

ENERGY STATEMENT



Basement Conversion 10 Tottington Road Bury BL8 1LH

August 2026

Report Reference: J005434

Revision:

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Appendix 1 – Be Lean Sample SAP Report

Appendix 2 – Be Green Sample SAP Report

Appendix 3 – Minimal PV Sample SAP Report

DISCLAIMER: This report is to be used for planning purposes only. This is not a full SAP calculation. Full SAP calculations should be carried out at design stage to inform the full specification of the building and outline further requirements on thermal bridging and photographic evidence. UKBC takes no responsibility for building regulation compliance if we have not carried out full SAP reports.

1.0 EXECUTIVE SUMMARY

1.1 UK Building Compliance have been appointed to undertake a Sustainability Statement on a proposed development at Basement Conversion, 10 Tottington Road, Bury, BL8 1LH.

1.2 The development comprises of a total of a 1 dwelling 7 bed HMO.

1.3 This document has been produced to satisfy:

- Policy JP S2-S3 of Places for Everyone Joint Development Plan for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan.
- Part L of the Building Regulations England & Wales 2021

1.4 This document details how the requirements are met via the following:

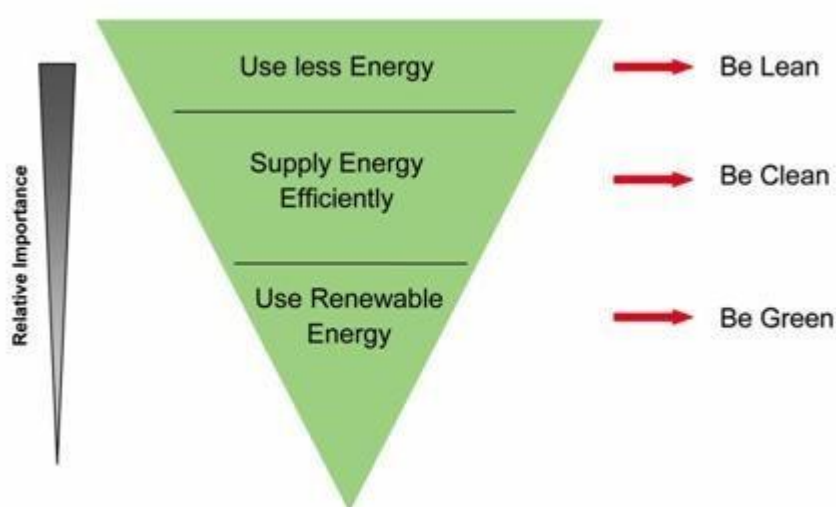
- Efficient fabric specification design
- Low carbon heating system
- Renewable technology

2.0 POLICY FRAMEWORK

2.1 The following section outlines how the scheme intends to meet its carbon reduction strategy. This has been carried out by a Elmhurst accredited Level 3 'On Construction Domestic Energy Assessor'.

2.2 LOCAL POLICIES

Policy JP-S2: Carbon and Energy outlines an expectation that new development will, unless it can be demonstrated that it is not practicable, or financially viable be net zero carbon. From 2025 development should also calculate and minimise carbon emissions. Development proposals should set out how this has been achieved in an energy statement in accordance with the energy hierarchy set out below:



From 2025 any residual carbon emissions that cannot be fully mitigated on-site should be offset in agreement with the relevant local planning authority through a financial contribution to a carbon offset fund.

Policy JP-S3 looks at delivering renewable and low carbon energy schemes will be supported with particular emphasis on the decentralized energy networks in areas identified as "Heat and Energy Network Opportunities Areas". New residential developments that are '10 dwellings or more' or other developments over 1,000m² floor space must connect to an existing or planned network where feasible. This is not applicable to this development of only 3 dwellings.

(Source: Places for Everyone Joint Development Plan Document For Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan. P. 89-98, [ONLINE] [Accessed Aug 2026].

2.3 NATIONAL POLICIES

2.4 In June 2022, Part L1A of the Building Regulations England & Wales was updated.

2.5 In addition to tightening of the previous 'Building Emission Rating' criteria, a new compliance metric 'Primary Energy Demand' was also introduced.

2.6 A combination of lower U-Values and the introduction of renewable technology can summarise the main changes between the previous and new Part L standards.

2.7 The new Part L standards ensure a carbon reduction of approximately 35%, compared to the previous version.

3.0 BASELINE

3.1 SAP Calculations have been carried out on a full sample using the Elmhurst SAP10.2 software to gain the regulated emissions for the site.

This report will look at 2 options for heating:

Option 1: Gas Boiler

Option 2: Air Source Heat Pump

Regulated Emissions are the CO₂ emissions covered under Part L of the Building Regulations and comprise of:

- a. Space Heating and Cooling
- b. Hot Water
- c. Lighting
- d. Pumps and Fans

Development emissions at this stage of the hierarchy are as follows:

Option 1:

	Regulated CO ₂ Emissions	% Improvement on TER
Target Emissions Rate (TER)	24.85	
Dwelling Emissions Rate (DER)		
Target Fabric Energy Efficiency (TFEE)	82.42	
Dwelling Fabric Energy Efficiency (DFEE)		
Target Primary Energy Rating (TPER)	135.85	
Dwelling Primary Energy Rating (DPER)		

Option 2:

	Regulated CO ₂ Emissions	% Improvement on TER
Target Emissions Rate (TER)	8.44	
Dwelling Emissions Rate (DER)		
Target Fabric Energy Efficiency (TFEE)	82.42	

Dwelling Fabric Energy Efficiency (DFEE)		
Target Primary Energy Rating (TPER)	87.25	
Dwelling Primary Energy Rating (DPER)		

4.0 BE LEAN

4.1 High energy efficiency standards are demonstrated in the table below. Construction Details have been selected to ensure that all fabric U-Values exceed the requirements of Part L of the Building Regulations (2021). The proposed construction details for the residential units are as follows:

Elements	U Value	Development Notes
Basement Floor- Upgraded	0.20 W/m ² /K	
Ground Floor- Existing	0.70 W/m ² /K	
Basement Walls- Upgraded	0.20 W/m ² /K	
External Wall- Existing	0.70 W/m ² /K	
Pitched Roof (Joists)- Existing	0.35 W/m ² /K	
Windows/Glazed Doors	1.4 W/m ² /K	Double Glazed
Ventilation	Natural Ventilation	Extract in wet rooms
Heating/Cooling	Option 1: Gas Boiler Or Option 2: Air Source Heat Pump	Ideal LOGIC MAX System S24 Vaillant aroTHERM 10kW
Heating Controls	Time & Temperature Zone Control	
Heating Emitters	Radiators	
Lighting	100% Low Energy	
Renewable Technology	N/A	

4.2 Development emissions at this stage of the hierarchy are as follows:

Option 1:

	Regulated CO ₂ Emissions	% Improvement on TER
Target Emissions Rate (TER)	24.85	
Dwelling Emissions Rate (DER)	20.34	18.15%
Target Fabric Energy Efficiency (TFEE)	82.42	
Dwelling Fabric Energy Efficiency (DFEE)	77.85	5.54%

Target Primary Energy Rating (TPER)	135.85	
Dwelling Primary Energy Rating (DPER)	111.77	17.73%

4.3 A carbon reduction of 18.15% is achieved via efficiency measures alone.

4.4 Development emissions at this stage of the hierarchy are as follows:

Option 2:

	Regulated CO2 Emissions	% Improvement on TER
Target Emissions Rate (TER)	8.44	
Dwelling Emissions Rate (DER)	6.00	28.91%
Target Fabric Energy Efficiency (TFEE)	82.42	
Dwelling Fabric Energy Efficiency (DFEE)	77.85	5.54%
Target Primary Energy Rating (TPER)	87.25	
Dwelling Primary Energy Rating (DPER)	62.17	28.74%

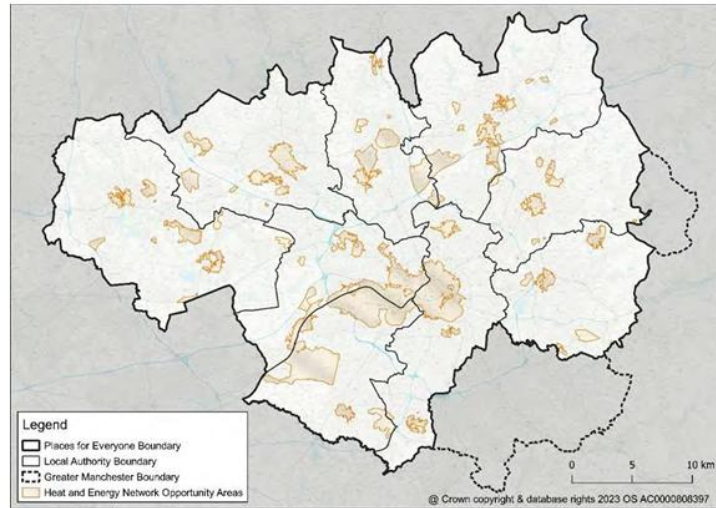
A full sample SAP Input Data Sheet and SAP L1B Checklist can be found in Appendix 1 to verify the above inputs.

4.5 A carbon reduction of 28.91% is achieved via efficiency measures alone.

5.0 BE CLEAN

5.1 Although the requirement of connecting to an existing or planned heat/energy network does not apply here, it is important to consider clean energy sources.

5.2 The development is within a “Heat and Energy Network Opportunity Area” as shown below:



There is a possibility of connection to a heat network in the future.

6.0 BE GREEN

6.1 The potential renewable energy applicable to this development and its feasibility is investigated below:

Renewable	Advantages	Disadvantages	Feasibility
Photovoltaic Panels	Can have significant impact on carbon by offsetting electricity which has a high carbon footprint. Low maintenance. No noise issues associated with PV. No additional land use from the installation of PV panels.	High capital investment required. Needs unobstructed space on roof. Solar PV has a reduced carbon reduction effect when incorporating the new SAP 10 emission factors than it did previously.	The development incorporates a large, sloped roof which is suited to PV. No roof lights are included allowing for more roof space.
Solar Thermal Collectors	No additional land use from the installation of solar thermal collectors. Low maintenance and easy to manage. Low capital cost. No noise issues associated with Solar thermal collectors.	Limited CO ₂ offset No Grants or Tariffs for new build installations.	Solar thermal collectors are feasible for the development, although it is not possible to meet the required carbon saving as the maximum demand that solar thermal collectors can be designed to meet can be no greater than 50% of the hot water demand.
Biomass Heating	Potential to reduce large component of the total CO ₂ . A biomass boiler would replace a standard gas heating system so some of the cost may be offset through money saved on a traditional boiler.	Regular maintenance will be required. Reliability of fuel may become a problem, therefore limited cost saving for residents. A plant room and fuel store will be required which may take additional land from the proposed development or surroundings. The fuel will need to be delivered, which can cause issues with access etc.	Biomass is not considered feasible for such a development due to the need for space to accommodate fuel storages, access for delivery vehicles and local NO _x emissions.
Ground Source Heat Pumps	Low maintenance and easy to manage Optimum efficiency with under- floor heating systems. As heat pumps would replace standard heating systems, some of the cost may offset through money saved on a traditional boiler.	The heat pump has a noise level around 45- 60dB so some attenuation may be required and it should be sensibly located. Relatively high capital cost. Requires electricity to run the pump, therefore limited carbon savings in most cases. For communal systems plant room required which may take additional land from the proposed development/ surroundings.	Limited Space on site and large communal infrastructure needed would remove and reduce amenity space.

