3990	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1344.3086	0.1569	210.8869	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1857.5981	0.1413	262.5684	(264)
Space and water heating			473.4553	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1379.8842	0.1363	-188.0495	
PV Unit electricity exported	-2477.2060	0.1233	-305.4561	
Total			-493.5056	(269)
Total CO2, kg/year			1.9468	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1344.3086	1.5808	2125.0684	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	1.5227	2828.5219	(278)
Space and water heating			4953.5903	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	152.4072	1.5338	233.7672	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1379.8842	1.5038	-2075.0272	
PV Unit electricity exported	-2477.2060	0.4525	-1120.8154	
Total			-3195.8426	(283)
Total Primary energy kWh/year			1991.5149	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating: B 84
Current environmental impact rating: A 98

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: B 84
Potential environmental impact rating: A 98

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£928	£928	£0
Space heating	£372	£372	£0
Water heating	£514	£514	£0
Lighting	£42	£42	£0
Generated (PV)	-£526	-£526	£0
Total cost of fuels	£402	£402	£0
Total cost of uses	£402	£402	£0
Delivered energy	-9 kWh/m²	-9 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.0 tonnes	0.0 tonnes	0.0 tonnes
CO2 emissions per m²	0 kg/m²	0 kg/m²	0 kg/m²
Primary energy	34 kWh/m²	34 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b) x	2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8758 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8654	0.8485	0.8315	0.7466	0.7297	0.6448	0.6448	0.6279	0.6788	0.7297	0.7636	0.7976	(22b)
Effective ac	0.8745	0.8599	0.8457	0.7787	0.7662	0.7079	0.7079	0.6971	0.7304	0.7662	0.7916	0.8180	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)
External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000	(29a)
Total net area of external elements Aum(A, m2)			27.4900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		12.5628			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Party Ceiling			58.2200			20.0000	1164.4000	(32b)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	22281.1400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		382.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)		5.4980 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	18.0608 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	45.1045	44.3568	40.8453	40.1883	37.1299	37.1299	36.5635	38.3079	40.1883	41.5174	42.9069	(38)
Heat transfer coeff	63.9279	63.1652	62.4176	58.9061	58.2491	55.1906	55.1906	54.6242	56.3687	58.2491	59.5782	60.9677	(39)
Average = Sum(39)m / 12 =												58.9029	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0980	1.0849	1.0721	1.0118	1.0005	0.9480	0.9480	0.9382	0.9682	1.0005	1.0233	1.0472	(40)

HLP (average)												1.0117	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309	(42)
Hot water usage for mixer showers													
	53.0570	52.2597	51.0978	48.8747	47.2342	45.4046	44.3647	45.5178	46.7818	48.7462	51.0170	52.8537	(42a)
Hot water usage for baths													
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses													
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												102.8721	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	111.9218	109.5101	106.5856	102.1682	98.5703	94.7066	93.2436	96.1558	99.2239	103.2774	107.7619	111.6358	(44)
Energy conte	177.2567	155.9409	163.8181	139.8632	132.6946	116.4528	112.7701	119.0609	122.3530	140.1464	153.5266	174.7947	(45)
Energy content (annual)										Total = Sum(45)m =		1708.6781	
Distribution loss (46)m = 0.15 x (45)m													
	26.5885	23.3911	24.5727	20.9795	19.9042	17.4679	16.9155	17.8591	18.3530	21.0220	23.0290	26.2192	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
										Total per year (kWh/year) = Sum(64)m =		1857.5981	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	69.0563	60.9896	64.5879	56.2965	54.2394	48.5125	47.6145	49.7062	50.4744	56.7171	60.8396	68.2376	(65)

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5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	92.8176	90.7583	86.8117	78.1896	72.9024	67.3785	63.9979	66.8094	70.1033	76.2326	84.4994	91.7172	(72)
Total internal gains													
	452.9240	451.0611	436.9622	410.5591	384.6267	361.1255	347.2522	349.8671	363.3135	387.2238	416.1357	441.3309	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	492.2297	518.9333	532.2714	532.7475	525.2262	502.3526	482.7258	471.3539	467.8918	462.8959	463.3825	474.8601	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	96.8153	97.9844	99.1580	105.0691	106.2542	112.1423	112.1423	113.3051	109.7986	106.2542	103.8838	101.5162	
alpha	7.4544	7.5323	7.6105	8.0046	8.0836	8.4762	8.4762	8.5537	8.3199	8.0836	7.9256	7.7677	
util living area													
	0.9983	0.9969	0.9927	0.9735	0.9032	0.6922	0.5023	0.5319	0.7946	0.9706	0.9956	0.9986	(86)
MIT	20.2477	20.3465	20.5065	20.7437	20.9109	20.9927	20.9995	20.9993	20.9772	20.7931	20.5164	20.2771	(87)
Th 2	20.0024	20.0132	20.0237	20.0735	20.0829	20.1269	20.1269	20.1351	20.1099	20.0829	20.0639	20.0442	(88)
util rest of house													
	0.9975	0.9953	0.9887	0.9588	0.8548	0.6037	0.4031	0.4327	0.7097	0.9514	0.9930	0.9980	(89)
MIT 2	19.1432	19.2779	19.4894	19.8238	20.0162	20.1239	20.1268	20.1350	20.0985	19.8929	19.5357	19.2143	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.6951	19.8118	19.9976	20.2834	20.4633	20.5580	20.5629	20.5668	20.5375	20.3427	20.0257	19.7453	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.6951	19.8118	19.9976	20.2834	20.4633	20.5580	20.5629	20.5668	20.5375	20.3427	20.0257	19.7453	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9971	0.9949	0.9886	0.9627	0.8768	0.6482	0.4528	0.4824	0.7524	0.9579	0.9928	0.9977	(94)
Useful gains	490.8198	516.3030	526.2058	512.8825	460.5159	325.6397	218.5679	227.3769	352.0336	443.3959	460.0527	473.7527	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	984.1747	941.9099	842.4877	670.5519	510.4515	328.8257	218.7137	227.6097	362.8762	567.5031	770.0895	947.7608	(97)
Space heating kWh													
	367.0561	286.0078	235.3137	113.5220	37.1521	0.0000	0.0000	0.0000	0.0000	92.3358	223.2265	352.6620	(98a)
Space heating requirement - total per year (kWh/year)												1707.2759	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	367.0561	286.0078	235.3137	113.5220	37.1521	0.0000	0.0000	0.0000	0.0000	92.3358	223.2265	352.6620	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1707.2759	
Space heating per m2											(98c) / (4) =	29.3246	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	367.0561	286.0078	235.3137	113.5220	37.1521	0.0000	0.0000	0.0000	0.0000	92.3358	223.2265	352.6620	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	367.0561	286.0078	235.3137	113.5220	37.1521	0.0000	0.0000	0.0000	0.0000	92.3358	223.2265	352.6620	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-63.9580	-94.3614	-138.9334	-148.4470	-146.4572	-126.8774	-124.6586	-119.9045	-107.9074	-99.7875	-69.7439	-54.4845	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-25.9682	-59.7992	-132.7353	-225.9798	-322.9545	-336.8999	-332.0694	-274.9937	-194.4638	-99.9374	-37.7723	-20.1710	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	1707.2759	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1857.5981	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	152.4072	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	358.0157	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1707.2759	16.4900	281.5298	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	16.4900	306.3179	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	16.4900	25.1319	(250)
Additional standing charges			0.0000	(251)

Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1295.5208	16.4900	-213.6314	
PV Unit electricity exported	-2063.7446	5.5900	-115.3633	
Total			-328.9947	(252)
Total energy cost			283.9850	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	0.9905	(257)
SAP value		83.9448	
SAP rating (Section 12)		84	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1707.2759	0.1561	266.4809	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1857.5981	0.1413	262.5684	(264)
Space and water heating			529.0493	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1295.5208	0.1358	-175.9799	
PV Unit electricity exported	-2063.7446	0.1227	-253.2921	
Total			-429.2720	(269)
Total CO2, kg/year			121.7743	(272)
CO2 emissions per m2			2.0900	(273)
EI value			98.4191	
EI rating			98	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6788	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.8654	0.7976	0.7806	0.7297	0.7297	0.6788	0.6788	0.6618	0.6788	0.7636	0.7466	0.7976	(22b)
Effective ac	0.8745	0.8180	0.8047	0.7662	0.7662	0.7304	0.7304	0.7190	0.7304	0.7916	0.7787	0.8180	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.2357	6.8584			(27)

External Wall 1	27.4900	5.5500	21.9400	0.2600	5.7044	190.0000	4168.6000 (29a)
Total net area of external elements Aum(A, m2)			27.4900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		12.5628		(33)
Main dwelling							
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000 (32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000 (32)
Party Floor 1			58.2200			30.0000	1746.6000 (32d)
Party Ceiling			58.2200			20.0000	1164.4000 (32b)
Internal Walls			111.0600			9.0000	999.5400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	22281.1400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		382.7059 (35)
Thermal bridges (Default value 0.200 * total exposed area)		5.4980 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	18.0608 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8672	42.9069	42.2046	40.1883	40.1883	38.3079	38.3079	37.7113	38.3079	41.5174	40.8453	42.9069	(38)
Heat transfer coeff	63.9279	60.9677	60.2654	58.2491	58.2491	56.3687	56.3687	55.7721	56.3687	59.5782	58.9061	60.9677	(39)
Average = Sum(39)m / 12 =												58.8324	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0980	1.0472	1.0351	1.0005	1.0005	0.9682	0.9682	0.9580	0.9682	1.0233	1.0118	1.0472	(40)
HLP (average)												1.0105	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309	(42)
Hot water usage for mixer showers	53.0570	52.2597	51.0978	48.8747	47.2342	45.4046	44.3647	45.5178	46.7818	48.7462	51.0170	52.8537	(42a)
Hot water usage for baths	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												102.8721	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	111.9218	109.5101	106.5856	102.1682	98.5703	94.7066	93.2436	96.1558	99.2239	103.2774	107.7619	111.6358	(44)
Energy conte	177.2567	155.9409	163.8181	139.8632	132.6946	116.4528	112.7701	119.0609	122.3530	140.1464	153.5266	174.7947	(45)
Energy content (annual)										Total = Sum(45)m =		1708.6781	
Distribution loss (46)m = 0.15 x (45)m	26.5885	23.3911	24.5727	20.9795	19.9042	17.4679	16.9155	17.8591	18.3530	21.0220	23.0290	26.2192	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
										Total per year (kWh/year) = Sum(64)m =		1857.5981	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	69.0563	60.9896	64.5879	56.2965	54.2394	48.5125	47.6145	49.7062	50.4744	56.7171	60.8396	68.2376	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	92.8176	90.7583	86.8117	78.1896	72.9024	67.3785	63.9979	66.8094	70.1033	76.2326	84.4994	91.7172	(72)
Total internal gains	452.9240	451.0611	436.9622	410.5591	384.6267	361.1255	347.2522	349.8671	363.3135	387.2238	416.1357	441.3309	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	15.0428	0.4600	0.7000	0.7700	3.6924	(75)
Southwest	4.4500	46.3896	0.4600	0.7000	0.7700	46.0649	(79)

Solar gains	49.7573	73.4838	102.9654	135.2716	149.5616	163.0044	152.4518	138.9511	120.0610	86.7229	59.2696	40.5283	(83)
Total gains	502.6812	524.5449	539.9276	545.8307	534.1883	524.1299	499.7040	488.8182	483.3745	473.9467	475.4053	481.8592	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	96.8153	101.5162	102.6992	106.2542	106.2542	109.7986	109.7986	110.9731	109.7986	103.8838	105.0691	101.5162	
alpha	7.4544	7.7677	7.8466	8.0836	8.0836	8.3199	8.3199	8.3982	8.3199	7.9256	8.0046	7.7677	
util living area	0.9970	0.9950	0.9874	0.9561	0.8471	0.5987	0.4172	0.4220	0.6885	0.9412	0.9896	0.9974	(86)
MIT	20.3522	20.4599	20.6149	20.8120	20.9513	20.9975	20.9999	20.9999	20.9928	20.8655	20.6412	20.3896	(87)
Th 2	20.0024	20.0442	20.0542	20.0829	20.0829	20.1099	20.1099	20.1185	20.1099	20.0639	20.0735	20.0442	(88)
util rest of house	0.9954	0.9924	0.9805	0.9329	0.7815	0.5057	0.3170	0.3216	0.5926	0.9041	0.9833	0.9960	(89)
MIT 2	19.2767	19.4472	19.6501	19.9109	20.0517	20.1091	20.1099	20.1185	20.1072	19.9559	19.7005	19.3581	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	19.8141	19.9532	20.1322	20.3611	20.5012	20.5530	20.5546	20.5589	20.5497	20.4104	20.1705	19.8735	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8141	19.9532	20.1322	20.3611	20.5012	20.5530	20.5546	20.5589	20.5497	20.4104	20.1705	19.8735	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9950	0.9920	0.9812	0.9410	0.8133	0.5524	0.3671	0.3718	0.6410	0.9198	0.9841	0.9957	(94)
Useful gains	500.1722	520.3744	529.7829	513.6154	434.4799	289.5114	183.4292	181.7272	309.8231	435.9305	467.8658	479.7654	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	921.4653	868.9854	773.3349	626.8258	460.2380	290.4693	183.4570	181.7553	312.8306	512.9907	693.3554	876.3198	(97)
Space heating kWh	313.4421	234.2666	181.2026	81.5115	19.1640	0.0000	0.0000	0.0000	0.0000	57.3328	162.3525	295.0365	(98a)
Space heating requirement - total per year (kWh/year)												1344.3086	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	313.4421	234.2666	181.2026	81.5115	19.1640	0.0000	0.0000	0.0000	0.0000	57.3328	162.3525	295.0365	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1344.3086	
Space heating per m2											(98c) / (4) =	23.0902	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	313.4421	234.2666	181.2026	81.5115	19.1640	0.0000	0.0000	0.0000	0.0000	57.3328	162.3525	295.0365	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	313.4421	234.2666	181.2026	81.5115	19.1640	0.0000	0.0000	0.0000	0.0000	57.3328	162.3525	295.0365	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	189.9047	167.3649	176.4661	152.1032	145.3426	128.6928	125.4181	131.7089	134.5930	152.7944	165.7666	187.4427	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-78.3173	-100.1437	-143.7271	-152.1128	-146.0213	-132.9762	-129.7276	-126.6464	-116.0694	-107.1506	-82.5294	-64.4624	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-39.1072	-71.9884	-157.7022	-269.9440	-358.5723	-406.2506	-388.7103	-331.7022	-239.3458	-128.6736	-56.6176	-28.5918	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	1344.3086	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1857.5981	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	152.4072	(232)

Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	-502.7764	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1344.3086	27.6700	371.9702	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	27.6700	513.9974	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	27.6700	42.1711	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1379.8842	27.6700	-381.8140	
PV Unit electricity exported	-2477.2060	5.8100	-143.9257	
Total			-525.7396	(252)
Total energy cost			402.3990	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1344.3086	0.1569	210.8869	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1857.5981	0.1413	262.5684	(264)
Space and water heating			473.4553	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1379.8842	0.1363	-188.0495	
PV Unit electricity exported	-2477.2060	0.1233	-305.4561	
Total			-493.5056	(269)
Total CO2, kg/year			1.9468	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1344.3086	1.5808	2125.0684	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1857.5981	1.5227	2828.5219	(278)
Space and water heating			4953.5903	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	152.4072	1.5338	233.7672	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1379.8842	1.5038	-2075.0272	
PV Unit electricity exported	-2477.2060	0.4525	-1120.8154	
Total			-3195.8426	(283)
Total Primary energy kWh/year			1991.5149	(286)

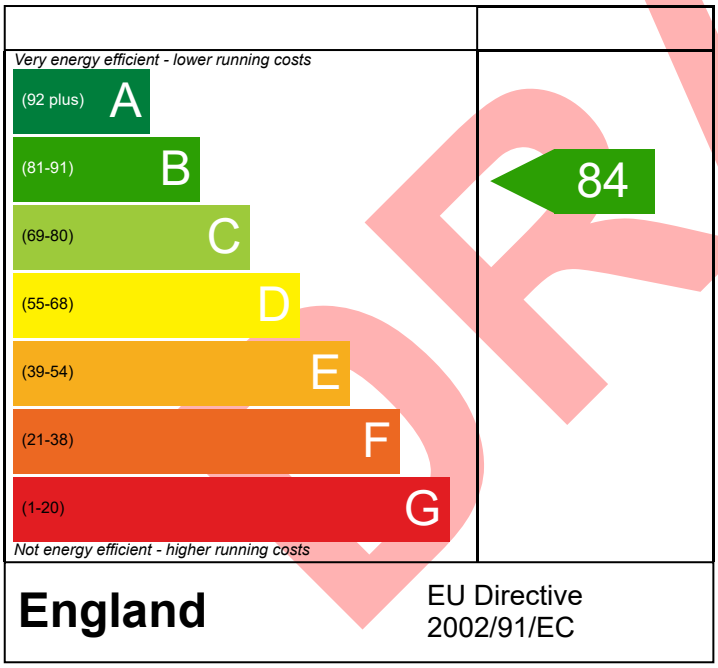
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.22 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