Air Source Heat Pumps	ASHP systems are generally cheaper than ground source as there is no requirement for long lengths of buried piping. Low maintenance and easy to manage. Optimum efficiency with under- floor heating systems. As heat pumps would replace standard heating systems, some of the cost may offset through money saved on a traditional boiler.	The heat pump has a noise level around 50- 60dB so some attenuation may be required, and it should be sensibly located. The potential noise from the external unit may mean there is local opposition to their installation. Requires electricity to run the pump, therefore limited carbon savings in most cases. For communal systems, plant room is required which may take additional land from the proposed development/surroundings Potential noise issues.	There would be space for the outdoor wall units to be fitted. This option previously did not meet a 35% reduction alone, but under the new SAP 10 figures – it becomes more favourable. This is due to the significant carbon emission reduction associated with the updated national grid figures.
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6.2 To achieve net zero emissions a Solar PV system is required.

6.3 Option 1: Using gas boiler and 33.00kWp of East/West/South facing Solar PV achieves the following development emissions at this stage of the hierarchy:

	Regulated CO2 Emissions	% Improvement on TER
Target Emissions Rate (TER)	24.85	
Dwelling Emissions Rate (DER)	-0.02	100.08%
Target Fabric Energy Efficiency (TFEE)	82.42	
Dwelling Fabric Energy Efficiency (DFEE)	77.85	5.54%
Target Primary Energy Rating (TPER)	135.85	
Dwelling Primary Energy Rating (DPER)	25.16	81.47%

6.4 Option 2: Using an air source heat pump and 9.50kWp of East/West/South facing Solar PV achieves the following development emissions at this stage of the hierarchy:

	Regulated CO2 Emissions	% Improvement on TER
Target Emissions Rate (TER)	8.44	
Dwelling Emissions Rate (DER)	-0.17	102.01%

Target Fabric Energy Efficiency (TFEE)	82.42	
Dwelling Fabric Energy Efficiency (DFEE)	77.85	5.54%
Target Primary Energy Rating (TPER)	87.25	
Dwelling Primary Energy Rating (DPER)	22.80	73.86%

6.5 As the Solar PV demand may exceed the available roof space for installation it may not be feasible to achieve net zero.

6.6 The table below represents a more achievable way to minimise the amount of carbon produced from the dwelling.

Using the existing gas boiler and 9kWp of Solar PV facing East/West/South the following development emissions are achieved:

	Regulated CO2 Emissions	% Improvement on TER
Target Emissions Rate (TER)	24.85	
Dwelling Emissions Rate (DER)	14.65	41.05%
Target Fabric Energy Efficiency (TFEE)	82.42	
Dwelling Fabric Energy Efficiency (DFEE)	77.85	5.54%
Target Primary Energy Rating (TPER)	135.85	
Dwelling Primary Energy Rating (DPER)	80.20	40.96%

6.7 Although the amount of carbon produced is reduced by 41.05%, net zero is not achieved meaning that a carbon offset fund will be required.

7.0 Carbon Offset Fund

From 2025 any residual carbon emissions that cannot be fully mitigated on-site should be offset in agreement with the relevant local planning authority through a financial contribution to a carbon offset fund.

A specific amount isn't provided within Policy JP S2-S3 of Places for Everyone Joint Development Plan for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan.

8.0 WASTE MANAGEMENT

8.1 The following section outlines the schemes requirements and proposal for recycling and waste disposal.

8.2 NATIONAL POLICIES

Part H of the 2010 England & Wales Building Regulations outlines the following requirement:

“For domestic developments space should be provided for storage of containers for separated waste (i.e. waste which can be recycled is stored separately from waste which cannot) with a combined capacity of 0.25m² per dwelling or such other capacity as maybe agreed with the waste collection authority. Where collections are less frequent than once per week, this allowance should be increased accordingly.”

8.3 BRITISH STANDARD 5906: 2005

8.4 British Standard 5906:2005 **Waste management in buildings — Code of practice** states that the developer or his agent should reach agreement with all appropriate authorities, particularly upon the following points.

- a)** The methods of storage, segregation, on-site treatment and collection of waste, including recyclable material, to be used for the form of layout and building density adopted.
- b)** A designated location for waste including recyclable material storage, segregation and treatment areas to be provided and means of access to them for waste collection staff and vehicles.
- c)** The storage capacity to be provided with allowance for the frequency of collection specified by the collection authority, the volume and nature of waste including recyclable material expected and the size and type of containers to be used.
- d)** The responsibility for cleansing and maintenance of storage facilities.
- e)** Environmental aspects, e.g. air pollution, indoor air quality, noise control, and litter abatement.
- f)** The discharge of waste into sewers (e.g. food waste disposers).
- g)** Means of escape and fire-fighting arrangements in waste and recyclable material storage and collection areas.
- h)** Appropriate arrangements for older persons and persons with disabilities.

9.0 SUSTAINABLE CONSTRUCTION

9.1 The Developer will monitor and record waste produce from site activities to ensure that the maximum possible will be diverted from landfill and reused in line with the waste hierarchy (below). This may be via a SWMP or via a licensed waste contractor.



9.2 All timber will be purchased in line with the Government's Policy for UK Timber Procurement.

9.3 As per local authority requirements - a minimum of 10% of the total value of materials to be used will be derived from recycled content in products and materials selected.

9.4 Should the developer and client wish to go further than the mandatory requirements, the following voluntary BREEAM options could be considered when sourcing materials;

- Responsible sourcing certifications e.g. EMS (EMAS, ISO14001).
- Chain of custody and/or BES6001 for key and supply chain processes.
- Legally sourced timber: Chain of custody and certificate (FSC, SFI, PEFC, MTCC, SGS, TFT, Verified etc).

10.0 WATER CONSUMPTION

10.1 The following section outlines the schemes requirements and proposal for sustainable water consumption.

10.2 NATIONAL POLICIES

Part G of the 2013 England & Wales Building Regulations outlines the following requirement:

“The estimated consumption of wholesome water of a new dwelling should be no more than 125 liters/person/day or 110 liters/person/day where the optional requirement applies. This includes a fixed factor of water for outdoor use of 5 liters/ person/day.”

10.3 WATER PROPOSAL

10.4 It is proposed that the 125 liters per person per day target will be achieved through the installment of water efficient appliances.

10.5 Table 1 specifies the requirements for the properties water-based appliances and calculates how this demand reduction will lead to water consumption of below 110 litres per person per day.

10.6 The various flow rates and capacities of the appliances listed in Table 1 should be adhered to when purchasing items for the properties.

10.7 WATER CALCULATIONS

Installation Type	Unit of Measure	Quantity	Capacity/ Flow Rate	Use factor	Fixed Use	Total L/P/D
WC (single flush)	Flush (L)	0	0.00	4.42	0.00	0.00
WC (dual flush)	Full flush (L)	7	6.00	1.46	0.00	8.76
	Part flush (L)		3.00	2.96	0.00	8.88
Taps (excl kitchen/utility)	Flow (L/minute)	7	6.00	1.58	1.58	11.06
Baths	Capacity (L)	0	0.00	0.00	0.00	0.00
Showers	Flow (L/minute)	6	9.00	5.67	0.00	51.03
Kitchen/Utility Room Taps	Flow (L/minute)	2	5.00	0.44	10.36	12.56
Washing Machine	L/kg dry load	2	8.00	2.10	0.00	16.80
Dishwasher	L/place setting	1	1.25	3.60	0.00	4.50
Waste Disposal Unit	L/use	0	0.00	3.08	0.00	0.00
Water Softener	L/P/D	0	0.00	1.00	0.00	0.00
Total calculated use (litres/person/day)						113.59
Contribution from Greywater (litres/person/day)						0.00
Contribution from Rainwater (litres/person/day)						0.00
Normalisation factor						0.91
Total water consumption						103.37
External water use						5.00
Total Water Consumption (Building Regulation 17.K)						108.37

11.0 COOLING AND OVERHEATING

THE COOLING HIERARCHY

11.1 Pursuant with Policy 5.9 of the London Plan the following measures have been investigated:

Cooling Hierarchy	Measures Undertaken
1. Minimising internal heat generation through energy efficient design	Individual heating means the associated heat loss associated with communal heat pipes will not apply to this project.
2. Reducing the amount of heat entering the building in summer	Carefully designed shading measures have been considered, including: Specification of blinds.
3. Use of thermal mass and high ceilings to manage the heat within the building	Level of exposed thermal mass has been maximised to help to absorb excess heat within the building.
4. Passive Ventilation	The use of: Openable windows, Dual aspect units, Designing in the 'stack effect.
5. Mechanical Ventilation	N/A

OVERHEATING RISK ANALYSIS

11.2 Approved Document Part O 2021 applies to new residential buildings only. This includes residential dwellings, institutional, other (e.g., student accommodation). Shared communal rooms and common spaces containing more than one residential unit fall within the scope of Part O as do live/work units.

The simplified method is not suitable for buildings with more than one residential unit which use a communal heating or hot water system with significant amounts of horizontal heating or hot water distribution pipework.

An overheating calculation should be carried out on all new residential buildings under the 2021 building regulations.

11.3 There is no active cooling for the project.

12.0 CONCLUSION

12.1 This document recommends the following sustainability measures:

- Policy JP S2-S3 of Places for Everyone Joint Development Plan for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan.
- Part L of the Building Regulations England & Wales 2021

12.2 The use of air source heat pumps and Solar PV achieve net zero.

12.3 The use of a boiler requires a large amount of Solar PV to achieve net zero, if net zero is not achieved then a carbon offset fund will be required.

12.4 Wherever possible, the development will endeavor to exceed both the national and local waste, water efficiency and sustainable construction requirements as set out in this document.