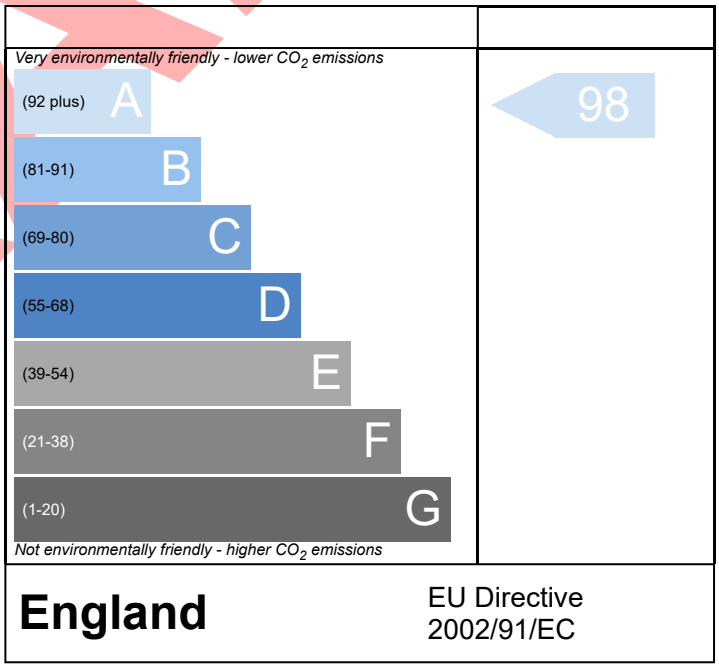
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

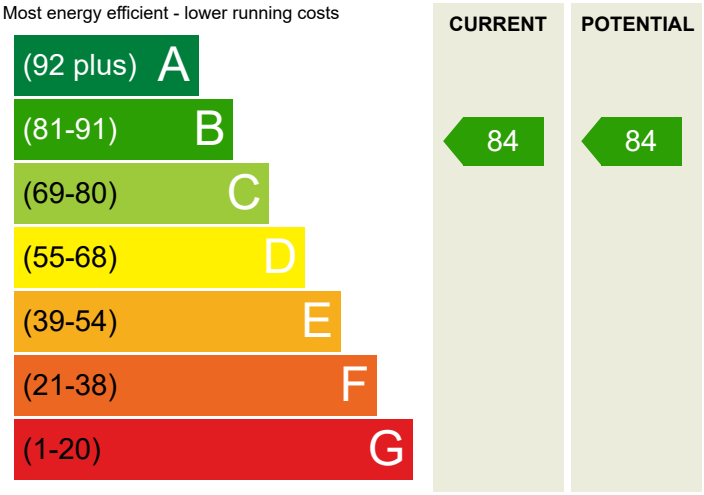
Energy Report

Dwelling Address	
Reference	Flat 7-Be Green
SAP Version	10.2
Assessment Date	12/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	58

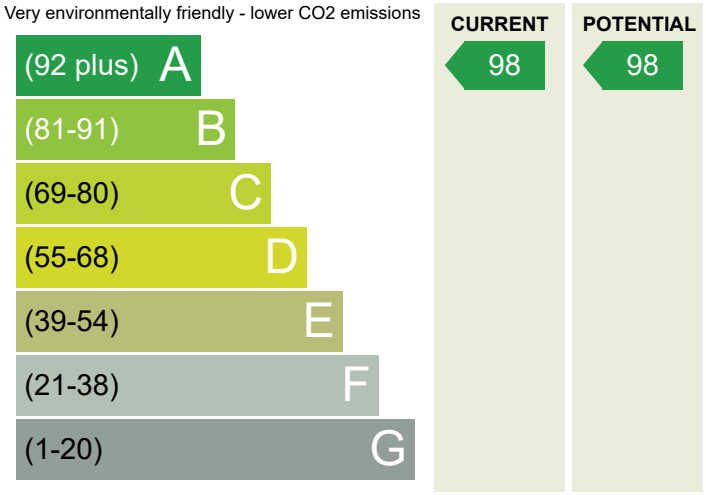
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

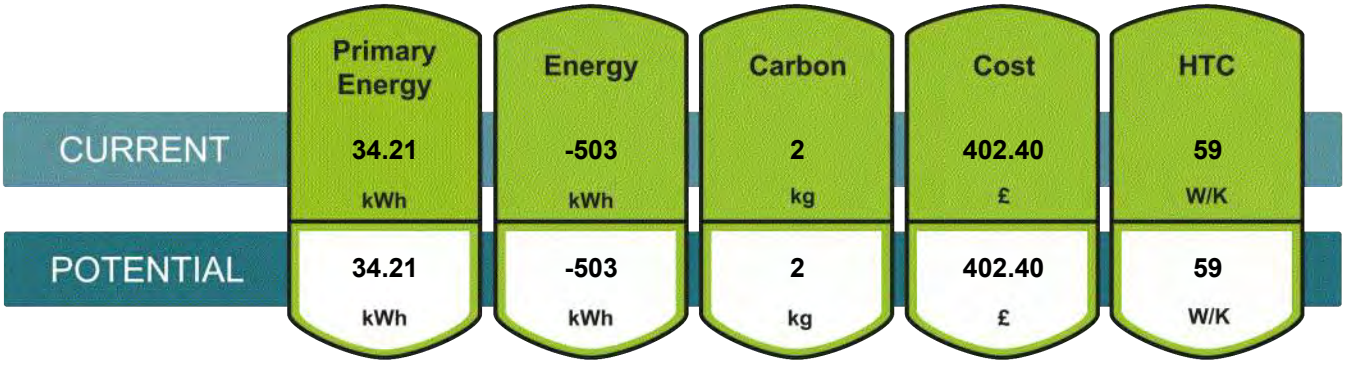


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

Energy Report

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£42	£42	
Heating	£372	£372	
Hot Water	£514	£514	
New Technologies e.g. Impact of PV	-(£526)	-(£526)	
TOTAL	£402	£402	

Estimated energy use and potential savings

Space Heating
1344
kWh per year

Water Heating
1858
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 8	**Issued on Date**	15/06/2026
Assessment Reference	Be Green	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	69 C	**DER**	6.78	**TER**	
Environmental	95 A	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.24	**DFEE**	58.96	**TFEE**	
Compliance Check	N/A	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	95.73	**TPER**	

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client	KJC, KJC Architects		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	339.05	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.17 m	58.61 m²	2.73 m

8.0 Living Area	31.93	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.26	190.00	57.79	51.00	0.00	None	6.79	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	36.17	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	82.28

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling	Timber I-joists, carpeted	20.00	58.61

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Timber I-joists, carpeted	30.00	58.61

Summary for Input Data

elmhurst energy

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	2.96	
SE Windows	Windows	External Wall 1	South East	2.19	
NE Windows	Windows	External Wall 1	North East	1.64	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	
Controls description	Programmer and room thermostat	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	

Summary for Input Data

elmhurst energy

Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over Bath	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.24	kWh/day

32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	No	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.08	South West	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 8	Issued on Date	15/06/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	69 C	DER	6.78	TER	
Environmental	95 A	% DER < TER			N/A
CO_2 Emissions (t/year)	0.24	DFEE	58.96	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	95.73	TPER	

Assessor Details	Mr. Dion Mellows	Assessor ID	G297-0001
Client	KJC, KJC Architects		

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0319	1.0117	0.9915	0.8903	0.8701	0.7689	0.7689	0.7487	0.8094	0.8701	0.9105	0.9510	(22b)
Effective ac	1.0319	1.0117	0.9915	0.8963	0.8785	0.7956	0.7956	0.7803	0.8275	0.8785	0.9145	0.9522	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.2600	13.2600	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.6507			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Party Ceiling			58.6100			20.0000	1172.2000	(32b)
Internal Walls			82.2800			9.0000	740.5200	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		19871.6200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							339.0483	(35)
Thermal bridges (Default value 0.200 * total exposed area)							11.5580	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		33.2087	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	53.4203	52.3538	47.3275	46.3871	42.0094	42.0094	41.1987	43.6956	46.3871	48.2895	50.2784	(38)

Heat transfer coeff

	87.6974	86.6290	85.5625	80.5362	79.5958	75.2181	75.2181	74.4074	76.9043	79.5958	81.4982	83.4871 (39)
Average = Sum(39)m / 12 =												80.5291

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4963	1.4781	1.4599	1.3741	1.3581	1.2834	1.2834	1.2695	1.3121	1.3581	1.3905	1.4245	(40)
HLP (average)												1.3740	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421 (42)
Hot water usage for mixer showers												
	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757 (42a)
Hot water usage for baths												
	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583 (42b)
Hot water usage for other uses												
	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188 (42c)
Average daily hot water use (litres/day)												126.1167 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m													
	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains													
	482.9922	480.8799	466.0485	437.7012	410.5907	385.7882	370.9727	374.0628	388.1126	413.3605	444.1734	471.0427	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579	(83)
Total gains	529.4049	561.3093	579.7385	584.6749	580.7869	557.2053	535.2168	520.6070	513.2702	503.2344	500.0148	510.6007	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	62.9425	63.7188	64.5130	68.5393	69.3491	73.3852	73.3852	74.1848	71.7762	69.3491	67.7303	66.1167	
alpha	5.1962	5.2479	5.3009	5.5693	5.6233	5.8923	5.8923	5.9457	5.7851	5.6233	5.5154	5.4078	
util living area													
	0.9968	0.9949	0.9905	0.9759	0.9311	0.7858	0.6039	0.6378	0.8664	0.9752	0.9938	0.9973	(86)
MIT	19.7257	19.8597	20.0890	20.4414	20.7235	20.9390	20.9892	20.9856	20.8801	20.5328	20.1225	19.7729	(87)
Th 2	19.6903	19.7040	19.7177	19.7832	19.7956	19.8539	19.8539	19.8648	19.8313	19.7956	19.7706	19.7446	(88)
util rest of house													

	0.9953	0.9926	0.9857	0.9625	0.8894	0.6792	0.4548	0.4913	0.7807	0.9585	0.9905	0.9961	(89)
MIT 2	18.2542	18.4349	18.7363	19.2264	19.5683	19.8238	19.8515	19.8612	19.7596	19.3517	18.8190	18.3537	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.0559	19.2111	19.4733	19.8883	20.1976	20.4313	20.4713	20.4738	20.3701	19.9952	19.5291	19.1269	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0559	19.2111	19.4733	19.8883	20.1976	20.4313	20.4713	20.4738	20.3701	19.9952	19.5291	19.1269	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9943	0.9914	0.9845	0.9639	0.9056	0.7366	0.5371	0.5722	0.8247	0.9620	0.9896	0.9952	(94)
Useful gains	526.3846	556.4735	570.7365	563.5634	525.9545	410.4103	287.4589	297.9153	423.3056	484.1020	494.8052	508.1740	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1294.0508	1239.7595	1110.0249	884.9550	676.3770	438.6215	291.1917	303.1173	482.1953	747.8160	1012.9528	1246.2010	(97)
Space heating kWh													
	571.1437	459.1682	401.2306	231.4019	111.9143	0.0000	0.0000	0.0000	0.0000	196.2032	373.0663	549.0921	(98a)
Space heating requirement - total per year (kWh/year)												2893.2203	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	571.1437	459.1682	401.2306	231.4019	111.9143	0.0000	0.0000	0.0000	0.0000	196.2032	373.0663	549.0921	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2893.2203	
Space heating per m2											(98c) / (4) =	49.3639	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	571.1437	459.1682	401.2306	231.4019	111.9143	0.0000	0.0000	0.0000	0.0000	196.2032	373.0663	549.0921	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	571.1437	459.1682	401.2306	231.4019	111.9143	0.0000	0.0000	0.0000	0.0000	196.2032	373.0663	549.0921	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-66.9610	-100.9220	-152.5773	-169.2706	-170.6008	-136.9806	-134.5920	-128.7321	-114.6600	-109.8722	-74.0011	-56.8427	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-22.9652	-53.2386	-119.0914	-205.1563	-298.8108	-326.7967	-322.1361	-266.1660	-187.7112	-89.8527	-33.5151	-17.8128	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2893.2203	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2366.3713	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												147.0407	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3359.2654	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												2047.3669	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2893.2203	16.4900	477.0920	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	16.4900	390.2146	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	16.4900	24.2470	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1416.0124	16.4900	-233.5005	
PV Unit electricity exported	-1943.2530	5.5900	-108.6278	
Total			-342.1283	(252)
Total energy cost			549.4254	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.9090	(257)
SAP value		69.0549	
SAP rating (Section 12)		69	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2893.2203	0.1550	448.3334	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			782.5819	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1416.0124	0.1358	-192.2975	
PV Unit electricity exported	-1943.2530	0.1218	-236.6445	
Total			-428.9421	(269)
Total CO2, kg/year			374.8624	(272)
CO2 emissions per m2			6.4000	(273)
EI value			95.1519	
EI rating			95	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b) x	2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0319	0.9510	0.9308	0.8701	0.8701	0.8094	0.8094	0.7891	0.8094	0.9105	0.8903	0.9510	(22b)
Effective ac	1.0319	0.9522	0.9332	0.8785	0.8785	0.8275	0.8275	0.8114	0.8275	0.9145	0.8963	0.9522	(25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.2600	13.2600	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.6507			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Party Ceiling			58.6100			20.0000	1172.2000	(32b)
Internal Walls			82.2800			9.0000	740.5200	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19871.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		339.0483 (35)
Thermal bridges (Default value 0.200 * total exposed area)		11.5580 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	33.2087 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	50.2784	49.2732	46.3871	46.3871	43.6956	43.6956	42.8417	43.6956	48.2895	47.3275	50.2784	(38)
Heat transfer coeff	87.6974	83.4871	82.4818	79.5958	79.5958	76.9043	76.9043	76.0504	76.9043	81.4982	80.5362	83.4871	(39)
Average = Sum(39)m / 12 =												80.4285	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4963	1.4245	1.4073	1.3581	1.3581	1.3121	1.3121	1.2976	1.3121	1.3905	1.3741	1.4245	(40)
HLP (average)												1.3723	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9421 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)

Hot water usage for baths

24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)

Hot water usage for other uses

34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)

Average daily hot water use (litres/day)		126.1167 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains	482.9922	480.8799	466.0485	437.7012	410.5907	385.7882	370.9727	374.0628	388.1126	413.3605	444.1734	471.0427	(73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
	m2	Table 6a	Specific data	Specific data	factor	W
		W/m2	or Table 6b	or Table 6c	Table 6d	

Northeast			1.6400	15.0428	0.4600	0.7000	0.7700	5.5051	(75)			
Southeast			2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)			
Southwest			2.9600	46.3896	0.4600	0.7000	0.7700	30.6409	(79)			
Solar gains	58.8161	87.2005	123.0433	163.0198	181.3464	198.1421	185.1171	167.9173	143.9588	103.1595	70.1321	47.8618	(83)
Total gains	541.8083	568.0804	589.0919	600.7211	591.9371	583.9302	556.0898	541.9801	532.0714	516.5200	514.3055	518.9045	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	62.9425	66.1167	66.9225	69.3491	69.3491	71.7762	71.7762	72.5821	71.7762	67.7303	68.5393	66.1167	
alpha	5.1962	5.4078	5.4615	5.6233	5.6233	5.7851	5.7851	5.8388	5.7851	5.5154	5.5693	5.4078	
util living area	0.9951	0.9930	0.9861	0.9644	0.8956	0.6994	0.5065	0.5137	0.7857	0.9563	0.9887	0.9957	(86)
MIT	19.8725	20.0203	20.2440	20.5453	20.8081	20.9690	20.9959	20.9958	20.9395	20.6470	20.2998	19.9322	(87)
Th 2	19.6903	19.7446	19.7577	19.7956	19.7956	19.8313	19.8313	19.8427	19.8313	19.7706	19.7832	19.7446	(88)
util rest of house	0.9927	0.9897	0.9790	0.9446	0.8347	0.5725	0.3495	0.3562	0.6694	0.9254	0.9820	0.9936	(89)
MIT 2	18.4417	18.6689	18.9613	19.3615	19.6557	19.8198	19.8308	19.8422	19.8038	19.4667	19.0526	18.5573	(90)
Living area fraction									fLA = Living area / (4) =			0.5448	(91)
MIT	19.2212	19.4051	19.6601	20.0064	20.2835	20.4458	20.4656	20.4707	20.4225	20.1097	19.7320	19.3064	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.2212	19.4051	19.6601	20.0064	20.2835	20.4458	20.4656	20.4707	20.4225	20.1097	19.7320	19.3064	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9915	0.9885	0.9783	0.9488	0.8625	0.6422	0.4357	0.4427	0.7326	0.9357	0.9817	0.9926	(94)
Useful gains	537.2110	561.5209	576.2837	569.9491	510.5553	374.9904	242.2903	239.9442	389.7746	483.3251	504.8837	515.0716	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1212.0800	1144.2024	1019.4850	828.3058	611.5737	388.0469	243.4452	241.1317	417.0146	677.2262	912.6394	1152.6521	(97)
Space heating kWh	502.1026	391.5619	329.7417	186.0168	75.1577	0.0000	0.0000	0.0000	0.0000	144.2624	293.5841	474.3599	(98a)
Space heating requirement - total per year (kWh/year)												2396.7872	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	502.1026	391.5619	329.7417	186.0168	75.1577	0.0000	0.0000	0.0000	0.0000	144.2624	293.5841	474.3599	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2396.7872	
Space heating per m2											(98c) / (4) =	40.8938	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement	502.1026	391.5619	329.7417	186.0168	75.1577	0.0000	0.0000	0.0000	0.0000	144.2624	293.5841	474.3599	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	502.1026	391.5619	329.7417	186.0168	75.1577	0.0000	0.0000	0.0000	0.0000	144.2624	293.5841	474.3599	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-82.7395	-107.8993	-159.4712	-175.5125	-169.0485	-144.4485	-140.7851	-136.7368	-123.9790	-119.1457	-88.6975	-67.7462	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-34.6849	-64.2329	-141.9582	-246.5443	-335.5451	-394.7783	-377.6527	-321.6119	-231.4361	-116.6785	-50.4494	-25.3080	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2396.7872	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	

Water heating fuel used	2366.3713	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	147.0407	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	1053.1090	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2396.7872	27.6700	663.1910	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	27.6700	654.7749	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	27.6700	40.6862	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1516.2097	27.6700	-419.5352	
PV Unit electricity exported	-2340.8805	5.8100	-136.0052	
Total			-555.5404	(252)
Total energy cost			803.1117	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2396.7872	0.1555	372.7359	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			706.9844	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1516.2097	0.1363	-206.6029	
PV Unit electricity exported	-2340.8805	0.1224	-286.4235	
Total			-493.0264	(269)
Total CO2, kg/year			235.1805	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2396.7872	1.5758	3776.7747	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	1.5223	3602.3424	(278)
Space and water heating			7379.1171	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	147.0407	1.5338	225.5360	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1516.2097	1.5037	-2279.9549	
PV Unit electricity exported	-2340.8805	0.4489	-1050.7589	
Total			-3330.7138	(283)
Total Primary energy kWh/year			4273.9393	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating: C 69
Current environmental impact rating: A 95

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: C 69
Potential environmental impact rating: A 95

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£1359	£1359	£0
Space heating	£663	£663	£0
Water heating	£655	£655	£0
Lighting	£41	£41	£0
Generated (PV)	-£556	-£556	£0
Total cost of fuels	£803	£803	£0
Total cost of uses	£803	£803	£0
Delivered energy	18 kWh/m²	18 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.2 tonnes	0.2 tonnes	0.0 tonnes
CO2 emissions per m²	4 kg/m²	4 kg/m²	0 kg/m²
Primary energy	73 kWh/m²	73 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8750 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0319	1.0117	0.9915	0.8903	0.8701	0.7689	0.7689	0.7487	0.8094	0.8701	0.9105	0.9510	(22b)
Effective ac	1.0319	1.0117	0.9915	0.8963	0.8785	0.7956	0.7956	0.7803	0.8275	0.8785	0.9145	0.9522	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)
External Wall 1	57.7900	6.7900	51.0000	0.2600	13.2600	190.0000	9690.0000	(29a)
Total net area of external elements Aum(A, m2)			57.7900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.6507			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Party Ceiling			58.6100			20.0000	1172.2000	(32b)
Internal Walls			82.2800			9.0000	740.5200	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19871.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		339.0483 (35)
Thermal bridges (Default value 0.200 * total exposed area)		11.5580 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	33.2087 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	53.4203	52.3538	47.3275	46.3871	42.0094	42.0094	41.1987	43.6956	46.3871	48.2895	50.2784	(38)
Heat transfer coeff	87.6974	86.6290	85.5625	80.5362	79.5958	75.2181	75.2181	74.4074	76.9043	79.5958	81.4982	83.4871	(39)
Average = Sum(39)m / 12 =												80.5291	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4963	1.4781	1.4599	1.3741	1.3581	1.2834	1.2834	1.2695	1.3121	1.3581	1.3905	1.4245	(40)
HLP (average)												1.3740	

Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421	(42)
Hot water usage for mixer showers													
	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)
Hot water usage for baths													
	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)
Hot water usage for other uses													
	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)
Average daily hot water use (litres/day)												126.1167	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)											Total = Sum(45)m =	2094.8113	
Distribution loss (46)m = 0.15 x (45)m													
	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage													
	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

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5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains													
	482.9922	480.8799	466.0485	437.7012	410.5907	385.7882	370.9727	374.0628	388.1126	413.3605	444.1734	471.0427	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579	(83)
Total gains	529.4049	561.3093	579.7385	584.6749	580.7869	557.2053	535.2168	520.6070	513.2702	503.2344	500.0148	510.6007	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	62.9425	63.7188	64.5130	68.5393	69.3491	73.3852	73.3852	74.1848	71.7762	69.3491	67.7303	66.1167	
alpha	5.1962	5.2479	5.3009	5.5693	5.6233	5.8923	5.8923	5.9457	5.7851	5.6233	5.5154	5.4078	
util living area													
	0.9968	0.9949	0.9905	0.9759	0.9311	0.7858	0.6039	0.6378	0.8664	0.9752	0.9938	0.9973	(86)
MIT	19.7257	19.8597	20.0890	20.4414	20.7235	20.9390	20.9892	20.9856	20.8801	20.5328	20.1225	19.7729	(87)
Th 2	19.6903	19.7040	19.7177	19.7832	19.7956	19.8539	19.8539	19.8648	19.8313	19.7956	19.7706	19.7446	(88)
util rest of house													
	0.9953	0.9926	0.9857	0.9625	0.8894	0.6792	0.4548	0.4913	0.7807	0.9585	0.9905	0.9961	(89)
MIT 2	18.2542	18.4349	18.7363	19.2264	19.5683	19.8238	19.8515	19.8612	19.7596	19.3517	18.8190	18.3537	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.0559	19.2111	19.4733	19.8883	20.1976	20.4313	20.4713	20.4738	20.3701	19.9952	19.5291	19.1269	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0559	19.2111	19.4733	19.8883	20.1976	20.4313	20.4713	20.4738	20.3701	19.9952	19.5291	19.1269	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9943	0.9914	0.9845	0.9639	0.9056	0.7366	0.5371	0.5722	0.8247	0.9620	0.9896	0.9952	(94)
Useful gains	526.3846	556.4735	570.7365	563.5634	525.9545	410.4103	287.4589	297.9153	423.3056	484.1020	494.8052	508.1740	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1294.0508	1239.7595	1110.0249	884.9550	676.3770	438.6215	291.1917	303.1173	482.1953	747.8160	1012.9528	1246.2010	(97)
Space heating kWh	571.1437	459.1682	401.2306	231.4019	111.9143	0.0000	0.0000	0.0000	0.0000	196.2032	373.0663	549.0921	(98a)
Space heating requirement - total per year (kWh/year)												2893.2203	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	571.1437	459.1682	401.2306	231.4019	111.9143	0.0000	0.0000	0.0000	0.0000	196.2032	373.0663	549.0921	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2893.2203	
Space heating per m2											(98c) / (4) =	49.3639	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	571.1437	459.1682	401.2306	231.4019	111.9143	0.0000	0.0000	0.0000	0.0000	196.2032	373.0663	549.0921	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	571.1437	459.1682	401.2306	231.4019	111.9143	0.0000	0.0000	0.0000	0.0000	196.2032	373.0663	549.0921	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-66.9610	-100.9220	-152.5773	-169.2706	-170.6008	-136.9806	-134.5920	-128.7321	-114.6600	-109.8722	-74.0011	-56.8427	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-22.9652	-53.2386	-119.0914	-205.1563	-298.8108	-326.7967	-322.1361	-266.1660	-187.7112	-89.8527	-33.5151	-17.8128	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2893.2203	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	2366.3713	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	147.0407	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	2047.3669	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2893.2203	16.4900	477.0920	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	16.4900	390.2146	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	16.4900	24.2470	(250)
Additional standing charges			0.0000	(251)

Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1416.0124	16.4900	-233.5005	
PV Unit electricity exported	-1943.2530	5.5900	-108.6278	
Total			-342.1283	(252)
Total energy cost			549.4254	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.9090	(257)
SAP value		69.0549	
SAP rating (Section 12)		69	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2893.2203	0.1550	448.3334	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			782.5819	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1416.0124	0.1358	-192.2975	
PV Unit electricity exported	-1943.2530	0.1218	-236.6445	
Total			-428.9421	(269)
Total CO2, kg/year			374.8624	(272)
CO2 emissions per m2			6.4000	(273)
EI value			95.1519	
EI rating			95	(274)
EI band			A	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		160.0053	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8094	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	1.0319	0.9510	0.9308	0.8701	0.8701	0.8094	0.8094	0.7891	0.8094	0.9105	0.8903	0.9510	(22b)
Effective ac	1.0319	0.9522	0.9332	0.8785	0.8785	0.8275	0.8275	0.8114	0.8275	0.9145	0.8963	0.9522	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.2357	8.3907			(27)

External Wall 1	57.7900	6.7900	51.0000	0.2600	13.2600	190.0000	9690.0000 (29a)
Total net area of external elements Aum(A, m2)			57.7900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.6507		(33)
Main dwelling							
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000 (32)
Party Floor 1			58.6100			30.0000	1758.3000 (32d)
Party Ceiling			58.6100			20.0000	1172.2000 (32b)
Internal Walls			82.2800			9.0000	740.5200 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19871.6200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		339.0483 (35)
Thermal bridges (Default value 0.200 * total exposed area)		11.5580 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	33.2087 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4887	50.2784	49.2732	46.3871	46.3871	43.6956	43.6956	42.8417	43.6956	48.2895	47.3275	50.2784	(38)
Heat transfer coeff	87.6974	83.4871	82.4818	79.5958	79.5958	76.9043	76.9043	76.0504	76.9043	81.4982	80.5362	83.4871	(39)
Average = Sum(39)m / 12 =												80.4285	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4963	1.4245	1.4073	1.3581	1.3581	1.3121	1.3121	1.2976	1.3121	1.3905	1.3741	1.4245	(40)
HLP (average)												1.3723	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421	(42)
Hot water usage for mixer showers	78.0749	76.9016	75.1918	71.9205	69.5064	66.8142	65.2839	66.9807	68.8407	71.7314	75.0729	77.7757	(42a)
Hot water usage for baths	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)
Hot water usage for other uses	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)
Average daily hot water use (litres/day)												126.1167	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	137.1349	134.3419	130.8636	125.3908	121.0128	116.2796	114.3249	117.7866	121.4568	126.4434	132.0060	136.7528	(44)
Energy conte	217.1881	191.3010	201.1325	171.6537	162.9065	142.9793	138.2661	145.8445	149.7684	171.5825	188.0668	214.1218	(45)
Energy content (annual)										Total = Sum(45)m =		2094.8113	
Distribution loss (46)m = 0.15 x (45)m	32.5782	28.6952	30.1699	25.7481	24.4360	21.4469	20.7399	21.8767	22.4653	25.7374	28.2100	32.1183	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2400	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7440	(55)
Total storage loss	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(56)
If cylinder contains dedicated solar storage	23.0640	20.8320	23.0640	22.3200	23.0640	22.3200	23.0640	23.0640	22.3200	23.0640	22.3200	23.0640	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
										Total per year (kWh/year) = Sum(64)m =		2366.3713	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	90.6663	80.2732	85.3278	74.9309	72.6176	65.3966	64.4247	66.9445	67.6540	75.5024	80.3882	89.6467	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)	121.8632	119.4542	114.6879	104.0706	97.6043	90.8287	86.5923	89.9791	93.9639	101.4817	111.6503	120.4929	(72)
Total internal gains	482.9922	480.8799	466.0485	437.7012	410.5907	385.7882	370.9727	374.0628	388.1126	413.3605	444.1734	471.0427	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	15.0428	0.4600	0.7000	0.7700	5.5051	(75)
Southeast	2.1900	46.3896	0.4600	0.7000	0.7700	22.6701	(77)
Southwest	2.9600	46.3896	0.4600	0.7000	0.7700	30.6409	(79)

Solar gains	58.8161	87.2005	123.0433	163.0198	181.3464	198.1421	185.1171	167.9173	143.9588	103.1595	70.1321	47.8618	(83)
Total gains	541.8083	568.0804	589.0919	600.7211	591.9371	583.9302	556.0898	541.9801	532.0714	516.5200	514.3055	518.9045	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	62.9425	66.1167	66.9225	69.3491	69.3491	71.7762	71.7762	72.5821	71.7762	67.7303	68.5393	66.1167	
alpha	5.1962	5.4078	5.4615	5.6233	5.6233	5.7851	5.7851	5.8388	5.7851	5.5154	5.5693	5.4078	
util living area	0.9951	0.9930	0.9861	0.9644	0.8956	0.6994	0.5065	0.5137	0.7857	0.9563	0.9887	0.9957	(86)
MIT	19.8725	20.0203	20.2440	20.5453	20.8081	20.9690	20.9959	20.9958	20.9395	20.6470	20.2998	19.9322	(87)
Th 2	19.6903	19.7446	19.7577	19.7956	19.7956	19.8313	19.8313	19.8427	19.8313	19.7706	19.7832	19.7446	(88)
util rest of house	0.9927	0.9897	0.9790	0.9446	0.8347	0.5725	0.3495	0.3562	0.6694	0.9254	0.9820	0.9936	(89)
MIT 2	18.4417	18.6689	18.9613	19.3615	19.6557	19.8198	19.8308	19.8422	19.8038	19.4667	19.0526	18.5573	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.2212	19.4051	19.6601	20.0064	20.2835	20.4458	20.4656	20.4707	20.4225	20.1097	19.7320	19.3064	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.2212	19.4051	19.6601	20.0064	20.2835	20.4458	20.4656	20.4707	20.4225	20.1097	19.7320	19.3064	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9915	0.9885	0.9783	0.9488	0.8625	0.6422	0.4357	0.4427	0.7326	0.9357	0.9817	0.9926	(94)
Useful gains	537.2110	561.5209	576.2837	569.9491	510.5553	374.9904	242.2903	239.9442	389.7746	483.3251	504.8837	515.0716	(95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000	(96)
Heat loss rate W	1212.0800	1144.2024	1019.4850	828.3058	611.5737	388.0469	243.4452	241.1317	417.0146	677.2262	912.6394	1152.6521	(97)
Space heating kWh	502.1026	391.5619	329.7417	186.0168	75.1577	0.0000	0.0000	0.0000	0.0000	144.2624	293.5841	474.3599	(98a)
Space heating requirement - total per year (kWh/year)												2396.7872	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	502.1026	391.5619	329.7417	186.0168	75.1577	0.0000	0.0000	0.0000	0.0000	144.2624	293.5841	474.3599	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2396.7872	
Space heating per m2											(98c) / (4) =	40.8938	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	502.1026	391.5619	329.7417	186.0168	75.1577	0.0000	0.0000	0.0000	0.0000	144.2624	293.5841	474.3599	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	502.1026	391.5619	329.7417	186.0168	75.1577	0.0000	0.0000	0.0000	0.0000	144.2624	293.5841	474.3599	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	240.2521	212.1330	224.1965	193.9737	185.9705	165.2993	161.3301	168.9085	172.0884	194.6465	210.3868	237.1858	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-82.7395	-107.8993	-159.4712	-175.5125	-169.0485	-144.4485	-140.7851	-136.7368	-123.9790	-119.1457	-88.6975	-67.7462	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-34.6849	-64.2329	-141.9582	-246.5443	-335.5451	-394.7783	-377.6527	-321.6119	-231.4361	-116.6785	-50.4494	-25.3080	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2396.7872	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												2366.3713	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												147.0407	(232)

Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3857.0902	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	1053.1090	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2396.7872	27.6700	663.1910	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	27.6700	654.7749	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	27.6700	40.6862	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1516.2097	27.6700	-419.5352	
PV Unit electricity exported	-2340.8805	5.8100	-136.0052	
Total			-555.5404	(252)
Total energy cost			803.1117	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2396.7872	0.1555	372.7359	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2366.3713	0.1412	334.2485	(264)
Space and water heating			706.9844	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1516.2097	0.1363	-206.6029	
PV Unit electricity exported	-2340.8805	0.1224	-286.4235	
Total			-493.0264	(269)
Total CO2, kg/year			235.1805	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2396.7872	1.5758	3776.7747	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2366.3713	1.5223	3602.3424	(278)
Space and water heating			7379.1171	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	147.0407	1.5338	225.5360	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1516.2097	1.5037	-2279.9549	
PV Unit electricity exported	-2340.8805	0.4489	-1050.7589	
Total			-3330.7138	(283)
Total Primary energy kWh/year			4273.9393	(286)

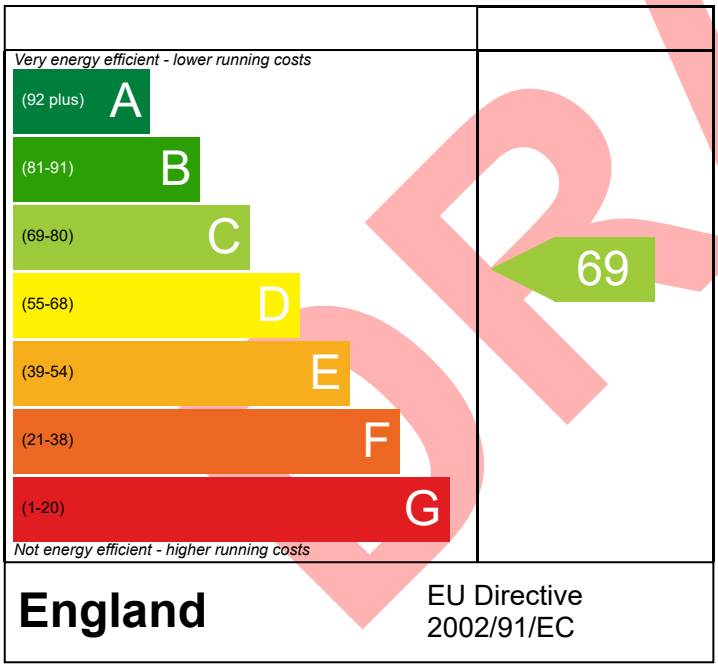
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.61 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