Appendix 1: Be Lean

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Hinckley
Leicestershire
LE10 0PJ
Tel: 01455 634 855
Email: info@ukbuildingcompliance.co.uk
Website: www.ukbuildingcompliance.co.uk

4th August 2026

To whom it may concern,

Part L Justification Statement in support of proposed conversion at Basement Conversion, 10 Tottington Road, Bury, BL8 1LH- Option 2, Be Lean.

In accordance with the criteria set out In Approved Document Part L we have used SAP10 to model the dwelling to a notional standard and the dwelling to the proposed standard. The SAP Output Reports for both scenarios are appended to this Statement.

The Notional Dwelling has a Dwelling CO2 Emission Rate of 8.44 kg/ m².

The Notional Dwelling has a Dwelling Fabric Energy Efficiency of 82.42 kWh/ m².

The Notional Dwelling has a Dwelling Primary Energy Rate of 87.25 kWh/ m².

The Proposed Dwelling has a Dwelling CO2 Emission Rate of 6.00 kg/ m².

The Proposed Dwelling has a Dwelling Fabric Energy Efficiency of 77.85 kWh/ m².

The Proposed Dwelling has a Dwelling Primary Energy Rate of 62.17 kWh/ m².

The proposed dwelling is more efficient than the notional dwelling and therefore compliant with regulations.

If any information contained in this report is unclear or requires additional explanation please do not hesitate to contact a member of our team.

Regards

Will Hughes

Environmental Consultant

UK Building Compliance

NOTIONAL DWELLING REPORT

Summary for Input Data

Plot Reference	Plot 1- ASHP	Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	58 D	DER	8.44	TER	
Environmental	91 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.38	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	87.25	TPER	

Assessor Details	Mr. Will Hughes	Assessor ID	FJ65-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	West
Property Tenture	ND
Transaction Type	5
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
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	104.73 kJ/m ² K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.96 m	30.75 m ²	2.28 m
	2nd Storey:	38.50 m	62.39 m ²	2.40 m
		38.50 m	62.39 m ²	2.40 m

8.0 Living Area	19.14 m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Upgraded External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	202.87	187.37	0.00	None	15.50	Enter Gross Area
	Upgraded Basement Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	55.46	55.46	0.00	None	0.00	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	246.88

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Upgraded Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	62.39	62.39	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	30.75
	Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.39

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Upgraded GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.25	None	0.00	110.00	30.75
	Existing GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.70	None	0.00	110.00	31.64

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	+1	Plasterboard ceiling, carpeted chipboard floor	18.00	30.75
Internal Floor 2	+2	Plasterboard ceiling, carpeted chipboard floor	18.00	62.39

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door				0.63			1.80
Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.60

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Door	Door	Upgraded External Wall	West	1.89	
S Glazing	Glazing	Upgraded External Wall	South	2.73	
N Glazing	Glazing	Upgraded External Wall	North	3.19	
N Door	Door	Upgraded External Wall	North	1.89	
E Glazing	Glazing	Upgraded External Wall	East	3.91	
E Door	Door	Upgraded External Wall	East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	10.00	850.00	13

24.0 Main Heating 1

Percentage of Heat

 %

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Controls description

Is MHS Pumped

Heating Pump Age

Heat Emitter

Summary for Input Data

Flow Temperature	Unknown				
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25.0 Main Heating 2	None				
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26.0 Heat Networks	None				
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27.0 Secondary Heating	None				
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28.0 Water Heating					
Water Heating	Main Heating 1				
SAP Code	901				
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	No				
Cold Water Source	From mains				
Bath Count	0				
Supplementary Immersion	No				
Immersion Only Heating Hot Water	No				

28.1 Showers					
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System					
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29.0 Hot Water Cylinder	Hot Water Cylinder				
Cylinder Stat	No				
Cylinder In Heated Space	No				
Independent Time Control	No				
Insulation Type	Measured Loss				
Cylinder Volume	300.00				L
Loss	1.39				kWh/day
Pipes insulation	Fully insulated primary pipework				

31.0 Thermal Store	None				
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Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026	
Assessment Reference	Notional		Plot Type Ref			
Plot Address				SAP Version	10.2	
SAP Rating	58 D		DER	8.44	TER	
Environmental	91 B		% DER < TER			N/A
CO ₂ Emissions (t/year)	1.38		DFEE	82.42	TFEE	
Compliance Check	N/A		% DFEE < TFEE			
% DPER < TPER			DPER	87.25	TPER	
Assessor Details	Mr. Will Hughes				Assessor ID	FJ65-0001
Client						

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

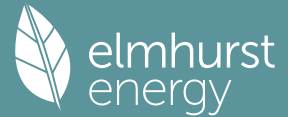
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 137.6549		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges
Total fabric heat loss (33) + (36) + (36a) = 76.6220 (36)
0.0000
214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 328.0125 325.9640 323.9560 314.5247 312.7601 304.5457 304.5457 303.0246 307.7098 312.7601 316.3298 320.0618 (39)
314.5163
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 2.1090 2.0958 2.0829 2.0223 2.0109 1.9581 1.9581 1.9483 1.9785 2.0109 2.0339 2.0579 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m 30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 754.4703 777.5342 742.1545 720.8596 684.8373 626.7613 601.5911 601.5321 620.8555 676.2510 715.7091 738.7994 (73)

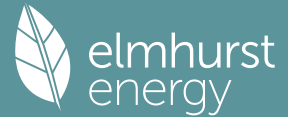
6. Solar gains

[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
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 827.3122 907.1381 932.8011 977.1732 988.6575 935.3117 896.2155 859.9403 834.2710 823.2132 803.9966 800.4464 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372
alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9774	0.9717	0.9644	0.9473	0.9174	0.8643	0.7875	0.8089	0.8982	0.9489	0.9702	0.9789 (86)
MIT	16.5131	16.7899	17.3246	18.1663	19.0245	19.8578	20.3649	20.2989	19.6320	18.5607	17.4527	16.5242 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9726	0.9655	0.9559	0.9325	0.8880	0.7970	0.6442	0.6810	0.8481	0.9317	0.9627	0.9745 (89)
MIT 2	14.2836	14.6312	15.3065	16.3716	17.4419	18.4662	19.0265	18.9682	18.2023	16.8733	15.4769	14.3027 (90)
Living area fraction	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	FLA = Living area / (4) =			0.1231 (91)
MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (92)
Temperature adjustment												0.0000
adjusted MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9481	0.9370	0.9227	0.8917	0.8397	0.7515	0.6225	0.6534	0.8003	0.8913	0.9333	0.9514 (94)
Useful gains	784.3784	849.9738	860.6804	871.3259	830.1732	702.8877	557.8867	561.8994	667.6565	733.7681	750.3799	761.5523 (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	3364.7332	3258.5673	2933.3630	2419.4708	1856.7627	1229.5949	789.1438	827.8458	1316.4553	2026.9811	2726.7716	3320.9835 (97)
Space heating kWh	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98a)
Space heating requirement - total per year (kWh/year)												11248.2509
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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11248.2509
Space heating per m2										(98c) / (4) =		72.3221 (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 %)												170.0000 (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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98)
Space heating efficiency (main heating system 1)	170.0000	170.0000	170.0000	170.0000	170.0000	0.0000	0.0000	0.0000	0.0000	170.0000	170.0000	170.0000 (210)
Space heating fuel (main heating system)	1129.2847	952.1028	907.1035	655.6849	449.2839	0.0000	0.0000	0.0000	0.0000	565.9709	837.0600	1120.1275 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)
Efficiency of water heater	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000 (216)
Fuel for water heating, kWh/month	172.9845	153.2712	163.5519	145.5131	142.2281	111.4515	110.0783	114.4598	115.7183	147.5683	155.0573	171.3183 (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	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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												6616.6182 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												170.0000
Water heating fuel used												1703.2006 (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)												393.4653 (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												8713.2841 (238)

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----- 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	6616.6182	0.1533	1014.2140 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1703.2006	0.1417	241.2636 (264)
Space and water heating			1255.4776 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Total CO2, kg/year			1312.2668 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			8.4400 (273)

----- 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	6616.6182	1.5675	10371.4794 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1703.2006	1.5238	2595.3960 (278)
Space and water heating			12966.8753 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Total Primary energy kWh/year			13570.3855 (286)
Dwelling Primary energy Rate (DPER)			87.2500 (287)

Full SAP Calculation Printout



Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026	
Assessment Reference	Notional		Plot Type Ref			
Plot Address				SAP Version	10.2	
SAP Rating	58 D	DER	8.44	TER		
Environmental	91 B	% DER < TER				N/A
CO ₂ Emissions (t/year)	1.38	DFEE	82.42	TFEE		
Compliance Check	N/A	% DFEE < TFEE				
% DPER < TPER		DPER	87.25	TPER		
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001	
Client						

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820 (5)

2. Ventilation rate

	m ³ 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	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum (A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$
 Thermal mass parameter ($\text{TMP} = C_m / \text{TFA}$) in $\text{kJ/m}^2\text{K}$
 Thermal bridges (Default value $0.200 \times \text{total exposed area}$)
 Point Thermal bridges
 Total fabric heat loss

$(28) \dots (30) + (32) + (32a) \dots (32e) = 16289.2200$ (34)
 104.7336 (35)
 76.6220 (36)
 $(36a) = 0.0000$
 $(33) + (36) + (36a) = 214.2769$ (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850
Average = $\text{Sum}(39)\text{m} / 12 =$	328.0125	325.9640	323.9560	314.5247	312.7601	304.5457	304.5457	303.0246	307.7098	312.7601	316.3298	320.0618
												314.5163
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.1090	2.0958	2.0829	2.0223	2.0109	1.9581	1.9581	1.9483	1.9785	2.0109	2.0339	2.0579
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9425											
Hot water usage for mixer showers	0.0000											
Hot water usage for baths	0.0000											
Hot water usage for other uses	0.0000											
Average daily hot water use (litres/day)	41.5087											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	76.5191	74.4197	72.1278	69.2755	66.7308	64.0863	63.5371	65.8244	68.1702	70.8859	73.7634	76.4117
Distribution loss (46)m = $0.15 \times (45)\text{m}$	121.1875	105.9726	110.8577	94.8346	89.8324	78.8016	76.8426	81.5043	84.0607	96.1915	105.0895	119.6423
Water storage loss (or HIU loss):	0.0000											
Total storage loss	0.0000											
If cylinder contains dedicated solar storage	0.0000											
Primary loss	0.0000											
Combi loss	0.0000											
Total heat required for water heating calculated for each month	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959
WWHRS	0.0000											
PV diverter	0.0000											
Solar input	0.0000											
FGHRS	0.0000											
Output from w/h	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959
12Total per year (kWh/year)	990.0948											
Electric shower(s)	58.9062	52.4859	57.3126	54.6927	55.7190	53.1505	54.9222	55.7190	54.6927	57.3126	56.2349	58.9062
Heat gains from water heating, kWh/month	40.4789	35.6407	37.8854	33.8255	33.0191	30.0330	30.0596	31.2494	31.5361	34.7688	36.3903	40.1505

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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126
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
Losses e.g. evaporation (negative values) (Table 5)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006
Water heating gains (Table 5)	54.4071	53.0367	50.9213	46.9799	44.3806	41.7125	40.4027	42.0019	43.8001	46.7323	50.5420	53.9658
Total internal gains	655.0037	679.1978	646.3685	631.1520	598.7112	581.3801	558.7660	556.9774	574.2122	588.4195	622.0707	640.1574

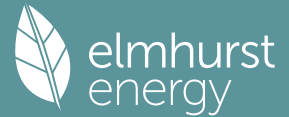
6. Solar gains

[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			
North				3.1900	10.6334	0.6300	0.7000	0.7700	10.3666 (74)			
East				3.9100	19.6403	0.6300	0.7000	0.7700	23.4691 (76)			
South				2.7300	46.7521	0.6300	0.7000	0.7700	39.0063 (78)			
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)	
Total gains	727.8456	808.8017	837.0150	887.4656	902.5313	889.9305	853.3904	815.3855	787.6277	735.3817	710.3582	701.8043 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000											
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	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372

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alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9819	0.9768	0.9704	0.9551	0.9286	0.8738	0.8003	0.8219	0.9069	0.9578	0.9761	0.9833 (86)
MIT	16.4229	16.7008	17.2401	18.0896	18.9564	19.8270	20.3421	20.2734	19.5971	18.4849	17.3676	16.4332 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9781	0.9717	0.9633	0.9424	0.9024	0.8096	0.6607	0.6982	0.8599	0.9433	0.9699	0.9798 (89)
MIT 2	15.2298	15.5108	16.0526	16.9173	17.7759	18.6309	19.0839	19.0366	18.4142	17.3172	16.1982	15.2575 (90)
Living area fraction	15.3766	15.6573	16.1988	17.0616	17.9212	18.7781	19.2387	19.1888	18.5598	17.4609	16.3421	15.4022 (92)
MIT	15.3766	15.6573	16.1988	17.0616	17.9212	18.7781	19.2387	19.1888	18.5598	17.4609	16.3421	15.4022 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9631	0.9537	0.9418	0.9146	0.8679	0.7753	0.6454	0.6780	0.8246	0.9163	0.9515	0.9659 (94)
Useful gains	701.0206	771.3560	788.2740	811.7127	783.3114	689.9925	550.7977	552.8355	649.4639	673.8380	675.9288	677.8543 (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	3633.2684	3506.4783	3141.9722	2567.0169	1945.7355	1272.4148	803.6196	845.0830	1372.3235	2145.8044	2923.5649	3585.3854 (97)
Space heating kWh	2181.5923	1838.0022	1751.1515	1263.8190	864.8435	0.0000	0.0000	0.0000	0.0000	1095.1430	1618.2980	2163.2031 (98a)
Space heating requirement - total per year (kWh/year)												12776.0528
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	2181.5923	1838.0022	1751.1515	1263.8190	864.8435	0.0000	0.0000	0.0000	0.0000	1095.1430	1618.2980	2163.2031 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												12776.0528
Space heating per m2										(98c) / (4) =		82.1453 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	2862.7300	2253.6385	2302.9866	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.2981	0.3526	0.3333	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	853.3276	794.6892	767.6502	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	920.9546	883.3263	843.4058	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	48.6914	65.9460	56.3622	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	12.1729	16.4865	14.0905	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												42.7499 (107)
Energy for space heating												82.1453 (99)
Energy for space cooling												0.2749 (108)
Total												82.4201 (109)
Fabric Energy Efficiency (DFEE)												82.4 (109)

Full SAP Calculation Printout



Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026	
Assessment Reference	Notional		Plot Type Ref			
Plot Address				SAP Version	10.2	
SAP Rating	58 D	DER	8.44	TER		
Environmental	91 B	% DER < TER				N/A
CO ₂ Emissions (t/year)	1.38	DFEE	82.42	TFEE		
Compliance Check	N/A	% DFEE < TFEE				
% DPER < TPER		DPER	87.25	TPER		
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001	
Client						

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)... (3n) =	369.5820 (5)

2. Ventilation rate

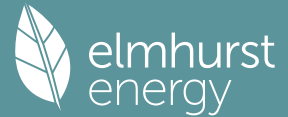
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 328.0125 325.9640 323.9560 314.5247 312.7601 304.5457 304.5457 303.0246 307.7098 312.7601 316.3298 320.0618 (39)
314.5163
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 2.1090 2.0958 2.0829 2.0223 2.0109 1.9581 1.9581 1.9483 1.9785 2.0109 2.0339 2.0579 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m 30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 754.4703 777.5342 742.1545 720.8596 684.8373 626.7613 601.5911 601.5321 620.8555 676.2510 715.7091 738.7994 (73)

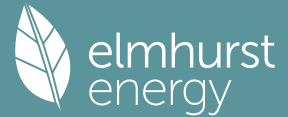
6. Solar gains

[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
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 827.3122 907.1381 932.8011 977.1732 988.6575 935.3117 896.2155 859.9403 834.2710 823.2132 803.9966 800.4464 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372
alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9774	0.9717	0.9644	0.9473	0.9174	0.8643	0.7875	0.8089	0.8982	0.9489	0.9702	0.9789 (86)
MIT	16.5131	16.7899	17.3246	18.1663	19.0245	19.8578	20.3649	20.2989	19.6320	18.5607	17.4527	16.5242 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9726	0.9655	0.9559	0.9325	0.8880	0.7970	0.6442	0.6810	0.8481	0.9317	0.9627	0.9745 (89)
MIT 2	14.2836	14.6312	15.3065	16.3716	17.4419	18.4662	19.0265	18.9682	18.2023	16.8733	15.4769	14.3027 (90)
Living area fraction	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	FLA = Living area / (4) =	17.0809	15.7200	0.1231 (91)
MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (92)
Temperature adjustment												0.0000
adjusted MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9481	0.9370	0.9227	0.8917	0.8397	0.7515	0.6225	0.6534	0.8003	0.8913	0.9333	0.9514 (94)
Useful gains	784.3784	849.9738	860.6804	871.3259	830.1732	702.8877	557.8867	561.8994	667.6565	733.7681	750.3799	761.5523 (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	3364.7332	3258.5673	2933.3630	2419.4708	1856.7627	1229.5949	789.1438	827.8458	1316.4553	2026.9811	2726.7716	3320.9835 (97)
Space heating kWh	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98a)
Space heating requirement - total per year (kWh/year)												11248.2509
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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11248.2509
Space heating per m2										(98c) / (4) =		72.3221 (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 %)												170.0000 (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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98)
Space heating efficiency (main heating system 1)	170.0000	170.0000	170.0000	170.0000	170.0000	0.0000	0.0000	0.0000	0.0000	170.0000	170.0000	170.0000 (210)
Space heating fuel (main heating system)	1129.2847	952.1028	907.1035	655.6849	449.2839	0.0000	0.0000	0.0000	0.0000	565.9709	837.0600	1120.1275 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)
Efficiency of water heater	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000 (216)
Fuel for water heating, kWh/month	172.9845	153.2712	163.5519	145.5131	142.2281	111.4515	110.0783	114.4598	115.7183	147.5683	155.0573	171.3183 (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	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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												6616.6182 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												170.0000
Water heating fuel used												1703.2006 (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)												393.4653 (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												8713.2841 (238)

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----- 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	6616.6182	0.1533	1014.2140	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1703.2006	0.1417	241.2636	(264)
Space and water heating			1255.4776	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	393.4653	0.1443	56.7892	(268)
Total CO2, kg/year			1312.2668	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			8.4400	(273)

----- 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	6616.6182	1.5675	10371.4794	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1703.2006	1.5238	2595.3960	(278)
Space and water heating			12966.8753	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	393.4653	1.5338	603.5102	(282)
Total Primary energy kWh/year			13570.3855	(286)
Dwelling Primary energy Rate (DPER)			87.2500	(287)

PROPOSED DWELLING REPORT

Summary for Input Data

Plot Reference	Plot 1- ASHP	Issued on Date	04/08/2026
Assessment Reference	Proposed Baseline	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	70 C	DER	6.00	TER	
Environmental	94 A	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.97	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	62.17	TPER	

Assessor Details	Mr. Will Hughes	Assessor ID	FJ65-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	West
Property Tenture	ND
Transaction Type	5
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
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	104.73 kJ/m ² K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.96 m	30.75 m ²	2.28 m
	2nd Storey:	38.50 m	62.39 m ²	2.40 m
		38.50 m	62.39 m ²	2.40 m

8.0 Living Area	19.14 m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Upgraded External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.25	17.00	202.87	187.37	0.00	None	15.50	Enter Gross Area
	Upgraded Basement Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.20	17.00	55.46	55.46	0.00	None	0.00	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	246.88

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Upgraded Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	62.39	62.39	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	30.75
	Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.39

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Upgraded GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.20	None	0.00	110.00	30.75
	Existing GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.70	None	0.00	110.00	31.64

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	+1	Plasterboard ceiling, carpeted chipboard floor	18.00	30.75
Internal Floor 2	+2	Plasterboard ceiling, carpeted chipboard floor	18.00	62.39

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door				0.63			1.60
Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Door	Door	Upgraded External Wall	West	1.89	
S Glazing	Glazing	Upgraded External Wall	South	2.73	
N Glazing	Glazing	Upgraded External Wall	North	3.19	
N Door	Door	Upgraded External Wall	North	1.89	
E Glazing	Glazing	Upgraded External Wall	East	3.91	
E Door	Door	Upgraded External Wall	East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	10.00	850.00	13

24.0 Main Heating 1

Percentage of Heat

 %

Database Ref. No.