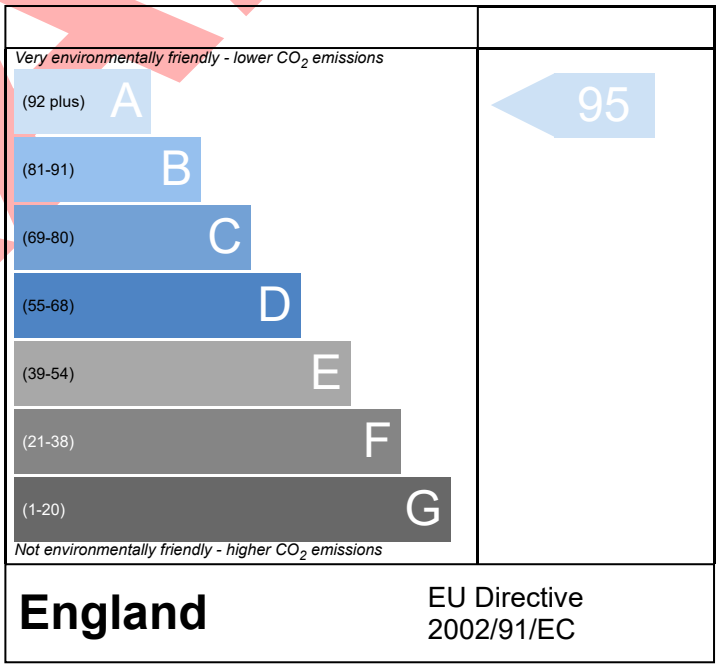
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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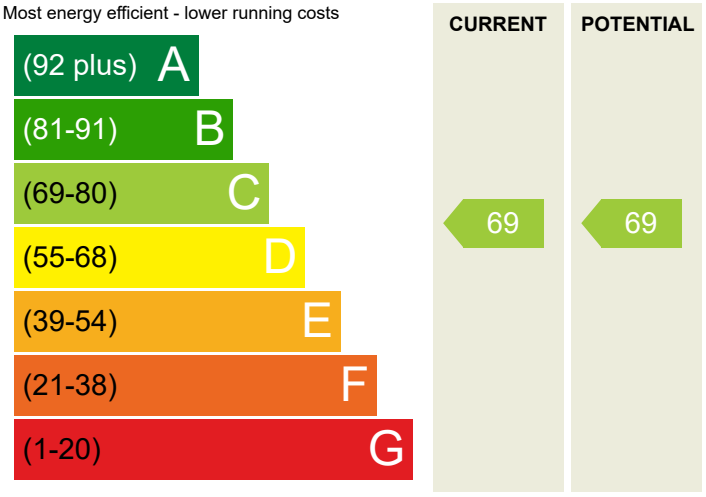
Energy Report

Dwelling Address	
Reference	Flat 8 -Be Green
SAP Version	10.2
Assessment Date	12/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	59

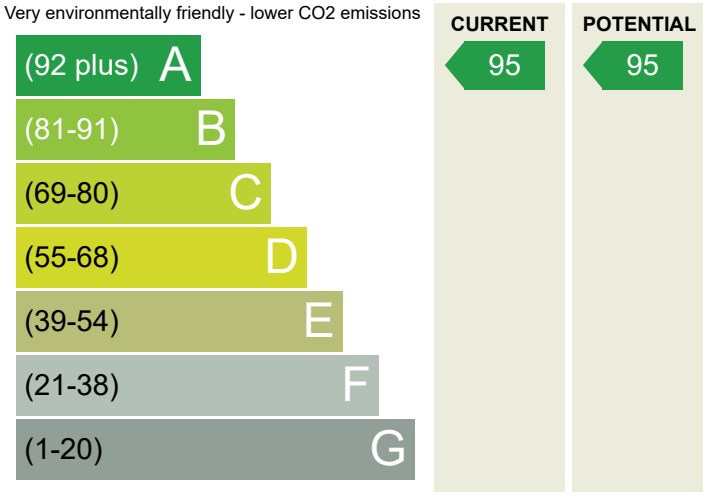
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

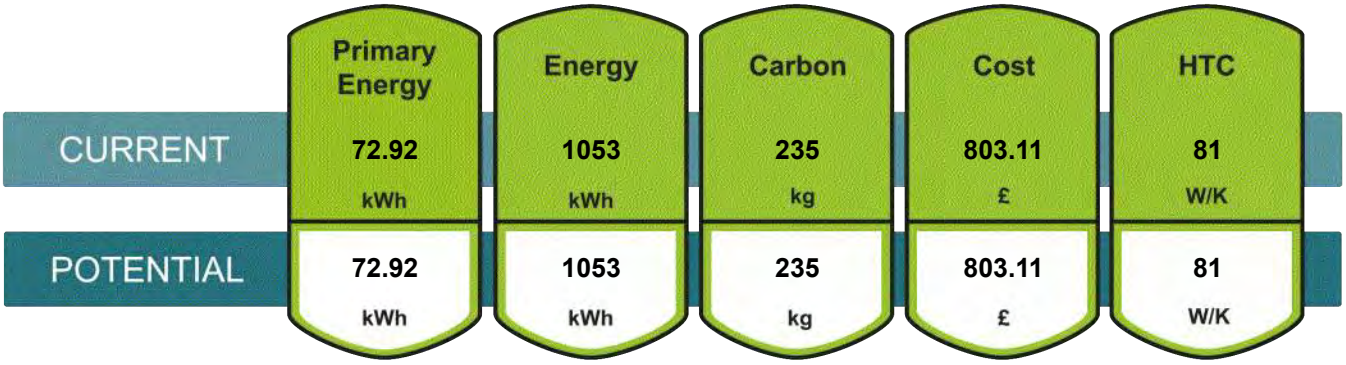


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

Energy Report

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£41	£41	
Heating	£663	£663	
Hot Water	£655	£655	
New Technologies e.g. Impact of PV	-(£556)	-(£556)	
TOTAL	£803	£803	

Estimated energy use and potential savings

Space Heating
2397
kWh per year

Water Heating
2366
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 9	**Issued on Date**	15/06/2026
Assessment Reference	Be Green	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	87 B	**DER**	1.47	**TER**	12.64
Environmental	99 A	**% DER < TER**			88.37
CO_2 Emissions (t/year)	0	**DFEE**	29.31	**TFEE**	30.33
Compliance Check	See BREL	**% DFEE < TFEE**			3.35
% DPER < TPER	35.07	**DPER**	43.42	**TPER**	66.88

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northeast	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	485.57	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	22.85 m	58.22 m²	2.73 m

8.0 Living Area	29.09	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.15	190.00	62.38	56.83	0.00	None	5.55	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Property	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	33.47	0.00	None
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	45.43	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	111.06

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	58.22	58.22	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Timber I-joists, carpeted	30.00	58.22

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	4.45	
NW Windows	Windows	External Wall 1	North East	1.10	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	User Input	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E7 Party floor between dwellings (in blocks of flats)		10.07			Yes
E14 Flat roof		10.07			Yes
E18 Party wall between dwellings		5.46			No
E2 Other lintels (including other steel lintels)		5.77			No
E3 Sill		5.77			No
E4 Jamb		9.30			No
E16 Corner (normal)		5.46			No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)		12.75			No
P4 Party wall - Roof (insulation at ceiling level)		12.75			No

Y-value	0.04	W/m²K
Description	Ref	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	3.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting	No				
	Name	**Efficacy**	**Power**	**Capacity**	**Count**
	Lighting 1	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	

Summary for Input Data

In Summer	100.00
Controls SAP Code	2605
Controls description	Programmer and room thermostat

25.0 Main Heating 2 — None

26.0 Heat Networks — None

27.0 Secondary Heating — None

28.0 Water Heating

Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder — Hot Water Cylinder

Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day

32.0 Photovoltaic Unit — One Dwelling

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.08	South West	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro — None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

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Compliance Check	See BREL	**% DFEE < TFEE**			3.35
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Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client			

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.0000	(17)
Infiltration rate		0.2758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2138	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.2726	0.2672	0.2619	0.2351	0.2298	0.2031	0.2031	0.1977	0.2138	0.2298	0.2405	0.2512	(22b)
Effective ac	0.5371	0.5357	0.5343	0.5276	0.5264	0.5206	0.5206	0.5196	0.5228	0.5264	0.5289	0.5315	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.1450	6.3550			(27)
External Wall 1	62.3800	5.5500	56.8300	0.1500	8.5245	190.0000	10797.7000	(29a)
External Roof 1	58.2200		58.2200	0.1100	6.4042	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			120.6000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.2837			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Internal Walls			111.0600			9.0000	999.5400	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		28269.8200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							485.5689	(35)
Thermal bridges (User defined value 0.045 * total exposed area)							5.4270	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		26.7107	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	28.1734	28.0978	28.0236	27.6753	27.6101	27.3068	27.3068	27.2506	27.4236	27.6101	27.7420	27.8798	(38)

Heat transfer coeff

	54.8841	54.8084	54.7343	54.3860	54.3208	54.0175	54.0175	53.9613	54.1343	54.3208	54.4526	54.5905 (39)
Average = Sum(39)m / 12 =												54.3857

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9427	0.9414	0.9401	0.9341	0.9330	0.9278	0.9278	0.9269	0.9298	0.9330	0.9353	0.9377	(40)
HLP (average)												0.9341	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9309 (42)

Hot water usage for mixer showers

	56.5942	55.7437	54.5043	52.1330	50.3831	48.4316	47.3224	48.5523	49.9006	51.9959	54.4181	56.3773 (42a)

Hot water usage for baths

	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779 (42b)

Hot water usage for other uses

	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042 (42c)

Average daily hot water use (litres/day) 106.1333 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	115.4589	112.9941	109.9921	105.4265	101.7193	97.7335	96.2013	99.1903	102.3427	106.5271	111.1630	115.1594	(44)
Energy conte	182.8587	160.9021	169.0538	144.3237	136.9337	120.1748	116.3471	122.8183	126.1988	144.5563	158.3721	180.3118	(45)
Energy content (annual)										Total = Sum(45)m =		1762.8511	
Distribution loss (46)m = 0.15 x (45)m													
	27.4288	24.1353	25.3581	21.6486	20.5401	18.0262	17.4521	18.4227	18.9298	21.6834	23.7558	27.0468	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
										Total per year (kWh/year) = Sum(64)m =		1911.7711	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	70.9189	62.6391	66.3288	57.7796	55.6488	49.7501	48.8038	50.9555	51.7531	58.1834	62.4507	70.0721	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	95.3211	93.2130	89.1516	80.2495	74.7968	69.0974	65.5965	68.4886	71.8793	78.2035	86.7371	94.1829	(72)
Total internal gains													
	455.4275	453.5159	439.3020	412.6190	386.5212	362.8443	348.8508	351.5463	365.0895	389.1946	418.3734	443.7966	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	494.7333	521.3881	534.6112	534.8073	527.1207	504.0714	484.3244	473.0331	469.6678	464.8667	465.6202	477.3257	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	143.0785	143.2759	143.4701	144.3889	144.5621	145.3739	145.3739	145.5252	145.0601	144.5621	144.2121	143.8480	
alpha	10.5386	10.5517	10.5647	10.6259	10.6375	10.6916	10.6916	10.7017	10.6707	10.6375	10.6141	10.5899	
util living area													
	0.9993	0.9984	0.9949	0.9773	0.8934	0.6820	0.4906	0.5245	0.7801	0.9752	0.9978	0.9995	(86)
MIT	20.5447	20.6097	20.7176	20.8538	20.9630	20.9979	20.9999	20.9999	20.9923	20.8795	20.6845	20.5252	(87)
Th 2	20.1314	20.1325	20.1335	20.1386	20.1395	20.1439	20.1439	20.1447	20.1422	20.1395	20.1376	20.1356	(88)
util rest of house													

	0.9989	0.9974	0.9915	0.9616	0.8377	0.5932	0.3952	0.4272	0.6919	0.9548	0.9961	0.9992	(89)
MIT 2	19.6128	19.6966	19.8343	20.0043	20.1162	20.1433	20.1439	20.1447	20.1393	20.0365	19.7967	19.5914	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	20.0784	20.1528	20.2756	20.4288	20.5393	20.5703	20.5716	20.5720	20.5655	20.4577	20.2403	20.0580	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.0784	20.1528	20.2756	20.4288	20.5393	20.5703	20.5716	20.5720	20.5655	20.4577	20.2403	20.0580	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9988	0.9974	0.9922	0.9678	0.8655	0.6378	0.4429	0.4758	0.7367	0.9637	0.9963	0.9992	(94)
Useful gains	494.1514	520.0357	530.4190	517.5865	456.2244	321.5144	214.5175	225.0847	346.0086	447.9920	463.9077	476.9339	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	865.9822	835.9843	753.9990	627.0032	480.1575	322.4999	214.5373	225.1265	350.0052	535.4797	715.5225	865.6943	(97)
Space heating kWh													
	276.6421	212.3174	166.3436	78.7800	17.8062	0.0000	0.0000	0.0000	0.0000	65.0909	181.1627	289.2377	(98a)
Space heating requirement - total per year (kWh/year)												1287.3806	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	276.6421	212.3174	166.3436	78.7800	17.8062	0.0000	0.0000	0.0000	0.0000	65.0909	181.1627	289.2377	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1287.3806	
Space heating per m2											(98c) / (4) =	22.1123	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	276.6421	212.3174	166.3436	78.7800	17.8062	0.0000	0.0000	0.0000	0.0000	65.0909	181.1627	289.2377	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	276.6421	212.3174	166.3436	78.7800	17.8062	0.0000	0.0000	0.0000	0.0000	65.0909	181.1627	289.2377	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-62.6496	-91.6956	-133.7751	-143.6571	-142.8005	-127.9349	-125.6781	-120.8288	-108.6299	-97.8503	-68.7175	-53.7746	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-27.2766	-62.4651	-137.8936	-230.7698	-326.6112	-335.8424	-331.0499	-274.0693	-193.7413	-101.8747	-38.7987	-20.8809	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1287.3806	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1911.7711	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												152.4072	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3359.2654	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												-7.7066	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1287.3806	16.4900	212.2891	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	16.4900	315.2511	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	16.4900	25.1319	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1277.9920	16.4900	-210.7409	
PV Unit electricity exported	-2081.2734	5.5900	-116.3432	
Total			-327.0841	(252)
Total energy cost			225.5880	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	0.7868	(257)
SAP value		87.2463	
SAP rating (Section 12)		87	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1287.3806	0.1565	201.4837	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1911.7711	0.1414	270.2382	(264)
Space and water heating			471.7218	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1277.9920	0.1356	-173.2808	
PV Unit electricity exported	-2081.2734	0.1232	-256.3717	
Total			-429.6525	(269)
Total CO2, kg/year			64.0664	(272)
CO2 emissions per m2			1.1000	(273)
EI value			99.1683	
EI rating			99	(274)
EI band			A	

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b) x	2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n) 58.2200						(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.0000	(17)
Infiltration rate		0.2758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2138	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.2245	0.2138	0.2138	0.1977	0.1977	0.1764	0.1817	0.1710	0.1764	0.1870	0.1870	0.2031	(22b)
Effective ac	0.5252	0.5228	0.5228	0.5196	0.5196	0.5156	0.5165	0.5146	0.5156	0.5175	0.5175	0.5206	(25)

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3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Windows			5.5500	1.1450	6.3550			(27)
External Wall 1	62.3800	5.5500	56.8300	0.1500	8.5245	190.0000	10797.7000	(29a)
External Roof 1	58.2200		58.2200	0.1100	6.4042	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			120.6000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.2837			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Internal Walls			111.0600			9.0000	999.5400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	28269.8200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		485.5689 (35)
Thermal bridges (User defined value 0.045 * total exposed area)		5.4270 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	26.7107 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	27.5465	27.4236	27.4236	27.2506	27.2506	27.0409	27.0911	26.9922	27.0409	27.1428	27.1428	27.3068	(38)
Heat transfer coeff	54.2571	54.1343	54.1343	53.9613	53.9613	53.7515	53.8017	53.7029	53.7515	53.8534	53.8534	54.0175	(39)
Average = Sum(39)m / 12 =												53.9317	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9319	0.9298	0.9298	0.9269	0.9269	0.9232	0.9241	0.9224	0.9232	0.9250	0.9250	0.9278	(40)
HLP (average)												0.9263	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9309 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
56.5942	55.7437	54.5043	52.1330	50.3831	48.4316	47.3224	48.5523	49.9006	51.9959	54.4181	56.3773	(42a)

Hot water usage for baths

24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)

Hot water usage for other uses

34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)

Average daily hot water use (litres/day)	106.1333 (43)

Daily hot water use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
115.4589	112.9941	109.9921	105.4265	101.7193	97.7335	96.2013	99.1903	102.3427	106.5271	111.1630	115.1594	(44)
Energy conte 182.8587	160.9021	169.0538	144.3237	136.9337	120.1748	116.3471	122.8183	126.1988	144.5563	158.3721	180.3118	(45)

Energy content (annual)	Total = Sum(45)m = 1762.8511

Distribution loss (46)m = 0.15 x (45)m

27.4288	24.1353	25.3581	21.6486	20.5401	18.0262	17.4521	18.4227	18.9298	21.6834	23.7558	27.0468	(46)

Water storage loss (or HIU loss):	
Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	0.6800 (48)
Temperature factor from Table 2b	0.6000 (49)
Enter (49) or (54) in (55)	0.4080 (55)

Total storage loss

12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)

If cylinder contains dedicated solar storage

12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter -0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)

	Total per year (kWh/year) = Sum(64)m = 1911.7711 (64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000 (64a)

Heat gains from water heating, kWh/month

70.9189	62.6391	66.3288	57.7796	55.6488	49.7501	48.8038	50.9555	51.7531	58.1834	62.4507	70.0721	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m 115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)

Water heating gains (Table 5)

95.3211	93.2130	89.1516	80.2495	74.7968	69.0974	65.5965	68.4886	71.8793	78.2035	86.7371	94.1829	(72)

Total internal gains

455.4275	453.5159	439.3020	412.6190	386.5212	362.8443	348.8508	351.5463	365.0895	389.1946	418.3734	443.7966	(73)

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6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
	m2	Table 6a	Specific data	Specific data	factor	W