Fuel Type

In Winter

In Summer

Model Name

Manufacturer

System Type

Controls SAP Code

Controls description

Summary for Input Data

Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Enter value
Flow Temperature Value	45.00

25.0 Main Heating 2	None
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26.0 Heat Networks	None
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27.0 Secondary Heating	None
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28.0 Water Heating	
Water Heating	Main Heating 1
SAP Code	901
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	No
Cold Water Source	From mains
Bath Count	0
Immersion Only Heating Hot Water	No

28.1 Showers					
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder		
Cylinder Stat	No		
Cylinder In Heated Space	No		
Independent Time Control	No		
Insulation Type	Measured Loss		
Cylinder Volume	300.00	L	
Loss	1.39	kWh/day	
Pipes insulation	Fully insulated primary pipework		

31.0 Thermal Store	None
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Recommendations	
Lower cost measures	None
Further measures to achieve even higher standards	None

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Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026
Assessment Reference	Proposed Baseline	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	70 C	DER	6.00	TER	
Environmental	94 A	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.97	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	62.17	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

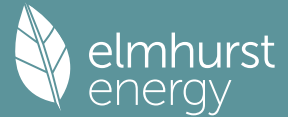
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 118.3191		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges (36a) = 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 194.9411 (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	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Heat transfer coeff	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
Average = Sum(39)m / 12 =												295.1805
HLP	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
HLP (average)												1.8979
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9425 (42)
Hot water usage for mixer showers													82.3846 (42a)
	82.7014	81.4586	79.6475	76.1824	73.6252	70.7734	69.1525	70.9498	72.9201	75.9820	79.5216		
Hot water usage for baths													0.0000 (42b)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
Hot water usage for other uses													47.1203 (42c)
	47.1203	45.4068	43.6934	41.9799	40.2664	38.5530	38.5530	40.2664	41.9799	43.6934	45.4068		
Average daily hot water use (litres/day)													119.0846 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.8217	126.8654	123.3409	118.1623	113.8916	109.3264	107.7055	111.2163	114.9000	119.6754	124.9284	129.5049 (44)	
Energy conte	205.6059	180.6547	189.5704	161.7583	153.3200	134.4296	130.2604	137.7090	141.6832	162.3984	177.9834	202.7733 (45)	
Energy content (annual)													Total = Sum(45)m = 1978.1465
Distribution loss (46)m = 0.15 x (45)m													30.4160 (46)
	30.8409	27.0982	28.4356	24.2637	22.9980	20.1644	19.5391	20.6564	21.2525	24.3598	26.6975		
Water storage loss (or HIU loss):													300.0000 (47)
Store volume													1.3900 (48)
a) If manufacturer declared loss factor is known (kWh/day):													0.7800 (49)
Temperature factor from Table 2b													1.0842 (55)
Enter (49) or (54) in (55)													
Total storage loss													33.6102 (56)
	33.6102	30.3576	33.6102	32.5260	33.6102	32.5260	33.6102	33.6102	32.5260	33.6102	32.5260		
If cylinder contains dedicated solar storage													33.6102 (57)
	33.6102	30.3576	33.6102	32.5260	33.6102	32.5260	33.6102	33.6102	32.5260	33.6102	32.5260		
Primary loss	54.8576	49.5488	54.8576	53.0880	54.8576	22.5120	23.2624	23.2624	22.5120	54.8576	53.0880	54.8576 (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													294.0737 (62)
	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)	
Total per year (kWh/year)													2895.4411 (64)
Electric shower(s)													0.0000 (64a)
	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													111.3082 (65)
	112.2500	99.7067	106.9182	96.2550	94.8650	62.7074	61.9215	64.3982	65.1193	97.8835	101.6499		

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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													206.9833 (67)
	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827		
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													326.4756 (68)
	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)	
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													37.7126 (69)
	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (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)													-117.7006 (71)
	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)	
Water heating gains (Table 5)													150.8737 (72)
	150.8737	148.3731	143.7073	133.6875	127.5067	87.0937	83.2278	86.5567	90.4434	131.5639	141.1804	149.6078 (72)	
Total internal gains	751.4703	774.5342	739.1545	717.8596	681.8373	626.7613	601.5911	601.5321	620.8555	673.2510	712.7091	735.7994 (73)	

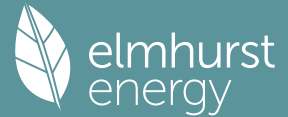
6. Solar gains

[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
North				3.1900	10.6334		0.6300		0.7000		0.7700		10.3666 (74)
East				3.9100	19.6403		0.6300		0.7000		0.7700		23.4691 (76)
South				2.7300	46.7521		0.6300		0.7000		0.7700		39.0063 (78)
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470	(83)
Total gains	824.3122	904.1381	929.8011	974.1732	985.6575	935.3117	896.2155	859.9403	834.2710	820.2132	800.9966	797.4464	(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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462	
alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031	
util living area	0.9775	0.9717	0.9641	0.9464	0.9151	0.8585	0.7775	0.8000	0.8944	0.9481	0.9702	0.9791	(86)
Living	16.6767	16.9514	17.4753	18.3024	19.1344	19.9407	20.4218	20.3590	19.7187	18.6779	17.5995	16.6940	
Non living	14.5026	14.8503	15.5135	16.5653	17.6064	18.6003	19.1310	19.0762	18.3402	17.0450	15.6806	14.5305	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	18.7901	16.9514	17.4753	18.3024	19.1344	19.9407	20.4218	20.3590	19.7187	18.6779	17.5995	17.2966	(87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780	(88)
util rest of house	0.9729	0.9657	0.9558	0.9319	0.8861	0.7923	0.6392	0.6760	0.8450	0.9313	0.9629	0.9748	(89)
MIT 2	17.3915	14.8503	15.5135	16.5653	17.6064	18.6003	19.1310	19.0762	18.3402	17.0450	15.6806	15.3970	(90)
Living area fraction									fLA = Living area /				
MIT	17.5636	15.1088	15.7550	16.7790	17.7945	18.7652	19.2898	19.2340	18.5098	17.2460	15.9167	15.6307	(91)
Temperature adjustment												0.0000	
adjusted MIT	17.5636	15.1088	15.7550	16.7790	17.7945	18.7652	19.2898	19.2340	18.5098	17.2460	15.9167	15.6307	(93)

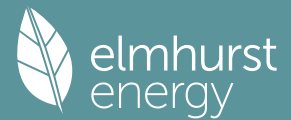
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9661	0.9379	0.9235	0.8922	0.8395	0.7493	0.6194	0.6506	0.7992	0.8921	0.9344	0.9583	(94)
Useful gains	796.3972	848.0250	858.7058	869.1538	827.4329	700.8168	555.1428	559.5155	666.7520	731.7337	748.4537	764.2217	(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	4094.1743	3130.3137	2819.2462	2325.8032	1788.2708	1187.9610	767.1709	803.9830	1271.6738	1950.0932	2618.5161	3437.5237	(97)
Space heating kWh	2453.5461	1533.6980	1458.6421	1048.7876	714.8634	0.0000	0.0000	0.0000	0.0000	906.4594	1346.4449	1988.9367	(98a)
Space heating requirement - total per year (kWh/year)												11451.3784	
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	2453.5461	1533.6980	1458.6421	1048.7876	714.8634	0.0000	0.0000	0.0000	0.0000	906.4594	1346.4449	1988.9367	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11451.3784	
Space heating per m2										(98c) / (4) =		73.6281	(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 %)												278.1687	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement	2453.5461	1533.6980	1458.6421	1048.7876	714.8634	0.0000	0.0000	0.0000	0.0000	906.4594	1346.4449	1988.9367	(98)
Space heating efficiency (main heating system 1)	278.1687	278.1687	278.1687	278.1687	278.1687	0.0000	0.0000	0.0000	0.0000	278.1687	278.1687	278.1687	(210)
Space heating fuel (main heating system)	882.0354	551.3554	524.3732	377.0330	256.9892	0.0000	0.0000	0.0000	0.0000	325.8668	484.0390	715.0110	(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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411	(64)
Efficiency of water heater (217)m	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	(216)
Fuel for water heating, kWh/month	173.4548	153.6879	163.9965	145.9087	142.6148	111.7545	110.3775	114.7710	116.0330	147.9695	155.4789	171.7841	(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	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081	(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												4116.7030	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												169.5391	
Water heating fuel used												1707.8313	(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)												393.4653	(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)

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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	6217.9997 (238)

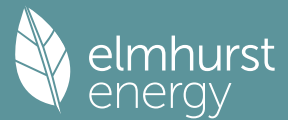
----- 12a. Carbon dioxide emissions - Individual heating systems including micro-CHP -----

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	4116.7030	0.1540	634.0106 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1707.8313	0.1417	241.9196 (264)
Space and water heating			875.9302 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Total CO2, kg/year			932.7194 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.0000 (273)

----- 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	4116.7030	1.5701	6463.6646 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1707.8313	1.5238	2602.4524 (278)
Space and water heating			9066.1170 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Total Primary energy kWh/year			9669.6272 (286)
Dwelling Primary energy Rate (DPER)			62.1700 (287)

Full SAP Calculation Printout



Plot Reference	Plot 1- ASHP				Issued on Date	04/08/2026	
Assessment Reference	Proposed Baseline			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	70 C	DER	6.00	TER			
Environmental	94 A	% DER < TER				N/A	
CO ₂ Emissions (t/year)	0.97	DFEE	77.85	TFEE			
Compliance Check	N/A	% DFEE < TFEE					
% DPER < TPER		DPER	62.17	TPER			
Assessor Details	Mr. Will Hughes				Assessor ID	FJ65-0001	
Client							

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820 (5)

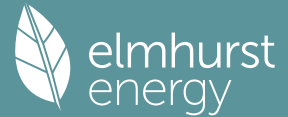
2. Ventilation rate

	m ³ 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	4 * 10 = 40.0000 (7a)											
Number of passive vents	0 * 10 = 0.0000 (7b)											
Number of flueless gas fires	0 * 40 = 0.0000 (7c)											
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)											
Pressure test	No											
Pressure Test Method	Blower Door											
Measured/design AP50	15.0000 (17)											
Infiltration rate	0.8582 (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) = 0.7295 (21)											
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	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)
Adj infilt rate	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)
	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)	0.0000 (23b)											
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =	0.0000 (23c)											
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	118.3191	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$ (28)...(30) + (32) + (32a)...(32e) = 16289.2200 (34)
Thermal mass parameter (TMP = C_m / TFA) in kJ/m²K 104.7336 (35)
Thermal bridges (Default value 0.200 * total exposed area) 76.6220 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 194.9411 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Average = Sum(39)m / 12 =	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
												295.1805
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9425 (42)											
Hot water usage for mixer showers												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths												
31.7548	31.2832	30.6191	29.3945	28.4776	27.4609	26.9118	27.5713	28.2893	29.3772	30.6269	31.6474	(42b)
Hot water usage for other uses												
44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	44.7643	(42c)
Average daily hot water use (litres/day)	70.1365 (43)											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
76.5191	74.4197	72.1278	69.2755	66.7308	64.0863	63.5371	65.8244	68.1702	70.8859	73.7634	76.4117	(44)
Energy content (annual)	121.1875	105.9726	110.8577	94.8346	89.8324	78.8016	76.8426	81.5043	84.0607	96.1915	105.0895	119.6423 (45)
Distribution loss (46)m = 0.15 x (45)m	Total = Sum(45)m = 1164.8174											
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss (or HIU loss):												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(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	(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	(61)
Total heat required for water heating calculated for each month												
103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959	(62)
WWHRS	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	(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	(63c)
FGHRS	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	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m = 990.0948 (64)											
Electric shower(s)	58.9062	52.4859	57.3126	54.6927	55.7190	53.1505	54.9222	55.7190	54.6927	57.3126	56.2349	58.9062 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	670.0548 (64a)											
Heat gains from water heating, kWh/month	40.4789	35.6407	37.8854	33.8255	33.0191	30.0330	30.0596	31.2494	31.5361	34.7688	36.3903	40.1505 (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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (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)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)
Water heating gains (Table 5)	54.4071	53.0367	50.9213	46.9799	44.3806	41.7125	40.4027	42.0019	43.8001	46.7323	50.5420	53.9658 (72)
Total internal gains	655.0037	679.1978	646.3685	631.1520	598.7112	581.3801	558.7660	556.9774	574.2122	588.4195	622.0707	640.1574 (73)

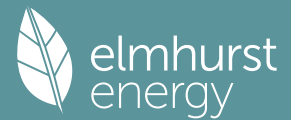
6. Solar gains

[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		
North						3.1900	10.6334	0.6300	0.7000	0.7700	10.3666 (74)	
East						3.9100	19.6403	0.6300	0.7000	0.7700	23.4691 (76)	
South						2.7300	46.7521	0.6300	0.7000	0.7700	39.0063 (78)	
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains	727.8456	808.8017	837.0150	887.4656	902.5313	889.9305	853.3904	815.3855	787.6277	735.3817	710.3582	701.8043 (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	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462

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alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9820	0.9768	0.9702	0.9543	0.9264	0.8685	0.7910	0.8137	0.9036	0.9571	0.9760	0.9834 (86)
MIT	16.5863	16.8631	17.3908	18.2261	19.0672	19.9095	20.3992	20.3336	19.6831	18.6025	17.5144	16.6027 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9783	0.9718	0.9632	0.9418	0.9006	0.8054	0.6560	0.6937	0.8573	0.9428	0.9701	0.9800 (89)
MIT 2	15.4354	15.7155	16.2459	17.0971	17.9298	18.7569	19.1853	19.1410	18.5437	17.4782	16.3883	15.4700 (90)
Living area fraction	15.5770	15.8567	16.3868	17.2360	18.0698	18.8988	19.3347	19.2877	18.6839	17.6165	16.5269	15.6094 (92)
MIT	15.5770	15.8567	16.3868	17.2360	18.0698	18.8988	19.3347	19.2877	18.6839	17.6165	16.5269	15.6094 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9638	0.9543	0.9423	0.9148	0.8672	0.7730	0.6422	0.6751	0.8234	0.9166	0.9522	0.9666 (94)
Useful gains	701.5160	771.8518	788.6957	811.8228	782.6822	687.8944	548.0841	550.4958	648.5492	674.0740	676.4149	678.3626 (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	3480.9631	3359.6392	3011.7100	2460.7051	1869.0529	1226.0517	779.9671	819.2201	1321.8831	2058.8251	2799.7401	3431.1049 (97)
Space heating kWh	2067.9086	1738.9931	1653.9226	1187.1953	808.2598	0.0000	0.0000	0.0000	0.0000	1030.2548	1528.7941	2048.0402 (98a)
Space heating requirement - total per year (kWh/year)												12063.3685
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	2067.9086	1738.9931	1653.9226	1187.1953	808.2598	0.0000	0.0000	0.0000	0.0000	1030.2548	1528.7941	2048.0402 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												12063.3685
Space heating per m2												77.5630 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	2680.9738	2110.5539	2156.0349	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.3175	0.3749	0.3548	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	851.2152	791.3494	764.9385	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	920.9546	883.3263	843.4058	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	50.2124	68.4308	58.3797	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	12.5531	17.1077	14.5949	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												44.2557 (107)
Energy for space heating												77.5630 (99)
Energy for space cooling												0.2845 (108)
Total												77.8475 (109)
Fabric Energy Efficiency (DFEE)												77.8 (109)

Full SAP Calculation Printout



Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026
Assessment Reference	Proposed Baseline	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	70 C	DER	6.00	TER	
Environmental	94 A	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.97	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	62.17	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

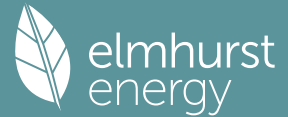
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 118.3191		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges (36a) = 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 194.9411 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 308.6768 306.6282 304.6203 295.1889 293.4244 285.2100 285.2100 283.6888 288.3740 293.4244 296.9941 300.7261 (39)
295.1805
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 1.9847 1.9715 1.9586 1.8980 1.8866 1.8338 1.8338 1.8240 1.8541 1.8866 1.9096 1.9336 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31
1.8979
31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m 30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (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) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 751.4703 774.5342 739.1545 717.8596 681.8373 626.7613 601.5911 601.5321 620.8555 673.2510 712.7091 735.7994 (73)

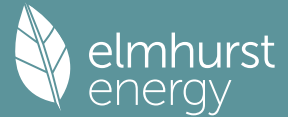
6. Solar gains

[Jan] Area Solar flux g Specific data FF Access Gains
m2 Table 6a W/m2 or Table 6b or Table 6c factor Table 6d W
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 824.3122 904.1381 929.8011 974.1732 985.6575 935.3117 896.2155 859.9403 834.2710 820.2132 800.9966 797.4464 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462	
alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031	
util living area	0.9775	0.9717	0.9641	0.9464	0.9151	0.8585	0.7775	0.8000	0.8944	0.9481	0.9702	0.9791	(86)
Living	16.6767	16.9514	17.4753	18.3024	19.1344	19.9407	20.4218	20.3590	19.7187	18.6779	17.5995	16.6940	
Non living	14.5026	14.8503	15.5135	16.5653	17.6064	18.6003	19.1310	19.0762	18.3402	17.0450	15.6806	14.5305	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	18.7901	16.9514	17.4753	18.3024	19.1344	19.9407	20.4218	20.3590	19.7187	18.6779	17.5995	17.2966	(87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780	(88)
util rest of house	0.9729	0.9657	0.9558	0.9319	0.8861	0.7923	0.6392	0.6760	0.8450	0.9313	0.9629	0.9748	(89)
MIT 2	17.3915	14.8503	15.5135	16.5653	17.6064	18.6003	19.1310	19.0762	18.3402	17.0450	15.6806	15.3970	(90)
Living area fraction									fLA = Living area /				(91)
MIT	17.5636	15.1088	15.7550	16.7790	17.7945	18.7652	19.2898	19.2340	18.5098	17.2460	15.9167	15.6307	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5636	15.1088	15.7550	16.7790	17.7945	18.7652	19.2898	19.2340	18.5098	17.2460	15.9167	15.6307	(93)

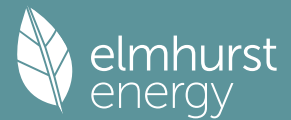
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9661	0.9379	0.9235	0.8922	0.8395	0.7493	0.6194	0.6506	0.7992	0.8921	0.9344	0.9583	(94)
Useful gains	796.3972	848.0250	858.7058	869.1538	827.4329	700.8168	555.1428	559.5155	666.7520	731.7337	748.4537	764.2217	(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	4094.1743	3130.3137	2819.2462	2325.8032	1788.2708	1187.9610	767.1709	803.9830	1271.6738	1950.0932	2618.5161	3437.5237	(97)
Space heating kWh	2453.5461	1533.6980	1458.6421	1048.7876	714.8634	0.0000	0.0000	0.0000	0.0000	906.4594	1346.4449	1988.9367	(98a)
Space heating requirement - total per year (kWh/year)												11451.3784	
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	2453.5461	1533.6980	1458.6421	1048.7876	714.8634	0.0000	0.0000	0.0000	0.0000	906.4594	1346.4449	1988.9367	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11451.3784	
Space heating per m2										(98c) / (4) =		73.6281	(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 %)													278.1687	(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	2453.5461	1533.6980	1458.6421	1048.7876	714.8634	0.0000	0.0000	0.0000	0.0000	906.4594	1346.4449	1988.9367	(98)	
Space heating efficiency (main heating system 1)	278.1687	278.1687	278.1687	278.1687	278.1687	0.0000	0.0000	0.0000	0.0000	278.1687	278.1687	278.1687	(210)	
Space heating fuel (main heating system)	882.0354	551.3554	524.3732	377.0330	256.9892	0.0000	0.0000	0.0000	0.0000	325.8668	484.0390	715.0110	(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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411	(64)	
Efficiency of water heater	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	(216)	
Fuel for water heating, kWh/month	173.4548	153.6879	163.9965	145.9087	142.6148	111.7545	110.3775	114.7710	116.0330	147.9695	155.4789	171.7841	(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	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081	(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													4116.7030	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													169.5391	
Water heating fuel used													1707.8313	(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)													393.4653	(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)

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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	6217.9997 (238)

----- 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	4116.7030	0.1540	634.0106 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1707.8313	0.1417	241.9196 (264)
Space and water heating			875.9302 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Total CO2, kg/year			932.7194 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.0000 (273)

----- 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	4116.7030	1.5701	6463.6646 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1707.8313	1.5238	2602.4524 (278)
Space and water heating			9066.1170 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Total Primary energy kWh/year			9669.6272 (286)
Dwelling Primary energy Rate (DPER)			62.1700 (287)

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Hinckley
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LE10 0PJ
Tel: 01455 634 855
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Website: www.ukbuildingcompliance.co.uk

4th August 2026

To whom it may concern,

Part L Justification Statement in support of proposed conversion at Basement Conversion, 10 Tottington Road, Bury, BL8 1LH- Option 1, Be Lean.

In accordance with the criteria set out In Approved Document Part L we have used SAP10 to model the dwelling to a notional standard and the dwelling to the proposed standard. The SAP Output Reports for both scenarios are appended to this Statement.

The Notional Dwelling has a Dwelling CO2 Emission Rate of 24.85 kg/ m².
The Notional Dwelling has a Dwelling Fabric Energy Efficiency of 82.42 kWh/ m².
The Notional Dwelling has a Dwelling Primary Energy Rate of 135.85 kWh/ m².

The Proposed Dwelling has a Dwelling CO2 Emission Rate of 20.34 kg/ m².
The Proposed Dwelling has a Dwelling Fabric Energy Efficiency of 77.85 kWh/ m².
The Proposed Dwelling has a Dwelling Primary Energy Rate of 111.77 kWh/ m².