					W/m2	or Table 6b		or Table 6c		Table 6d			
Northeast					1.1000	12.9236		0.4600	0.7000	0.7700		3.1722	(75)
Southwest					4.4500	40.4699		0.4600	0.7000	0.7700		40.1866	(79)
Solar gains	43.3588	67.4204	93.7963	124.6046	140.3662	151.2008	143.3455	130.9389	111.7795	80.3225	53.4001	36.6282	(83)
Total gains	498.7864	520.9363	533.0983	537.2236	526.8874	514.0452	492.1963	482.4853	476.8691	469.5171	471.7735	480.4247	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	144.7317	145.0601	145.0601	145.5252	145.5252	146.0931	145.9568	146.2255	146.0931	145.8167	145.8167	145.3739	
alpha	10.6488	10.6707	10.6707	10.7017	10.7017	10.7395	10.7305	10.7484	10.7395	10.7211	10.7211	10.6916	
util living area	0.9988	0.9975	0.9910	0.9553	0.7999	0.5226	0.3389	0.3562	0.6514	0.9448	0.9952	0.9991	(86)
MIT	20.6064	20.6608	20.7754	20.9074	20.9889	20.9999	21.0000	21.0000	20.9988	20.9323	20.7508	20.5907	(87)
Th 2	20.1404	20.1422	20.1422	20.1447	20.1447	20.1478	20.1471	20.1485	20.1478	20.1463	20.1463	20.1439	(88)
util rest of house	0.9979	0.9958	0.9847	0.9270	0.7246	0.4337	0.2456	0.2614	0.5572	0.9053	0.9914	0.9985	(89)
MIT 2	19.6994	19.7702	19.9138	20.0688	20.1395	20.1478	20.1471	20.1485	20.1475	20.0975	19.8879	19.6824	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	20.1526	20.2152	20.3443	20.4878	20.5639	20.5735	20.5732	20.5740	20.5728	20.5146	20.3191	20.1363	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.1526	20.2152	20.3443	20.4878	20.5639	20.5735	20.5732	20.5740	20.5728	20.5146	20.3191	20.1363	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9980	0.9960	0.9865	0.9398	0.7627	0.4781	0.2922	0.3088	0.6045	0.9245	0.9924	0.9985	(94)
Useful gains	497.7652	518.8616	525.9075	504.8946	401.8586	245.7874	143.8244	148.9688	288.2750	434.0642	468.1828	479.7077	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)
Heat loss rate W	816.7109	791.1833	700.7309	571.3294	408.1601	245.8339	143.8246	148.9692	288.7981	480.0829	663.4229	812.2204	(97)
Space heating kWh	237.2956	183.0001	130.0686	47.8331	4.6883	0.0000	0.0000	0.0000	0.0000	34.2379	140.5729	247.3894	(98a)
Space heating requirement - total per year (kWh/year)												1025.0859	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	237.2956	183.0001	130.0686	47.8331	4.6883	0.0000	0.0000	0.0000	0.0000	34.2379	140.5729	247.3894	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1025.0859	
Space heating per m2											(98c) / (4) =	17.6071	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	237.2956	183.0001	130.0686	47.8331	4.6883	0.0000	0.0000	0.0000	0.0000	34.2379	140.5729	247.3894	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	237.2956	183.0001	130.0686	47.8331	4.6883	0.0000	0.0000	0.0000	0.0000	34.2379	140.5729	247.3894	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-68.2856	-91.4867	-130.8271	-140.6319	-139.8364	-131.0809	-128.3173	-124.8516	-112.9618	-99.8907	-75.2886	-58.2840	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-33.1854	-65.1437	-141.8355	-246.3457	-332.4935	-368.1997	-358.1078	-305.4573	-215.9072	-116.7999	-49.0298	-25.1195	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1025.0859	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	

Water heating fuel used	1911.7711	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	152.4072	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3559.3674	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	-470.1033	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1025.0859	27.6700	283.6413	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	27.6700	528.9871	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	27.6700	42.1711	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1301.7424	27.6700	-360.1921	
PV Unit electricity exported	-2257.6250	5.8100	-131.1680	
Total			-491.3601	(252)
Total energy cost			363.4392	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1025.0859	0.1576	161.5260	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1911.7711	0.1414	270.2382	(264)
Space and water heating			431.7642	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1301.7424	0.1356	-176.5454	
PV Unit electricity exported	-2257.6250	0.1230	-277.7708	
Total			-454.3161	(269)
Total CO2, kg/year			-0.5549	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1025.0859	1.5834	1623.0894	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	1.5227	2911.0568	(278)
Space and water heating			4534.1462	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	152.4072	1.5338	233.7672	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1301.7424	1.5013	-1954.3067	
PV Unit electricity exported	-2257.6250	0.4515	-1019.2075	
Total			-2973.5143	(283)
Total Primary energy kWh/year			1794.3992	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating: B 87
Current environmental impact rating: A 99

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: B 87
Potential environmental impact rating: A 99

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current	Potential	Saving
Electricity	£855	£855	£0
Space heating	£284	£284	£0
Water heating	£529	£529	£0
Lighting	£42	£42	£0
Generated (PV)	-£491	-£491	£0
Total cost of fuels	£364	£364	£0
Total cost of uses	£364	£364	£0
Delivered energy	-8 kWh/m²	-8 kWh/m²	0 kWh/m²
Carbon dioxide emissions	-0.0 tonnes	-0.0 tonnes	0.0 tonnes
CO2 emissions per m²	-0 kg/m²	-0 kg/m²	0 kg/m²
Primary energy	31 kWh/m²	31 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.9406	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.0000	(17)
Infiltration rate		0.2758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2138	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.2726	0.2672	0.2619	0.2351	0.2298	0.2031	0.2031	0.1977	0.2138	0.2298	0.2405	0.2512	(22b)
Effective ac	0.5371	0.5357	0.5343	0.5276	0.5264	0.5206	0.5206	0.5196	0.5228	0.5264	0.5289	0.5315	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.1450	6.3550			(27)
External Wall 1	62.3800	5.5500	56.8300	0.1500	8.5245	190.0000	10797.7000	(29a)
External Roof 1	58.2200		58.2200	0.1100	6.4042	9.0000	523.9800	(30)
Total net area of external elements Aum(A, m2)			120.6000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	21.2837			(33)
Main dwelling								
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000	(32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000	(32)
Party Floor 1			58.2200			30.0000	1746.6000	(32d)
Internal Walls			111.0600			9.0000	999.5400	(32c)
Heat capacity Cm = Sum(A x k)				(28)...(30) + (32) + (32a)...(32e) =	28269.8200			(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							485.5689	(35)
Thermal bridges (User defined value 0.045 * total exposed area)							5.4270	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss				(33) + (36) + (36a) =	26.7107			(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	28.1734	28.0978	28.0236	27.6753	27.6101	27.3068	27.3068	27.2506	27.4236	27.6101	27.7420	27.8798	(38)
Heat transfer coeff	54.8841	54.8084	54.7343	54.3860	54.3208	54.0175	54.0175	53.9613	54.1343	54.3208	54.4526	54.5905	(39)
Average = Sum(39)m / 12 =												54.3857	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9427	0.9414	0.9401	0.9341	0.9330	0.9278	0.9278	0.9269	0.9298	0.9330	0.9353	0.9377	(40)

HLP (average)												0.9341	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309	(42)
Hot water usage for mixer showers													
	56.5942	55.7437	54.5043	52.1330	50.3831	48.4316	47.3224	48.5523	49.9006	51.9959	54.4181	56.3773	(42a)
Hot water usage for baths													
	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses													
	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												106.1333	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	115.4589	112.9941	109.9921	105.4265	101.7193	97.7335	96.2013	99.1903	102.3427	106.5271	111.1630	115.1594	(44)
Energy conte	182.8587	160.9021	169.0538	144.3237	136.9337	120.1748	116.3471	122.8183	126.1988	144.5563	158.3721	180.3118	(45)
Energy content (annual)										Total = Sum(45)m =		1762.8511	
Distribution loss (46)m = 0.15 x (45)m													
	27.4288	24.1353	25.3581	21.6486	20.5401	18.0262	17.4521	18.4227	18.9298	21.6834	23.7558	27.0468	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
										Total per year (kWh/year) = Sum(64)m =		1911.7711	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	70.9189	62.6391	66.3288	57.7796	55.6488	49.7501	48.8038	50.9555	51.7531	58.1834	62.4507	70.0721	(65)

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5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)													
	95.3211	93.2130	89.1516	80.2495	74.7968	69.0974	65.5965	68.4886	71.8793	78.2035	86.7371	94.1829	(72)
Total internal gains													
	455.4275	453.5159	439.3020	412.6190	386.5212	362.8443	348.8508	351.5463	365.0895	389.1946	418.3734	443.7966	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	11.2829	0.4600	0.7000	0.7700	2.7695	(75)
Southwest	4.4500	36.7938	0.4600	0.7000	0.7700	36.5363	(79)

Solar gains	39.3058	67.8722	95.3092	122.1884	140.5995	141.2271	135.4737	121.4868	104.5783	75.6721	47.2468	33.5292	(83)
Total gains	494.7333	521.3881	534.6112	534.8073	527.1207	504.0714	484.3244	473.0331	469.6678	464.8667	465.6202	477.3257	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	143.0785	143.2759	143.4701	144.3889	144.5621	145.3739	145.3739	145.5252	145.0601	144.5621	144.2121	143.8480	
alpha	10.5386	10.5517	10.5647	10.6259	10.6375	10.6916	10.6916	10.7017	10.6707	10.6375	10.6141	10.5899	
util living area													
	0.9993	0.9984	0.9949	0.9773	0.8934	0.6820	0.4906	0.5245	0.7801	0.9752	0.9978	0.9995	(86)
MIT	20.5447	20.6097	20.7176	20.8538	20.9630	20.9979	20.9999	20.9999	20.9923	20.8795	20.6845	20.5252	(87)
Th 2	20.1314	20.1325	20.1335	20.1386	20.1395	20.1439	20.1439	20.1447	20.1422	20.1395	20.1376	20.1356	(88)
util rest of house													
	0.9989	0.9974	0.9915	0.9616	0.8377	0.5932	0.3952	0.4272	0.6919	0.9548	0.9961	0.9992	(89)
MIT 2	19.6128	19.6966	19.8343	20.0043	20.1162	20.1433	20.1439	20.1447	20.1393	20.0365	19.7967	19.5914	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	20.0784	20.1528	20.2756	20.4288	20.5393	20.5703	20.5716	20.5720	20.5655	20.4577	20.2403	20.0580	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.0784	20.1528	20.2756	20.4288	20.5393	20.5703	20.5716	20.5720	20.5655	20.4577	20.2403	20.0580	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9988	0.9974	0.9922	0.9678	0.8655	0.6378	0.4429	0.4758	0.7367	0.9637	0.9963	0.9992	(94)
Useful gains	494.1514	520.0357	530.4190	517.5865	456.2244	321.5144	214.5175	225.0847	346.0086	447.9920	463.9077	476.9339	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	865.9822	835.9843	753.9990	627.0032	480.1575	322.4999	214.5373	225.1265	350.0052	535.4797	715.5225	865.6943	(97)
Space heating kWh													
	276.6421	212.3174	166.3436	78.7800	17.8062	0.0000	0.0000	0.0000	0.0000	65.0909	181.1627	289.2377	(98a)
Space heating requirement - total per year (kWh/year)												1287.3806	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	276.6421	212.3174	166.3436	78.7800	17.8062	0.0000	0.0000	0.0000	0.0000	65.0909	181.1627	289.2377	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1287.3806	
Space heating per m2											(98c) / (4) =	22.1123	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	276.6421	212.3174	166.3436	78.7800	17.8062	0.0000	0.0000	0.0000	0.0000	65.0909	181.1627	289.2377	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	276.6421	212.3174	166.3436	78.7800	17.8062	0.0000	0.0000	0.0000	0.0000	65.0909	181.1627	289.2377	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-62.6496	-91.6956	-133.7751	-143.6571	-142.8005	-127.9349	-125.6781	-120.8288	-108.6299	-97.8503	-68.7175	-53.7746	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-27.2766	-62.4651	-137.8936	-230.7698	-326.6112	-335.8424	-331.0499	-274.0693	-193.7413	-101.8747	-38.7987	-20.8809	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	1287.3806	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1911.7711	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	152.4072	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	-7.7066	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1287.3806	16.4900	212.2891	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	16.4900	315.2511	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	16.4900	25.1319	(250)
Additional standing charges			0.0000	(251)

Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1277.9920	16.4900	-210.7409	
PV Unit electricity exported	-2081.2734	5.5900	-116.3432	
Total			-327.0841	(252)
Total energy cost			225.5880	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	0.7868	(257)
SAP value		87.2463	
SAP rating (Section 12)		87	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1287.3806	0.1565	201.4837	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1911.7711	0.1414	270.2382	(264)
Space and water heating			471.7218	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1277.9920	0.1356	-173.2808	
PV Unit electricity exported	-2081.2734	0.1232	-256.3717	
Total			-429.6525	(269)
Total CO2, kg/year			64.0664	(272)
CO2 emissions per m2			1.1000	(273)
EI value			99.1683	
EI rating			99	(274)
EI band			A	

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		58.2200	(1b)	x 2.7300	(2b) =	158.9406	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.2200						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.9406	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1258	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.0000	(17)
Infiltration rate		0.2758	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2138	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.2245	0.2138	0.2138	0.1977	0.1977	0.1764	0.1817	0.1710	0.1764	0.1870	0.1870	0.2031	(22b)
Effective ac	0.5252	0.5228	0.5228	0.5196	0.5196	0.5156	0.5165	0.5146	0.5156	0.5175	0.5175	0.5206	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			5.5500	1.1450	6.3550			(27)

External Wall 1	62.3800	5.5500	56.8300	0.1500	8.5245	190.0000	10797.7000 (29a)
External Roof 1	58.2200		58.2200	0.1100	6.4042	9.0000	523.9800 (30)
Total net area of external elements Aum(A, m2)			120.6000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.2837		(33)
Main dwelling							
Party Wall to Adj Property			33.4700	0.0000	0.0000	180.0000	6024.6000 (32)
Party Wall to Adj Flat			45.4300	0.0000	0.0000	180.0000	8177.4000 (32)
Party Floor 1			58.2200			30.0000	1746.6000 (32d)
Internal Walls			111.0600			9.0000	999.5400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	28269.8200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		485.5689 (35)
Thermal bridges (User defined value 0.045 * total exposed area)		5.4270 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	26.7107 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	27.5465	27.4236	27.4236	27.2506	27.2506	27.0409	27.0911	26.9922	27.0409	27.1428	27.1428	27.3068	(38)
Heat transfer coeff	54.2571	54.1343	54.1343	53.9613	53.9613	53.7515	53.8017	53.7029	53.7515	53.8534	53.8534	54.0175	(39)
Average = Sum(39)m / 12 =												53.9317	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9319	0.9298	0.9298	0.9269	0.9269	0.9232	0.9241	0.9224	0.9232	0.9250	0.9250	0.9278	(40)
HLP (average)												0.9263	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9309	(42)
Hot water usage for mixer showers	56.5942	55.7437	54.5043	52.1330	50.3831	48.4316	47.3224	48.5523	49.9006	51.9959	54.4181	56.3773	(42a)
Hot water usage for baths	24.4606	24.0973	23.5857	22.6425	21.9362	21.1531	20.7300	21.2380	21.7911	22.6291	23.5918	24.3779	(42b)
Hot water usage for other uses	34.4042	33.1531	31.9021	30.6510	29.3999	28.1489	28.1489	29.3999	30.6510	31.9021	33.1531	34.4042	(42c)
Average daily hot water use (litres/day)												106.1333	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	115.4589	112.9941	109.9921	105.4265	101.7193	97.7335	96.2013	99.1903	102.3427	106.5271	111.1630	115.1594	(44)
Energy conte	182.8587	160.9021	169.0538	144.3237	136.9337	120.1748	116.3471	122.8183	126.1988	144.5563	158.3721	180.3118	(45)
Energy content (annual)										Total = Sum(45)m =		1762.8511	
Distribution loss (46)m = 0.15 x (45)m	27.4288	24.1353	25.3581	21.6486	20.5401	18.0262	17.4521	18.4227	18.9298	21.6834	23.7558	27.0468	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
										Total per year (kWh/year) = Sum(64)m =		1911.7711	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	70.9189	62.6391	66.3288	57.7796	55.6488	49.7501	48.8038	50.9555	51.7531	58.1834	62.4507	70.0721	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	115.8531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.5748	19.1626	15.5840	11.7981	8.8192	7.4456	8.0452	10.4575	14.0360	17.8219	20.8008	22.1744	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	251.3977	254.0064	247.4325	233.4375	215.7713	199.1675	188.0752	185.4664	192.0403	206.0354	223.7016	240.3054	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	48.5162	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	-77.2354	(71)
Water heating gains (Table 5)	95.3211	93.2130	89.1516	80.2495	74.7968	69.0974	65.5965	68.4886	71.8793	78.2035	86.7371	94.1829	(72)
Total internal gains	455.4275	453.5159	439.3020	412.6190	386.5212	362.8443	348.8508	351.5463	365.0895	389.1946	418.3734	443.7966	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.1000	12.9236	0.4600	0.7000	0.7700	3.1722	(75)
Southwest	4.4500	40.4699	0.4600	0.7000	0.7700	40.1866	(79)

Solar gains	43.3588	67.4204	93.7963	124.6046	140.3662	151.2008	143.3455	130.9389	111.7795	80.3225	53.4001	36.6282	(83)
Total gains	498.7864	520.9363	533.0983	537.2236	526.8874	514.0452	492.1963	482.4853	476.8691	469.5171	471.7735	480.4247	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	144.7317	145.0601	145.0601	145.5252	145.5252	146.0931	145.9568	146.2255	146.0931	145.8167	145.8167	145.3739	
alpha	10.6488	10.6707	10.6707	10.7017	10.7017	10.7395	10.7305	10.7484	10.7395	10.7211	10.7211	10.6916	
util living area	0.9988	0.9975	0.9910	0.9553	0.7999	0.5226	0.3389	0.3562	0.6514	0.9448	0.9952	0.9991	(86)
MIT	20.6064	20.6608	20.7754	20.9074	20.9889	20.9999	21.0000	21.0000	20.9988	20.9323	20.7508	20.5907	(87)
Th 2	20.1404	20.1422	20.1422	20.1447	20.1447	20.1478	20.1471	20.1485	20.1478	20.1463	20.1463	20.1439	(88)
util rest of house	0.9979	0.9958	0.9847	0.9270	0.7246	0.4337	0.2456	0.2614	0.5572	0.9053	0.9914	0.9985	(89)
MIT 2	19.6994	19.7702	19.9138	20.0688	20.1395	20.1478	20.1471	20.1485	20.1475	20.0975	19.8879	19.6824	(90)
Living area fraction										fLA = Living area / (4) =		0.4997	(91)
MIT	20.1526	20.2152	20.3443	20.4878	20.5639	20.5735	20.5732	20.5740	20.5728	20.5146	20.3191	20.1363	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.1526	20.2152	20.3443	20.4878	20.5639	20.5735	20.5732	20.5740	20.5728	20.5146	20.3191	20.1363	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9980	0.9960	0.9865	0.9398	0.7627	0.4781	0.2922	0.3088	0.6045	0.9245	0.9924	0.9985	(94)
Useful gains	497.7652	518.8616	525.9075	504.8946	401.8586	245.7874	143.8244	148.9688	288.2750	434.0642	468.1828	479.7077	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)
Heat loss rate W	816.7109	791.1833	700.7309	571.3294	408.1601	245.8339	143.8246	148.9692	288.7981	480.0829	663.4229	812.2204	(97)
Space heating kWh	237.2956	183.0001	130.0686	47.8331	4.6883	0.0000	0.0000	0.0000	0.0000	34.2379	140.5729	247.3894	(98a)
Space heating requirement - total per year (kWh/year)												1025.0859	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	237.2956	183.0001	130.0686	47.8331	4.6883	0.0000	0.0000	0.0000	0.0000	34.2379	140.5729	247.3894	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1025.0859	
Space heating per m2											(98c) / (4) =	17.6071	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	237.2956	183.0001	130.0686	47.8331	4.6883	0.0000	0.0000	0.0000	0.0000	34.2379	140.5729	247.3894	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	237.2956	183.0001	130.0686	47.8331	4.6883	0.0000	0.0000	0.0000	0.0000	34.2379	140.5729	247.3894	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	195.5067	172.3261	181.7018	156.5637	149.5817	132.4148	128.9951	135.4663	138.4388	157.2043	170.6121	192.9598	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.8843	15.1497	13.6406	9.9937	7.7194	6.3068	7.0419	9.1533	11.8893	15.5994	17.6195	19.4092	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-68.2856	-91.4867	-130.8271	-140.6319	-139.8364	-131.0809	-128.3173	-124.8516	-112.9618	-99.8907	-75.2886	-58.2840	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-33.1854	-65.1437	-141.8355	-246.3457	-332.4935	-368.1997	-358.1078	-305.4573	-215.9072	-116.7999	-49.0298	-25.1195	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1025.0859	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1911.7711	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												152.4072	(232)

Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3559.3674	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	-470.1033	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1025.0859	27.6700	283.6413	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	27.6700	528.9871	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	152.4072	27.6700	42.1711	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1301.7424	27.6700	-360.1921	
PV Unit electricity exported	-2257.6250	5.8100	-131.1680	
Total			-491.3601	(252)
Total energy cost			363.4392	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1025.0859	0.1576	161.5260	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1911.7711	0.1414	270.2382	(264)
Space and water heating			431.7642	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	152.4072	0.1443	21.9971	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1301.7424	0.1356	-176.5454	
PV Unit electricity exported	-2257.6250	0.1230	-277.7708	
Total			-454.3161	(269)
Total CO2, kg/year			-0.5549	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1025.0859	1.5834	1623.0894	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1911.7711	1.5227	2911.0568	(278)
Space and water heating			4534.1462	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	152.4072	1.5338	233.7672	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1301.7424	1.5013	-1954.3067	
PV Unit electricity exported	-2257.6250	0.4515	-1019.2075	
Total			-2973.5143	(283)
Total Primary energy kWh/year			1794.3992	(286)

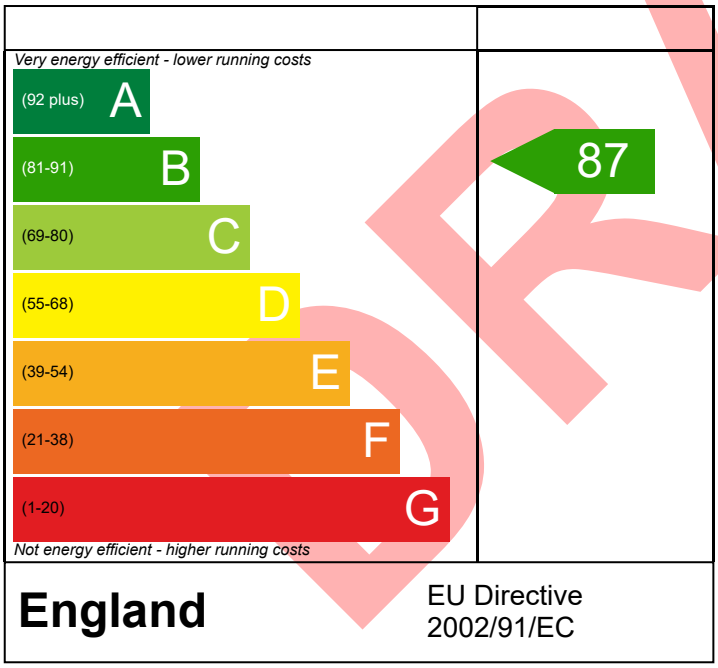
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.22 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

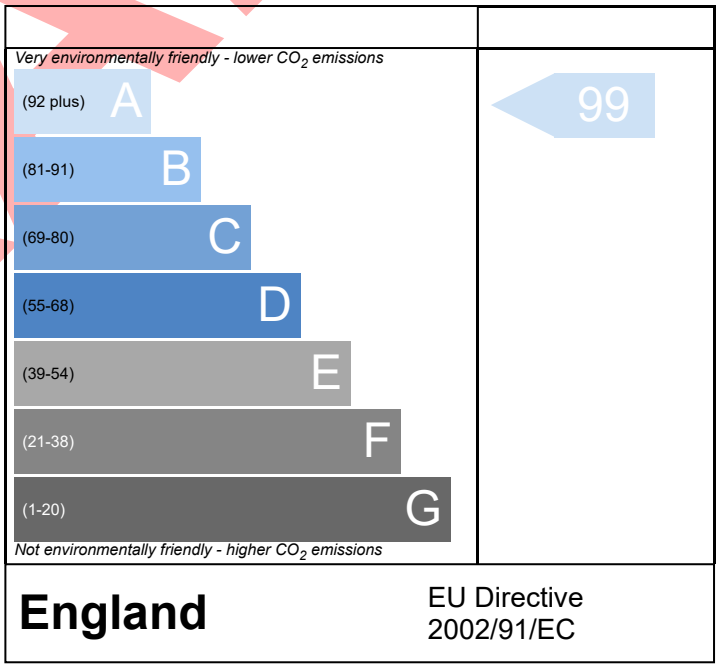
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

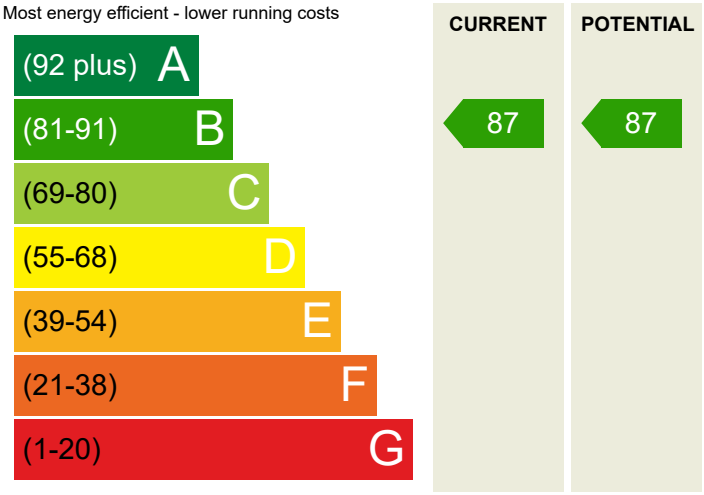
Energy Report

Dwelling Address	
Reference	Flat 9-Be Green
SAP Version	10.2
Assessment Date	15/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	58

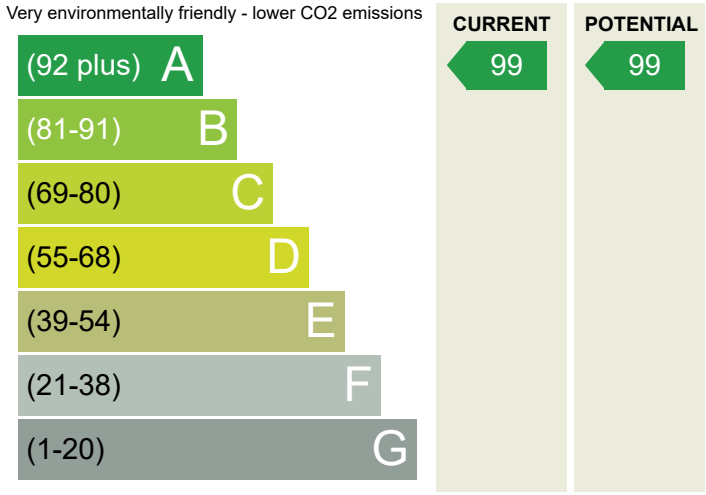
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

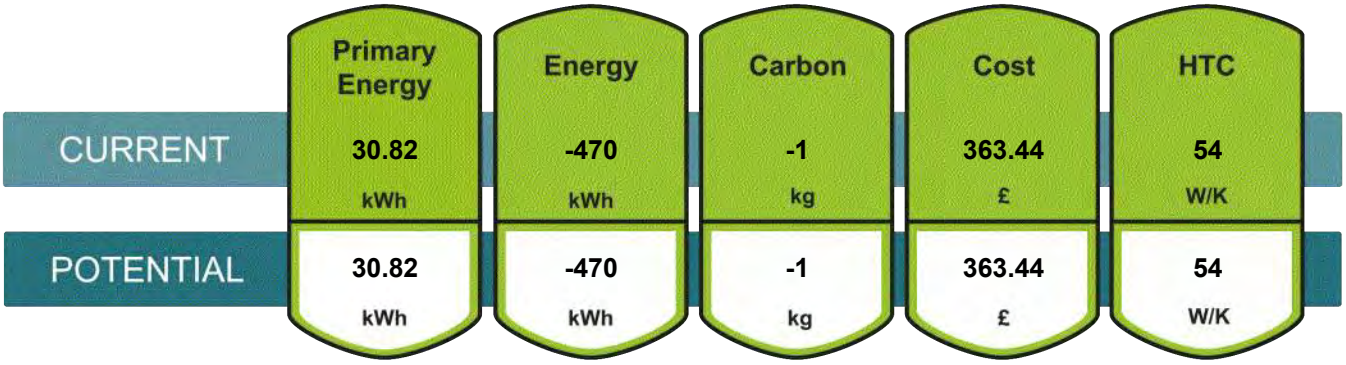


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.15 W/m²K	Very Good
Roof	Average thermal transmittance 0.11 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m³/h.m² (assumed)	Good

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£42	£42	
Heating	£284	£284	
Hot Water	£529	£529	
New Technologies e.g. Impact of PV	-(£491)	-(£491)	
TOTAL	£363	£363	

Estimated energy use and potential savings

Space Heating
1025
kWh per year

Water Heating
1912
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Summary for Input Data

elmhurst energy

Plot Reference	Flat 10	**Issued on Date**	15/06/2026
Assessment Reference	Be Green	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	86 B	**DER**	1.74	**TER**	13.01
Environmental	99 A	**% DER < TER**			86.63
CO_2 Emissions (t/year)	0.01	**DFEE**	31.01	**TFEE**	32.10
Compliance Check	See BREL	**% DFEE < TFEE**			3.40
% DPER < TPER	33.34	**DPER**	45.86	**TPER**	68.80

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northwest	
Property Tenture	3	
Transaction Type	8	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	328.05	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.17 m	58.61 m²	2.73 m

8.0 Living Area	31.93	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Solid wall : dense plaster, 200 mm dense block, insulated externally	0.16	190.00	57.79	51.00	0.00	None	6.79	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall to Adj Flat	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	36.17	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Walls	Plasterboard on timber frame	9.00	82.28

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	58.61	58.61	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)

Summary for Input Data

elmhurst energy

Party Floor 1	Lowest occupied	Timber I-joists, carpeted			30.00	58.61

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double glazed			0.46		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
SW Windows	Windows	External Wall 1	South West	2.96	
SE Windows	Windows	External Wall 1	South East	2.19	
NE Windows	Windows	External Wall 1	North East	1.64	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	User Input	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E7 Party floor between dwellings (in blocks of flats)		21.17			Yes
E14 Flat roof		21.17			Yes
E18 Party wall between dwellings		10.92			Yes
E16 Corner (normal)		10.92			No
E2 Other lintels (including other steel lintels)		4.57			No
E4 Jamb		7.20			No
E3 Sill		4.57			No

Y-value	0.05	W/m²K
Description	Ref	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	3.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	105.00	5.00	525.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2605	

Summary for Input Data

elmhurst energy

Controls description	Programmer and room thermostat
25.0 Main Heating 2	None
26.0 Heat Networks	None
27.0 Secondary Heating	None

28.0 Water Heating

Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower over Bath	Combi boiler or unvented hot water system	7.50		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	0.68	kWh/day

32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	No	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.08	South West	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro	None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Flat 10	**Issued on Date**	15/06/2026
Assessment Reference	Be Green	**Plot Type Ref**	
Plot Address		**SAP Version**	10.2

SAP Rating	86 B	**DER**	1.74	**TER**	13.01
Environmental	99 A	**% DER < TER**			86.63
CO_2 Emissions (t/year)	0.01	**DFEE**	31.01	**TFEE**	32.10
Compliance Check	See BREL	**% DFEE < TFEE**			3.40
% DPER < TPER	33.34	**DPER**	45.86	**TPER**	68.80

Assessor Details	Mr. Dion Mellows	**Assessor ID**	G297-0001
Client			

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		3.0000 (17)
Infiltration rate		0.2750 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2544 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.3243	0.3180	0.3116	0.2798	0.2734	0.2417	0.2417	0.2353	0.2544	0.2734	0.2862	0.2989	(22b)
Effective ac	0.5526	0.5506	0.5485	0.5391	0.5374	0.5292	0.5292	0.5277	0.5324	0.5374	0.5409	0.5447	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1600	8.1600	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	22.3819			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Internal Walls			82.2800			9.0000	740.5200	(32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		19226.9100	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							328.0483	(35)
Thermal bridges (User defined value 0.050 * total exposed area)							5.8200	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		28.2019	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	29.1779	29.0700	28.9643	28.4679	28.3750	27.9426	27.9426	27.8625	28.1091	28.3750	28.5629	28.7593	(38)

Heat transfer coeff

	57.3798	57.2719	57.1662	56.6698	56.5769	56.1445	56.1445	56.0644	56.3110	56.5769	56.7648	56.9613 (39)
Average = Sum(39)m / 12 =												56.6693

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9790	0.9772	0.9754	0.9669	0.9653	0.9579	0.9579	0.9566	0.9608	0.9653	0.9685	0.9719	(40)
HLP (average)												0.9669	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421 (42)
Hot water usage for mixer showers												
	56.7817	55.9284	54.6850	52.3058	50.5501	48.5921	47.4792	48.7133	50.0660	52.1683	54.5985	56.5642 (42a)
Hot water usage for baths												
	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583 (42b)
Hot water usage for other uses												
	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188 (42c)
Average daily hot water use (litres/day)												106.4851 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	115.8417	113.3687	110.3568	105.7761	102.0565	98.0576	96.5202	99.5192	102.6821	106.8803	111.5316	115.5412	(44)
Energy conte	183.4650	161.4355	169.6143	144.8022	137.3877	120.5732	116.7329	123.2255	126.6172	145.0356	158.8972	180.9096	(45)
Energy content (annual)										Total = Sum(45)m =		1768.6958	
Distribution loss (46)m = 0.15 x (45)m													
	27.5197	24.2153	25.4421	21.7203	20.6082	18.0860	17.5099	18.4838	18.9926	21.7553	23.8346	27.1364	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
									Total per year (kWh/year) = Sum(64)m =			1917.6158	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	71.1205	62.8165	66.5151	57.9387	55.7998	49.8826	48.9321	51.0909	51.8922	58.3427	62.6253	70.2708	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	95.5921	93.4770	89.4021	80.4704	74.9997	69.2814	65.7689	68.6705	72.0725	78.4177	86.9796	94.4501	(72)
Total internal gains													
	456.7211	454.9027	440.7627	414.1010	387.9861	364.2409	350.1493	352.7542	366.2213	390.2965	419.5027	444.9999	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579	(83)
Total gains	503.1337	535.3321	554.4528	561.0747	558.1824	535.6580	514.3935	499.2984	491.3789	480.1704	475.3441	484.5579	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	93.0782	93.2535	93.4259	94.2444	94.3991	95.1261	95.1261	95.2620	94.8448	94.3991	94.0866	93.7621	
alpha	7.2052	7.2169	7.2284	7.2830	7.2933	7.3417	7.3417	7.3508	7.3230	7.2933	7.2724	7.2508	
util living area													
	0.9954	0.9916	0.9812	0.9479	0.8519	0.6586	0.4791	0.5146	0.7562	0.9487	0.9899	0.9964	(86)
MIT	20.3118	20.4112	20.5712	20.7681	20.9236	20.9901	20.9991	20.9985	20.9744	20.7997	20.5201	20.2859	(87)
Th 2	20.1009	20.1024	20.1039	20.1110	20.1123	20.1185	20.1185	20.1197	20.1161	20.1123	20.1097	20.1068	(88)
util rest of house													