The proposed dwelling is more efficient than the notional dwelling and therefore compliant with regulations.

If any information contained in this report is unclear or requires additional explanation please do not hesitate to contact a member of our team.

Regards

Will Hughes

Environmental Consultant

UK Building Compliance

NOTIONAL DWELLING REPORT

Summary for Input Data

Plot Reference	Plot 1- Gas	Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	76 C	DER	24.85	TER	
Environmental	74 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	4.08	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	135.85	TPER	

Assessor Details	Mr. Will Hughes	Assessor ID	FJ65-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	West
Property Tenure	ND
Transaction Type	5
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
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	104.73 kJ/m ² K
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.96 m	30.75 m ²	2.28 m
	2nd Storey:	38.50 m	62.39 m ²	2.40 m
		38.50 m	62.39 m ²	2.40 m

8.0 Living Area	19.14 m ²
-----------------	----------------------

9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Upgraded External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	202.87	187.37	0.00	None	15.50	Enter Gross Area
	Upgraded Basement Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	55.46	55.46	0.00	None	0.00	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	246.88

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Upgraded Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	62.39	62.39	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	30.75
	Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.39

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Upgraded GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.25	None	0.00	110.00	30.75
	Existing GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.70	None	0.00	110.00	31.64

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	+1	Plasterboard ceiling, carpeted chipboard floor	18.00	30.75
Internal Floor 2	+2	Plasterboard ceiling, carpeted chipboard floor	18.00	62.39

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door				0.63			1.80
Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.60

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Door	Door	Upgraded External Wall	West	1.89	
S Glazing	Glazing	Upgraded External Wall	South	2.73	
N Glazing	Glazing	Upgraded External Wall	North	3.19	
N Door	Door	Upgraded External Wall	North	1.89	
E Glazing	Glazing	Upgraded External Wall	East	3.91	
E Door	Door	Upgraded External Wall	East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	10.00	850.00	13

24.0 Main Heating 1

Percentage of Heat

 %

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Controls description

Delayed Start Stat

Flue Type

Fan Assisted Flue

Summary for Input Data

Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	No

25.0 Main Heating 2	None
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26.0 Heat Networks	None
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27.0 Secondary Heating	None
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28.0 Water Heating	
Water Heating	Main Heating 1
SAP Code	901
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	No
Cold Water Source	From mains
Bath Count	0

28.1 Showers					
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System	
--	--

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	300.00	L
Loss	1.39	kWh/day
Pipes insulation	Fully insulated primary pipework	

31.0 Thermal Store	None
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Recommendations	
Lower cost measures	None
Further measures to achieve even higher standards	None

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	76 C	DER	24.85	TER	
Environmental	74 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	4.08	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	135.85	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

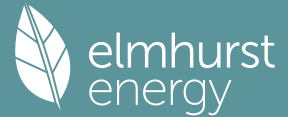
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 137.6549		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 328.0125 325.9640 323.9560 314.5247 312.7601 304.5457 304.5457 303.0246 307.7098 312.7601 316.3298 320.0618 (39)
314.5163
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 2.1090 2.0958 2.0829 2.0223 2.0109 1.9581 1.9581 1.9483 1.9785 2.0109 2.0339 2.0579 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m 30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 754.4703 777.5342 742.1545 720.8596 684.8373 626.7613 601.5911 601.5321 620.8555 676.2510 715.7091 738.7994 (73)

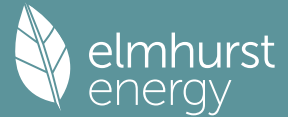
6. Solar gains

[Jan] Area Solar flux g FF Access Gains
m2 Table 6a Specific data Specific data Access factor W
W/m2 or Table 6b or Table 6c Table 6d
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 827.3122 907.1381 932.8011 977.1732 988.6575 935.3117 896.2155 859.9403 834.2710 823.2132 803.9966 800.4464 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372
alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9774	0.9717	0.9644	0.9473	0.9174	0.8643	0.7875	0.8089	0.8982	0.9489	0.9702	0.9789 (86)
MIT	16.5131	16.7899	17.3246	18.1663	19.0245	19.8578	20.3649	20.2989	19.6320	18.5607	17.4527	16.5242 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9726	0.9655	0.9559	0.9325	0.8880	0.7970	0.6442	0.6810	0.8481	0.9317	0.9627	0.9745 (89)
MIT 2	14.2836	14.6312	15.3065	16.3716	17.4419	18.4662	19.0265	18.9682	18.2023	16.8733	15.4769	14.3027 (90)
Living area fraction	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	FLA = Living area / (4) =	17.0809	15.7200	0.1231 (91)
MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (92)
Temperature adjustment												0.0000
adjusted MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9481	0.9370	0.9227	0.8917	0.8397	0.7515	0.6225	0.6534	0.8003	0.8913	0.9333	0.9514 (94)
Useful gains	784.3784	849.9738	860.6804	871.3259	830.1732	702.8877	557.8867	561.8994	667.6565	733.7681	750.3799	761.5523 (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	3364.7332	3258.5673	2933.3630	2419.4708	1856.7627	1229.5949	789.1438	827.8458	1316.4553	2026.9811	2726.7716	3320.9835 (97)
Space heating kWh	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98a)
Space heating requirement - total per year (kWh/year)												11248.2509
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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11248.2509
Space heating per m2										(98c) / (4) =		72.3221 (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 %)	79.0000 (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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98)
Space heating efficiency (main heating system 1)	79.0000	79.0000	79.0000	79.0000	79.0000	0.0000	0.0000	0.0000	0.0000	79.0000	79.0000	79.0000 (210)
Space heating fuel (main heating system)	2430.1063	2048.8288	1951.9948	1410.9675	966.8135	0.0000	0.0000	0.0000	0.0000	1217.9120	1801.2683	2410.4010 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)
Efficiency of water heater (217)m	77.5188	77.4550	77.3011	76.9878	76.3565	69.0000	69.0000	69.0000	69.0000	76.7162	77.2626	77.5207 (217)
Fuel for water heating, kWh/month	379.3581	336.4033	359.6822	321.3137	316.6566	274.5907	271.2073	282.0023	285.1032	327.0053	341.1708	375.6947 (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	3.4822	3.1452	3.4822	3.3699	3.4822	3.3699	3.4822	3.4822	3.3699	3.4822	3.3699	3.4822 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (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												14238.2922 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												74.0000
Water heating fuel used												3870.1882 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans: central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												41.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (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)

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Total delivered energy for all uses

18542.9458 (238)

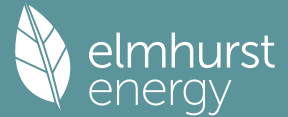
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	14238.2922	0.2100	2990.0414	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3870.1882	0.2100	812.7395	(264)
Space and water heating			3802.7809	(265)
Pumps, fans and electric keep-hot	41.0000	0.1387	5.6872	(267)
Energy for lighting	393.4653	0.1443	56.7892	(268)
Total CO2, kg/year			3865.2573	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			24.8500	(273)

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	14238.2922	1.1300	16089.2702	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3870.1882	1.1300	4373.3127	(278)
Space and water heating			20462.5829	(279)
Pumps, fans and electric keep-hot	41.0000	1.5128	62.0248	(281)
Energy for lighting	393.4653	1.5338	603.5102	(282)
Total Primary energy kWh/year			21128.1180	(286)
Dwelling Primary energy Rate (DPER)			135.8500	(287)

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Plot Reference	Plot 1- Gas				Issued on Date	04/08/2026	
Assessment Reference	Notional			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	76 C		DER	24.85		TER	
Environmental	74 C		% DER < TER				N/A
CO ₂ Emissions (t/year)	4.08		DFEE	82.42		TFEE	
Compliance Check	N/A		% DFEE < TFEE				
% DPER < TPER			DPER	135.85		TPER	
Assessor Details	Mr. Will Hughes				Assessor ID	FJ65-0001	
Client							

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820 (5)

2. Ventilation rate

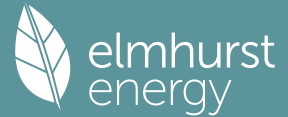
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)

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Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K
Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges
Total fabric heat loss

(28)...(30) + (32) + (32a)...(32e) = 16289.2200 (34)
104.7336 (35)
76.6220 (36)
(36a) = 0.0000
(33) + (36) + (36a) = 214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Average = Sum(39)m / 12 =	328.0125	325.9640	323.9560	314.5247	312.7601	304.5457	304.5457	303.0246	307.7098	312.7601	316.3298	320.0618 (39)
												314.5163
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.1090	2.0958	2.0829	2.0223	2.0109	1.9581	1.9581	1.9483	1.9785	2.0109	2.0339	2.0579 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9425 (42)											
Hot water usage for mixer showers	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42a)											
Hot water usage for baths	31.7548	31.2832	30.6191	29.3945	28.4776	27.4609	26.9118	27.5713	28.2893	29.3772	30.6269	31.6474 (42b)
Hot water usage for other uses	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	44.7643 (42c)
Average daily hot water use (litres/day)	70.1365 (43)											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	76.5191	74.4197	72.1278	69.2755	66.7308	64.0863	63.5371	65.8244	68.1702	70.8859	73.7634	76.4117 (44)
Energy content (annual)	121.1875	105.9726	110.8577	94.8346	89.8324	78.8016	76.8426	81.5043	84.0607	96.1915	105.0895	119.6423 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (46)											
Water storage loss (or HIU 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 (56)											
Total storage 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 (57)											
If cylinder contains dedicated solar storage	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)											
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	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959 (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	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959 (64)
12Total per year (kWh/year)	990.0948 (64)											
Electric shower(s)	58.9062	52.4859	57.3126	54.6927	55.7190	53.1505	54.9222	55.7190	54.6927	57.3126	56.2349	58.9062 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	670.0548 (64a)											
Heat gains from water heating, kWh/month	40.4789	35.6407	37.8854	33.8255	33.0191	30.0330	30.0596	31.2494	31.5361	34.7688	36.3903	40.1505 (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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (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)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)
Water heating gains (Table 5)	54.4071	53.0367	50.9213	46.9799	44.3806	41.7125	40.4027	42.0019	43.8001	46.7323	50.5420	53.9658 (72)
Total internal gains	655.0037	679.1978	646.3685	631.1520	598.7112	581.3801	558.7660	556.9774	574.2122	588.4195	622.0707	640.1574 (73)