	0.9936	0.9883	0.9735	0.9265	0.7991	0.5740	0.3838	0.4173	0.6747	0.9233	0.9851	0.9950	(89)
MIT 2	19.3156	19.4427	19.6443	19.8876	20.0545	20.1139	20.1183	20.1193	20.1021	19.9289	19.5872	19.2875	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.8583	19.9703	20.1493	20.3673	20.5280	20.5913	20.5982	20.5983	20.5773	20.4033	20.0954	19.8314	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8583	19.9703	20.1493	20.3673	20.5280	20.5913	20.5982	20.5983	20.5773	20.4033	20.0954	19.8314	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9929	0.9877	0.9739	0.9334	0.8253	0.6201	0.4358	0.4704	0.7187	0.9327	0.9851	0.9944	(94)
Useful gains	499.5761	528.7296	540.0071	523.7097	460.6734	332.1798	224.1875	234.8795	353.1763	447.8752	468.2388	481.8596	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	892.7320	863.1072	780.2763	649.8493	499.4605	336.3772	224.4750	235.3749	364.7454	554.6400	737.6809	890.3856	(97)
Space heating kWh													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98a)
Space heating requirement - total per year (kWh/year)												1393.0229	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1393.0229	
Space heating per m2											(98c) / (4) =	23.7677	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-62.9273	-92.2457	-134.9315	-145.7838	-145.7656	-128.2302	-125.9579	-121.0545	-108.7864	-99.1534	-69.1059	-53.9747	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-26.9989	-61.9150	-136.7373	-228.6431	-323.6461	-335.5471	-330.7701	-273.8436	-193.5848	-100.5716	-38.4103	-20.6808	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1393.0229	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1917.6158	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												147.0407	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3359.2654	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												98.4141	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1393.0229	16.4900	229.7095	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	16.4900	316.2149	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	16.4900	24.2470	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1287.9169	16.4900	-212.3775	
PV Unit electricity exported	-2071.3485	5.5900	-115.7884	
Total			-328.1659	(252)
Total energy cost			242.0055	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	0.8409	(257)
SAP value		86.3696	
SAP rating (Section 12)		86	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1393.0229	0.1561	217.4174	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1917.6158	0.1414	271.0657	(264)
Space and water heating			488.4830	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1287.9169	0.1356	-174.6659	
PV Unit electricity exported	-2071.3485	0.1231	-254.9223	
Total			-429.5882	(269)
Total CO2, kg/year			80.1174	(272)
CO2 emissions per m2			1.3700	(273)
EI value			98.9638	
EI rating			99	(274)
EI band			A	

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b) x	2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.0000	(17)
Infiltration rate		0.2750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2544	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.2671	0.2544	0.2544	0.2353	0.2353	0.2099	0.2162	0.2035	0.2099	0.2226	0.2226	0.2417	(22b)
Effective ac	0.5357	0.5324	0.5324	0.5277	0.5277	0.5220	0.5234	0.5207	0.5220	0.5248	0.5248	0.5292	(25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1600	8.1600	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	22.3819			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Internal Walls			82.2800			9.0000	740.5200	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19226.9100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		328.0483 (35)
Thermal bridges (User defined value 0.050 * total exposed area)		5.8200 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	28.2019 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	28.2842	28.1091	28.1091	27.8625	27.8625	27.5636	27.6351	27.4942	27.5636	27.7088	27.7088	27.9426	(38)
Heat transfer coeff	56.4861	56.3110	56.3110	56.0644	56.0644	55.7655	55.8370	55.6961	55.7655	55.9107	55.9107	56.1445	(39)
Average = Sum(39)m / 12 =												56.0222	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9638	0.9608	0.9608	0.9566	0.9566	0.9515	0.9527	0.9503	0.9515	0.9539	0.9539	0.9579	(40)
HLP (average)												0.9558	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.9421 (42)
Hot water usage for mixer showers	56.7817 55.9284 54.6850 52.3058 50.5501 48.5921 47.4792 48.7133 50.0660 52.1683 54.5985	56.5642 (42a)
Hot water usage for baths	24.5412 24.1768 23.6635 22.7172 22.0085 21.2228 20.7984 21.3081 21.8630 22.7038 23.6696	24.4583 (42b)
Hot water usage for other uses	34.5188 33.2635 32.0083 30.7531 29.4979 28.2426 28.2426 29.4979 30.7531 32.0083 33.2635	34.5188 (42c)
Average daily hot water use (litres/day)		106.4851 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	115.8417	113.3687	110.3568	105.7761	102.0565	98.0576	96.5202	99.5192	102.6821	106.8803	111.5316	115.5412	(44)
Energy conte	183.4650	161.4355	169.6143	144.8022	137.3877	120.5732	116.7329	123.2255	126.6172	145.0356	158.8972	180.9096	(45)
Energy content (annual)										Total = Sum(45)m =		1768.6958	
Distribution loss (46)m = 0.15 x (45)m	27.5197	24.2153	25.4421	21.7203	20.6082	18.0860	17.5099	18.4838	18.9926	21.7553	23.8346	27.1364	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
									Total per year (kWh/year) = Sum(64)m =			1917.6158	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	71.1205	62.8165	66.5151	57.9387	55.7998	49.8826	48.9321	51.0909	51.8922	58.3427	62.6253	70.2708	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)	95.5921	93.4770	89.4021	80.4704	74.9997	69.2814	65.7689	68.6705	72.0725	78.4177	86.9796	94.4501	(72)
Total internal gains	456.7211	454.9027	440.7627	414.1010	387.9861	364.2409	350.1493	352.7542	366.2213	390.2965	419.5027	444.9999	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W

Northeast			1.6400		12.9236		0.4600		0.7000		0.7700		4.7295 (75)
Southeast			2.1900		40.4699		0.4600		0.7000		0.7700		19.7772 (77)
Southwest			2.9600		40.4699		0.4600		0.7000		0.7700		26.7309 (79)
Solar gains	51.2376	79.9745	112.0314	150.0885	170.1223	183.7233	173.9883	158.1581	133.9603	95.5050	63.1666	43.2442 (83)	
Total gains	507.9587	534.8772	552.7941	564.1895	558.1084	547.9642	524.1377	510.9123	500.1816	485.8015	482.6693	488.2442 (84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	94.5508	94.8448	94.8448	95.2620	95.2620	95.7727	95.6500	95.8920	95.7727	95.5240	95.5240	95.1261	
alpha	7.3034	7.3230	7.3230	7.3508	7.3508	7.3848	7.3767	7.3928	7.3848	7.3683	7.3683	7.3417	
util living area	0.9932	0.9887	0.9726	0.9187	0.7659	0.5071	0.3302	0.3487	0.6373	0.9121	0.9830	0.9946	(86)
MIT	20.4064	20.4895	20.6558	20.8430	20.9682	20.9986	21.0000	20.9999	20.9929	20.8755	20.6189	20.3856	(87)
Th 2	20.1136	20.1161	20.1161	20.1197	20.1197	20.1240	20.1229	20.1250	20.1240	20.1219	20.1219	20.1185	(88)
util rest of house	0.9904	0.9841	0.9612	0.8869	0.6967	0.4193	0.2368	0.2534	0.5460	0.8718	0.9749	0.9923	(89)
MIT 2	19.4461	19.5527	19.7586	19.9791	20.0997	20.1235	20.1229	20.1250	20.1211	20.0193	19.7204	19.4238	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.9692	20.0630	20.2474	20.4498	20.5729	20.6003	20.6007	20.6016	20.5960	20.4857	20.2099	19.9478	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.9692	20.0630	20.2474	20.4498	20.5729	20.6003	20.6007	20.6016	20.5960	20.4857	20.2099	19.9478	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9898	0.9837	0.9632	0.9000	0.7336	0.4672	0.2877	0.3054	0.5959	0.8901	0.9759	0.9917	(94)
Useful gains	502.7789	526.1672	532.4448	507.7528	409.4172	256.0325	150.7895	156.0231	298.0610	432.4246	471.0368	484.2144	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)
Heat loss rate W	839.9065	814.4293	723.4485	591.4670	424.5687	256.5356	150.8004	156.0399	300.9132	496.8074	682.6624	833.6194	(97)
Space heating kWh	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98a)
Space heating requirement - total per year (kWh/year)												1118.4173	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1118.4173	
Space heating per m2											(98c) / (4) =	19.0824	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-68.5891	-92.0108	-132.0449	-143.0716	-141.8029	-131.3951	-128.6123	-125.0952	-113.1317	-101.3828	-75.7648	-58.5020	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-32.8818	-64.6196	-140.6177	-243.9060	-330.5271	-367.8855	-357.8128	-305.2136	-215.7372	-115.3078	-48.5536	-24.9014	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1118.4173	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	

Water heating fuel used	1917.6158	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	147.0407	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3559.3674	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	-376.2935	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1118.4173	27.6700	309.4661	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	27.6700	530.6043	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	27.6700	40.6862	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1311.4033	27.6700	-362.8653	
PV Unit electricity exported	-2247.9641	5.8100	-130.6067	
Total			-493.4720	(252)
Total energy cost			387.2845	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1118.4173	0.1570	175.6231	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1917.6158	0.1414	271.0657	(264)
Space and water heating			446.6888	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1311.4033	0.1357	-177.9023	
PV Unit electricity exported	-2247.9641	0.1229	-276.3405	
Total			-454.2428	(269)
Total CO2, kg/year			13.6685	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1118.4173	1.5814	1768.6147	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	1.5227	2919.9616	(278)
Space and water heating			4688.5763	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	147.0407	1.5338	225.5360	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1311.4033	1.5014	-1968.9894	
PV Unit electricity exported	-2247.9641	0.4510	-1013.9275	
Total			-2982.9169	(283)
Total Primary energy kWh/year			1931.1954	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating: B 86
Current environmental impact rating: A 99

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: B 86
Potential environmental impact rating: A 99

Fuel prices for cost data on this page from database revision number 595 TEST (29 May 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current	Potential	Saving
Electricity	£881	£881	£0
Space heating	£309	£309	£0
Water heating	£531	£531	£0
Lighting	£41	£41	£0
Generated (PV)	-£493	-£493	£0
Total cost of fuels	£388	£388	£0
Total cost of uses	£388	£388	£0
Delivered energy	-6 kWh/m²	-6 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.0 tonnes	0.0 tonnes	0.0 tonnes
CO2 emissions per m²	0 kg/m²	0 kg/m²	0 kg/m²
Primary energy	33 kWh/m²	33 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	160.0053	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		3.0000 (17)
Infiltration rate		0.2750 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2544 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.3243	0.3180	0.3116	0.2798	0.2734	0.2417	0.2417	0.2353	0.2544	0.2734	0.2862	0.2989	(22b)
Effective ac	0.5526	0.5506	0.5485	0.5391	0.5374	0.5292	0.5292	0.5277	0.5324	0.5374	0.5409	0.5447	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)
External Wall 1	57.7900	6.7900	51.0000	0.1600	8.1600	190.0000	9690.0000	(29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900	(30)
Total net area of external elements Aum(A, m2)			116.4000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	22.3819			(33)
Main dwelling								
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000	(32)
Party Floor 1			58.6100			30.0000	1758.3000	(32d)
Internal Walls			82.2800			9.0000	740.5200	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19226.9100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		328.0483 (35)
Thermal bridges (User defined value 0.050 * total exposed area)		5.8200 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	28.2019 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	29.1779	29.0700	28.9643	28.4679	28.3750	27.9426	27.9426	27.8625	28.1091	28.3750	28.5629	28.7593	(38)
Heat transfer coeff	57.3798	57.2719	57.1662	56.6698	56.5769	56.1445	56.1445	56.0644	56.3110	56.5769	56.7648	56.9613	(39)
Average = Sum(39)m / 12 =												56.6693	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9790	0.9772	0.9754	0.9669	0.9653	0.9579	0.9579	0.9566	0.9608	0.9653	0.9685	0.9719	(40)
HLP (average)												0.9669	

Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421	(42)
Hot water usage for mixer showers													
	56.7817	55.9284	54.6850	52.3058	50.5501	48.5921	47.4792	48.7133	50.0660	52.1683	54.5985	56.5642	(42a)
Hot water usage for baths													
	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)
Hot water usage for other uses													
	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)
Average daily hot water use (litres/day)												106.4851	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	115.8417	113.3687	110.3568	105.7761	102.0565	98.0576	96.5202	99.5192	102.6821	106.8803	111.5316	115.5412	(44)
Energy conte	183.4650	161.4355	169.6143	144.8022	137.3877	120.5732	116.7329	123.2255	126.6172	145.0356	158.8972	180.9096	(45)
Energy content (annual)											Total = Sum(45)m =	1768.6958	
Distribution loss (46)m = 0.15 x (45)m													
	27.5197	24.2153	25.4421	21.7203	20.6082	18.0860	17.5099	18.4838	18.9926	21.7553	23.8346	27.1364	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage													
	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
											Total per year (kWh/year) = Sum(64)m =	1917.6158	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	71.1205	62.8165	66.5151	57.9387	55.7998	49.8826	48.9321	51.0909	51.8922	58.3427	62.6253	70.2708	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)													
	95.5921	93.4770	89.4021	80.4704	74.9997	69.2814	65.7689	68.6705	72.0725	78.4177	86.9796	94.4501	(72)
Total internal gains													
	456.7211	454.9027	440.7627	414.1010	387.9861	364.2409	350.1493	352.7542	366.2213	390.2965	419.5027	444.9999	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	11.2829	0.4600	0.7000	0.7700	4.1291	(75)
Southeast	2.1900	36.7938	0.4600	0.7000	0.7700	17.9808	(77)
Southwest	2.9600	36.7938	0.4600	0.7000	0.7700	24.3028	(79)

Solar gains	46.4126	80.4294	113.6900	146.9737	170.1963	171.4171	164.2441	146.5442	125.1576	89.8739	55.8414	39.5579	(83)
Total gains	503.1337	535.3321	554.4528	561.0747	558.1824	535.6580	514.3935	499.2984	491.3789	480.1704	475.3441	484.5579	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	93.0782	93.2535	93.4259	94.2444	94.3991	95.1261	95.1261	95.2620	94.8448	94.3991	94.0866	93.7621	
alpha	7.2052	7.2169	7.2284	7.2830	7.2933	7.3417	7.3417	7.3508	7.3230	7.2933	7.2724	7.2508	
util living area													
	0.9954	0.9916	0.9812	0.9479	0.8519	0.6586	0.4791	0.5146	0.7562	0.9487	0.9899	0.9964	(86)
MIT	20.3118	20.4112	20.5712	20.7681	20.9236	20.9901	20.9991	20.9985	20.9744	20.7997	20.5201	20.2859	(87)
Th 2	20.1009	20.1024	20.1039	20.1110	20.1123	20.1185	20.1185	20.1197	20.1161	20.1123	20.1097	20.1068	(88)
util rest of house													
	0.9936	0.9883	0.9735	0.9265	0.7991	0.5740	0.3838	0.4173	0.6747	0.9233	0.9851	0.9950	(89)
MIT 2	19.3156	19.4427	19.6443	19.8876	20.0545	20.1139	20.1183	20.1193	20.1021	19.9289	19.5872	19.2875	(90)
Living area fraction											fLA = Living area / (4) =	0.5448	(91)
MIT	19.8583	19.9703	20.1493	20.3673	20.5280	20.5913	20.5982	20.5983	20.5773	20.4033	20.0954	19.8314	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8583	19.9703	20.1493	20.3673	20.5280	20.5913	20.5982	20.5983	20.5773	20.4033	20.0954	19.8314	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9929	0.9877	0.9739	0.9334	0.8253	0.6201	0.4358	0.4704	0.7187	0.9327	0.9851	0.9944	(94)
Useful gains	499.5761	528.7296	540.0071	523.7097	460.6734	332.1798	224.1875	234.8795	353.1763	447.8752	468.2388	481.8596	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	892.7320	863.1072	780.2763	649.8493	499.4605	336.3772	224.4750	235.3749	364.7454	554.6400	737.6809	890.3856	(97)
Space heating kWh	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98a)
Space heating requirement - total per year (kWh/year)												1393.0229	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1393.0229	
Space heating per m2											(98c) / (4) =	23.7677	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	292.5080	224.7018	178.7603	90.8205	28.8576	0.0000	0.0000	0.0000	0.0000	79.4331	193.9984	303.9434	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-62.9273	-92.2457	-134.9315	-145.7838	-145.7656	-128.2302	-125.9579	-121.0545	-108.7864	-99.1534	-69.1059	-53.9747	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-26.9989	-61.9150	-136.7373	-228.6431	-323.6461	-335.5471	-330.7701	-273.8436	-193.5848	-100.5716	-38.4103	-20.6808	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	1393.0229	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1917.6158	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	147.0407	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3359.2654	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	98.4141	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1393.0229	16.4900	229.7095	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	16.4900	316.2149	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	16.4900	24.2470	(250)
Additional standing charges			0.0000	(251)

Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1287.9169	16.4900	-212.3775	
PV Unit electricity exported	-2071.3485	5.5900	-115.7884	
Total			-328.1659	(252)
Total energy cost			242.0055	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	0.8409	(257)
SAP value		86.3696	
SAP rating (Section 12)		86	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1393.0229	0.1561	217.4174	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1917.6158	0.1414	271.0657	(264)
Space and water heating			488.4830	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1287.9169	0.1356	-174.6659	
PV Unit electricity exported	-2071.3485	0.1231	-254.9223	
Total			-429.5882	(269)
Total CO2, kg/year			80.1174	(272)
CO2 emissions per m2			1.3700	(273)
EI value			98.9638	
EI rating			99	(274)
EI band			A	

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		58.6100	(1b)	x 2.7300	(2b) =	160.0053	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.6100						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		160.0053	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1250	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		3.0000	(17)
Infiltration rate		0.2750	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2544	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.2671	0.2544	0.2544	0.2353	0.2353	0.2099	0.2162	0.2035	0.2099	0.2226	0.2226	0.2417	(22b)
Effective ac	0.5357	0.5324	0.5324	0.5277	0.5277	0.5220	0.5234	0.5207	0.5220	0.5248	0.5248	0.5292	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			6.7900	1.1450	7.7748			(27)

External Wall 1	57.7900	6.7900	51.0000	0.1600	8.1600	190.0000	9690.0000 (29a)
External Roof 1	58.6100		58.6100	0.1100	6.4471	9.0000	527.4900 (30)
Total net area of external elements Aum(A, m2)			116.4000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		22.3819		(33)
Main dwelling							
Party Wall to Adj Flat			36.1700	0.0000	0.0000	180.0000	6510.6000 (32)
Party Floor 1			58.6100			30.0000	1758.3000 (32d)
Internal Walls			82.2800			9.0000	740.5200 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	19226.9100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		328.0483 (35)
Thermal bridges (User defined value 0.050 * total exposed area)		5.8200 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	28.2019 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	28.2842	28.1091	28.1091	27.8625	27.8625	27.5636	27.6351	27.4942	27.5636	27.7088	27.7088	27.9426	(38)
Heat transfer coeff	56.4861	56.3110	56.3110	56.0644	56.0644	55.7655	55.8370	55.6961	55.7655	55.9107	55.9107	56.1445	(39)
Average = Sum(39)m / 12 =												56.0222	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9638	0.9608	0.9608	0.9566	0.9566	0.9515	0.9527	0.9503	0.9515	0.9539	0.9539	0.9579	(40)
HLP (average)												0.9558	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.9421	(42)
Hot water usage for mixer showers	56.7817	55.9284	54.6850	52.3058	50.5501	48.5921	47.4792	48.7133	50.0660	52.1683	54.5985	56.5642	(42a)
Hot water usage for baths	24.5412	24.1768	23.6635	22.7172	22.0085	21.2228	20.7984	21.3081	21.8630	22.7038	23.6696	24.4583	(42b)
Hot water usage for other uses	34.5188	33.2635	32.0083	30.7531	29.4979	28.2426	28.2426	29.4979	30.7531	32.0083	33.2635	34.5188	(42c)
Average daily hot water use (litres/day)												106.4851	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	115.8417	113.3687	110.3568	105.7761	102.0565	98.0576	96.5202	99.5192	102.6821	106.8803	111.5316	115.5412	(44)
Energy conte	183.4650	161.4355	169.6143	144.8022	137.3877	120.5732	116.7329	123.2255	126.6172	145.0356	158.8972	180.9096	(45)
Energy content (annual)										Total = Sum(45)m =		1768.6958	
Distribution loss (46)m = 0.15 x (45)m	27.5197	24.2153	25.4421	21.7203	20.6082	18.0860	17.5099	18.4838	18.9926	21.7553	23.8346	27.1364	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												0.6800	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.4080	(55)
Total storage loss	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(56)
If cylinder contains dedicated solar storage	12.6480	11.4240	12.6480	12.2400	12.6480	12.2400	12.6480	12.6480	12.2400	12.6480	12.2400	12.6480	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
										Total per year (kWh/year) = Sum(64)m =		1917.6158	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	71.1205	62.8165	66.5151	57.9387	55.7998	49.8826	48.9321	51.0909	51.8922	58.3427	62.6253	70.2708	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	116.5244	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.8151	18.4878	15.0353	11.3827	8.5087	7.1834	7.7619	10.0892	13.5417	17.1944	20.0684	21.3937	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	252.8779	255.5020	248.8894	234.8119	217.0417	200.3402	189.1825	186.5584	193.1710	207.2485	225.0187	241.7203	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	48.5945	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	-77.6829	(71)
Water heating gains (Table 5)	95.5921	93.4770	89.4021	80.4704	74.9997	69.2814	65.7689	68.6705	72.0725	78.4177	86.9796	94.4501	(72)
Total internal gains	456.7211	454.9027	440.7627	414.1010	387.9861	364.2409	350.1493	352.7542	366.2213	390.2965	419.5027	444.9999	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.6400	12.9236	0.4600	0.7000	0.7700	4.7295	(75)
Southeast	2.1900	40.4699	0.4600	0.7000	0.7700	19.7772	(77)
Southwest	2.9600	40.4699	0.4600	0.7000	0.7700	26.7309	(79)

Solar gains	51.2376	79.9745	112.0314	150.0885	170.1223	183.7233	173.9883	158.1581	133.9603	95.5050	63.1666	43.2442	(83)
Total gains	507.9587	534.8772	552.7941	564.1895	558.1084	547.9642	524.1377	510.9123	500.1816	485.8015	482.6693	488.2442	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	94.5508	94.8448	94.8448	95.2620	95.2620	95.7727	95.6500	95.8920	95.7727	95.5240	95.5240	95.1261	
alpha	7.3034	7.3230	7.3230	7.3508	7.3508	7.3848	7.3767	7.3928	7.3848	7.3683	7.3683	7.3417	
util living area	0.9932	0.9887	0.9726	0.9187	0.7659	0.5071	0.3302	0.3487	0.6373	0.9121	0.9830	0.9946	(86)
MIT	20.4064	20.4895	20.6558	20.8430	20.9682	20.9986	21.0000	20.9999	20.9929	20.8755	20.6189	20.3856	(87)
Th 2	20.1136	20.1161	20.1161	20.1197	20.1197	20.1240	20.1229	20.1250	20.1240	20.1219	20.1219	20.1185	(88)
util rest of house	0.9904	0.9841	0.9612	0.8869	0.6967	0.4193	0.2368	0.2534	0.5460	0.8718	0.9749	0.9923	(89)
MIT 2	19.4461	19.5527	19.7586	19.9791	20.0997	20.1235	20.1229	20.1250	20.1211	20.0193	19.7204	19.4238	(90)
Living area fraction										fLA = Living area / (4) =		0.5448	(91)
MIT	19.9692	20.0630	20.2474	20.4498	20.5729	20.6003	20.6007	20.6016	20.5960	20.4857	20.2099	19.9478	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.9692	20.0630	20.2474	20.4498	20.5729	20.6003	20.6007	20.6016	20.5960	20.4857	20.2099	19.9478	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9898	0.9837	0.9632	0.9000	0.7336	0.4672	0.2877	0.3054	0.5959	0.8901	0.9759	0.9917	(94)
Useful gains	502.7789	526.1672	532.4448	507.7528	409.4172	256.0325	150.7895	156.0231	298.0610	432.4246	471.0368	484.2144	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)
Heat loss rate W	839.9065	814.4293	723.4485	591.4670	424.5687	256.5356	150.8004	156.0399	300.9132	496.8074	682.6624	833.6194	(97)
Space heating kWh	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98a)
Space heating requirement - total per year (kWh/year)												1118.4173	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1118.4173	
Space heating per m2											(98c) / (4) =	19.0824	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	250.8229	193.7121	142.1068	60.2742	11.2727	0.0000	0.0000	0.0000	0.0000	47.9008	152.3705	259.9573	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	196.1130	172.8595	182.2623	157.0422	150.0357	132.8132	129.3809	135.8735	138.8572	157.6836	171.1372	193.5576	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.2194	14.6163	13.1603	9.6418	7.4476	6.0848	6.7940	8.8310	11.4707	15.0501	16.9991	18.7257	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-68.5891	-92.0108	-132.0449	-143.0716	-141.8029	-131.3951	-128.6123	-125.0952	-113.1317	-101.3828	-75.7648	-58.5020	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-32.8818	-64.6196	-140.6177	-243.9060	-330.5271	-367.8855	-357.8128	-305.2136	-215.7372	-115.3078	-48.5536	-24.9014	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1118.4173	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1917.6158	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												147.0407	(232)

Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3559.3674	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	-376.2935	(238)

10a. Fuel costs - using BEDF prices (595)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1118.4173	27.6700	309.4661	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	27.6700	530.6043	(247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	147.0407	27.6700	40.6862	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1311.4033	27.6700	-362.8653	
PV Unit electricity exported	-2247.9641	5.8100	-130.6067	
Total			-493.4720	(252)
Total energy cost			387.2845	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1118.4173	0.1570	175.6231	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1917.6158	0.1414	271.0657	(264)
Space and water heating			446.6888	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	147.0407	0.1443	21.2225	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1311.4033	0.1357	-177.9023	
PV Unit electricity exported	-2247.9641	0.1229	-276.3405	
Total			-454.2428	(269)
Total CO2, kg/year			13.6685	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	1118.4173	1.5814	1768.6147	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1917.6158	1.5227	2919.9616	(278)
Space and water heating			4688.5763	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	147.0407	1.5338	225.5360	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1311.4033	1.5014	-1968.9894	
PV Unit electricity exported	-2247.9641	0.4510	-1013.9275	
Total			-2982.9169	(283)
Total Primary energy kWh/year			1931.1954	(286)

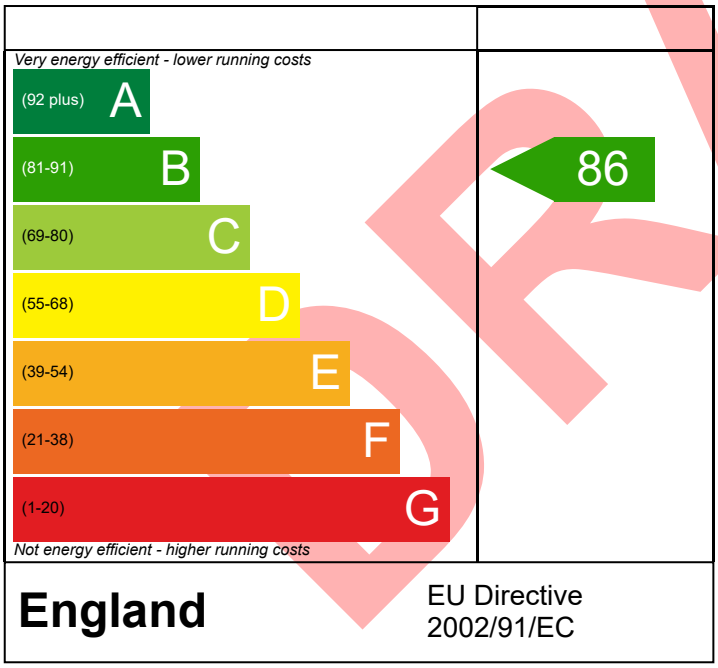
Predicted Energy Assessment

Dwelling type:	Flat, Mid-Terrace
Date of assessment:	15/06/2026
SAP Version:	10.2
Produced by:	Dion Mellows
Total floor area:	58.61 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

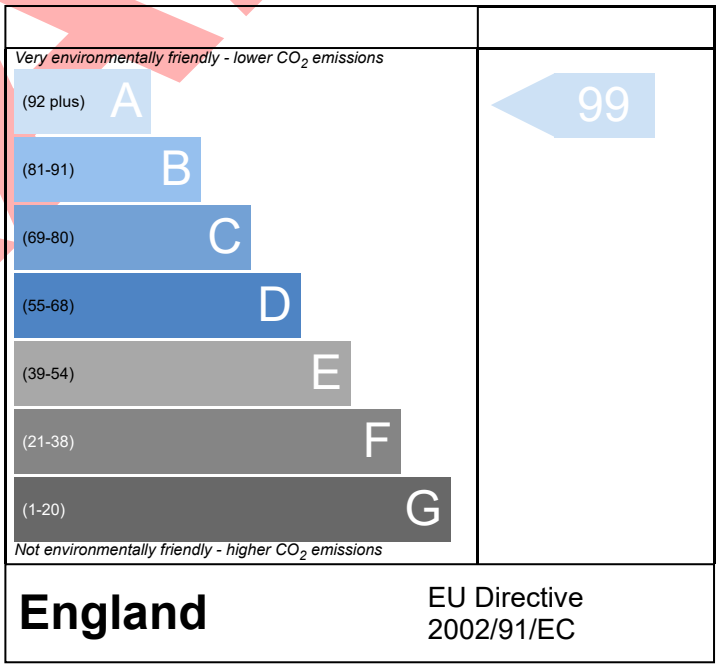
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

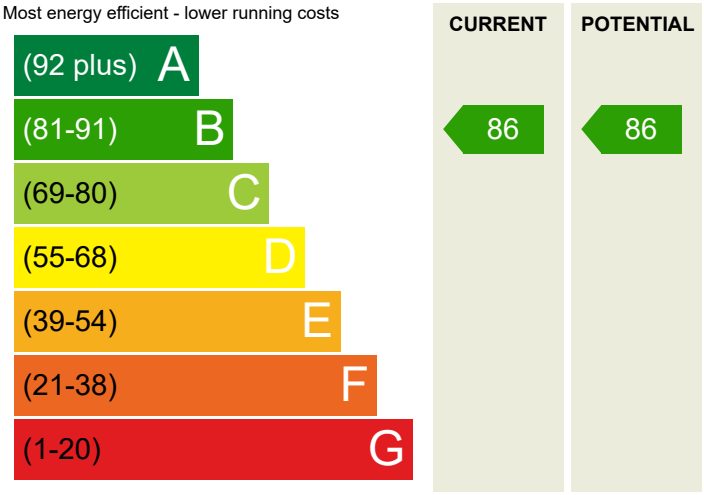
Energy Report

Dwelling Address	
Reference	Flat 10-Be Green
SAP Version	10.2
Assessment Date	12/06/2026
Submission Date	
Property Type	Flat, Mid-Terrace
Total Floor Area	59

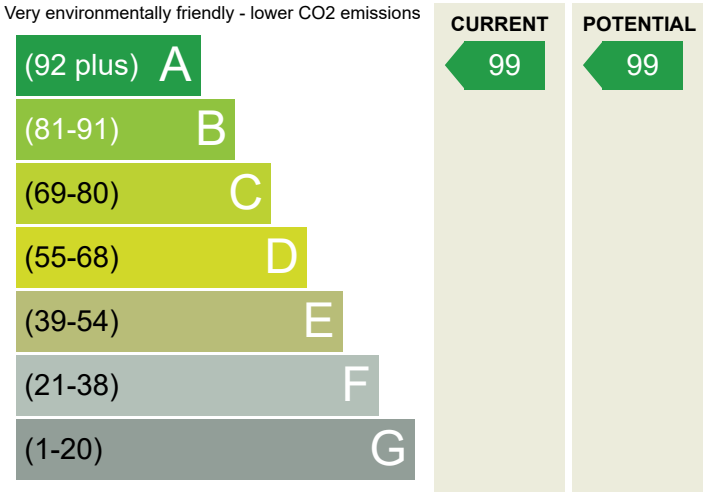
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Efficiency Rating

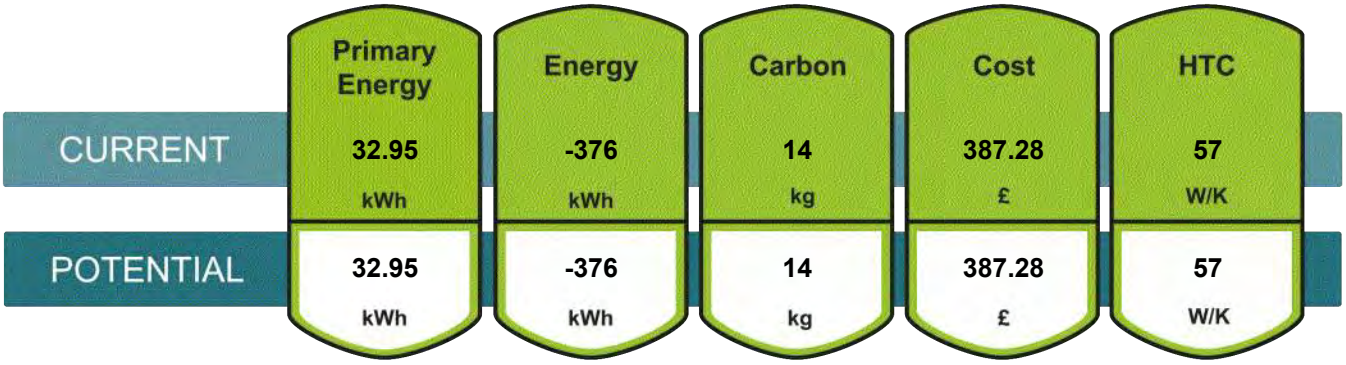


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.16 W/m²K	Very Good
Roof	Average thermal transmittance 0.11 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and room thermostat	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m³/h.m² (assumed)	Good

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£41	£41	
Heating	£309	£309	
Hot Water	£531	£531	
New Technologies e.g. Impact of PV	-(£493)	-(£493)	
TOTAL	£387	£387	

Estimated energy use and potential savings

Space Heating
1118
kWh per year

Water Heating
1918
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.