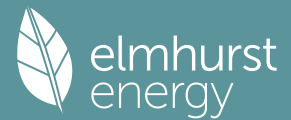
6. Solar gains

[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		
North						3.1900	10.6334	0.6300	0.7000	0.7700	10.3666 (74)	
East						3.9100	19.6403	0.6300	0.7000	0.7700	23.4691 (76)	
South						2.7300	46.7521	0.6300	0.7000	0.7700	39.0063 (78)	
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains	727.8456	808.8017	837.0150	887.4656	902.5313	889.9305	853.3904	815.3855	787.6277	735.3817	710.3582	701.8043 (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	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372

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alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9819	0.9768	0.9704	0.9551	0.9286	0.8738	0.8003	0.8219	0.9069	0.9578	0.9761	0.9833 (86)
MIT	16.4229	16.7008	17.2401	18.0896	18.9564	19.8270	20.3421	20.2734	19.5971	18.4849	17.3676	16.4332 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9781	0.9717	0.9633	0.9424	0.9024	0.8096	0.6607	0.6982	0.8599	0.9433	0.9699	0.9798 (89)
MIT 2	15.2298	15.5108	16.0526	16.9173	17.7759	18.6309	19.0839	19.0366	18.4142	17.3172	16.1982	15.2575 (90)
Living area fraction	15.3766	15.6573	16.1988	17.0616	17.9212	18.7781	19.2387	19.1888	18.5598	17.4609	16.3421	15.4022 (92)
MIT	15.3766	15.6573	16.1988	17.0616	17.9212	18.7781	19.2387	19.1888	18.5598	17.4609	16.3421	15.4022 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9631	0.9537	0.9418	0.9146	0.8679	0.7753	0.6454	0.6780	0.8246	0.9163	0.9515	0.9659 (94)
Useful gains	701.0206	771.3560	788.2740	811.7127	783.3114	689.9925	550.7977	552.8355	649.4639	673.8380	675.9288	677.8543 (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	3633.2684	3506.4783	3141.9722	2567.0169	1945.7355	1272.4148	803.6196	845.0830	1372.3235	2145.8044	2923.5649	3585.3854 (97)
Space heating kWh	2181.5923	1838.0022	1751.1515	1263.8190	864.8435	0.0000	0.0000	0.0000	0.0000	1095.1430	1618.2980	2163.2031 (98a)
Space heating requirement - total per year (kWh/year)												12776.0528
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	2181.5923	1838.0022	1751.1515	1263.8190	864.8435	0.0000	0.0000	0.0000	0.0000	1095.1430	1618.2980	2163.2031 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												12776.0528
Space heating per m2										(98c) / (4) =		82.1453 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	2862.7300	2253.6385	2302.9866	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.2981	0.3526	0.3333	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	853.3276	794.6892	767.6502	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	920.9546	883.3263	843.4058	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	48.6914	65.9460	56.3622	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	12.1729	16.4865	14.0905	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												42.7499 (107)
Energy for space heating												82.1453 (99)
Energy for space cooling												0.2749 (108)
Total												82.4201 (109)
Fabric Energy Efficiency (DFEE)												82.4 (109)

Full SAP Calculation Printout



Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	76 C	DER	24.85	TER	
Environmental	74 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	4.08	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	135.85	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

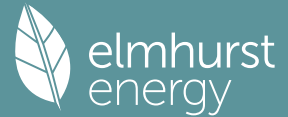
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 328.0125 325.9640 323.9560 314.5247 312.7601 304.5457 304.5457 303.0246 307.7098 312.7601 316.3298 320.0618 (39)
314.5163
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 2.1090 2.0958 2.0829 2.0223 2.0109 1.9581 1.9581 1.9483 1.9785 2.0109 2.0339 2.0579 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m 30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 754.4703 777.5342 742.1545 720.8596 684.8373 626.7613 601.5911 601.5321 620.8555 676.2510 715.7091 738.7994 (73)

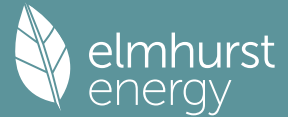
6. Solar gains

[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
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 827.3122 907.1381 932.8011 977.1732 988.6575 935.3117 896.2155 859.9403 834.2710 823.2132 803.9966 800.4464 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372
alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9774	0.9717	0.9644	0.9473	0.9174	0.8643	0.7875	0.8089	0.8982	0.9489	0.9702	0.9789 (86)
MIT	16.5131	16.7899	17.3246	18.1663	19.0245	19.8578	20.3649	20.2989	19.6320	18.5607	17.4527	16.5242 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9726	0.9655	0.9559	0.9325	0.8880	0.7970	0.6442	0.6810	0.8481	0.9317	0.9627	0.9745 (89)
MIT 2	14.2836	14.6312	15.3065	16.3716	17.4419	18.4662	19.0265	18.9682	18.2023	16.8733	15.4769	14.3027 (90)
Living area fraction	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	FLA = Living area / (4) =	17.0809	15.7200	0.1231 (91)
MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (92)
Temperature adjustment												0.0000
adjusted MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9481	0.9370	0.9227	0.8917	0.8397	0.7515	0.6225	0.6534	0.8003	0.8913	0.9333	0.9514 (94)
Useful gains	784.3784	849.9738	860.6804	871.3259	830.1732	702.8877	557.8867	561.8994	667.6565	733.7681	750.3799	761.5523 (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	3364.7332	3258.5673	2933.3630	2419.4708	1856.7627	1229.5949	789.1438	827.8458	1316.4553	2026.9811	2726.7716	3320.9835 (97)
Space heating kWh	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98a)
Space heating requirement - total per year (kWh/year)												11248.2509
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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11248.2509
Space heating per m2										(98c) / (4) =		72.3221 (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 %)	79.0000	(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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98)
Space heating efficiency (main heating system 1)	79.0000	79.0000	79.0000	79.0000	79.0000	0.0000	0.0000	0.0000	0.0000	79.0000	79.0000	79.0000 (210)
Space heating fuel (main heating system)	2430.1063	2048.8288	1951.9948	1410.9675	966.8135	0.0000	0.0000	0.0000	0.0000	1217.9120	1801.2683	2410.4010 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)
Efficiency of water heater (217)m	77.5188	77.4550	77.3011	76.9878	76.3565	69.0000	69.0000	69.0000	69.0000	76.7162	77.2626	77.5207 (217)
Fuel for water heating, kWh/month	379.3581	336.4033	359.6822	321.3137	316.6566	274.5907	271.2073	282.0023	285.1032	327.0053	341.1708	375.6947 (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	3.4822	3.1452	3.4822	3.3699	3.4822	3.3699	3.4822	3.4822	3.3699	3.4822	3.3699	3.4822 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (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												14238.2922 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												74.0000
Water heating fuel used												3870.1882 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans: central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												41.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (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)

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Total delivered energy for all uses

18542.9458 (238)

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	14238.2922	0.2100	2990.0414	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3870.1882	0.2100	812.7395	(264)
Space and water heating			3802.7809	(265)
Pumps, fans and electric keep-hot	41.0000	0.1387	5.6872	(267)
Energy for lighting	393.4653	0.1443	56.7892	(268)
Total CO2, kg/year			3865.2573	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			24.8500	(273)

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	14238.2922	1.1300	16089.2702	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3870.1882	1.1300	4373.3127	(278)
Space and water heating			20462.5829	(279)
Pumps, fans and electric keep-hot	41.0000	1.5128	62.0248	(281)
Energy for lighting	393.4653	1.5338	603.5102	(282)
Total Primary energy kWh/year			21128.1180	(286)
Dwelling Primary energy Rate (DPER)			135.8500	(287)

PROPOSED DWELLING REPORT

Summary for Input Data

Plot Reference	Plot 1- Gas	Issued on Date	04/08/2026
Assessment Reference	Proposed- Baseline	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	20.34	TER	
Environmental	79 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	3.34	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	111.77	TPER	

Assessor Details	Mr. Will Hughes	Assessor ID	FJ65-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	West	
Property Tenture	ND	
Transaction Type	5	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	3	
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	104.73	kJ/m²

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.96 m	30.75 m ²	2.28 m
	2nd Storey:	38.50 m	62.39 m ²	2.40 m
		38.50 m	62.39 m ²	2.40 m

8.0 Living Area	19.14	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Upgraded External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.25	17.00	202.87	187.37	0.00	None	15.50	Enter Gross Area
	Upgraded Basement Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.20	17.00	55.46	55.46	0.00	None	0.00	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	246.88

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Upgraded Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	62.39	62.39	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	30.75
	Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.39

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Upgraded GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.20	None	0.00	110.00	30.75
	Existing GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.70	None	0.00	110.00	31.64

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	+1	Plasterboard ceiling, carpeted chipboard floor	18.00	30.75
Internal Floor 2	+2	Plasterboard ceiling, carpeted chipboard floor	18.00	62.39

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door				0.63			1.60
Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Door	Door	Upgraded External Wall	West	1.89	
S Glazing	Glazing	Upgraded External Wall	South	2.73	
N Glazing	Glazing	Upgraded External Wall	North	3.19	
N Door	Door	Upgraded External Wall	North	1.89	
E Glazing	Glazing	Upgraded External Wall	East	3.91	
E Door	Door	Upgraded External Wall	East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	10.00	850.00	13

24.0 Main Heating 1

Percentage of Heat

 %

Database Ref. No.

Fuel Type

In Winter

In Summer

Model Name

Manufacturer

System Type

Controls SAP Code

Controls description

Summary for Input Data

Delayed Start Stat	Yes
Flue Type	Balanced
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	Yes

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
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
Cold Water Source	From mains
Bath Count	0

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Cylinder Volume	300.00
Loss	2.04
Pipes insulation	Fully insulated primary pipework

L
kWh/day

31.0 Thermal Store

None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Proposed- Baseline	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	80 C	DER	20.34	TER	
Environmental	79 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	3.34	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	111.77	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)... (3n)	= 369.5820 (5)

2. Ventilation rate

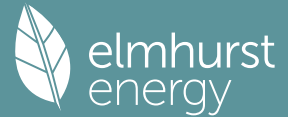
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 118.3191		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
 Point Thermal bridges (36a) = 76.6220 (36)
 Total fabric heat loss (33) + (36) + (36a) = 194.9411 (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	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Heat transfer coeff	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
Average = Sum(39)m / 12 =												295.1805
HLP	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
HLP (average)												1.8979
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9425 (42)
Hot water usage for mixer showers												82.3846 (42a)
	82.7014	81.4586	79.6475	76.1824	73.6252	70.7734	69.1525	70.9498	72.9201	75.9820	79.5216	
Hot water usage for baths												0.0000 (42b)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Hot water usage for other uses												44.7643 (42c)
	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	116.9427 (43)
Average daily hot water use (litres/day)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	127.4657	124.5951	121.1562	116.0633	111.8783	107.3988	105.7778	109.2030	112.8010	117.4907	122.6581	127.1488 (44)
Energy conte	201.8745	177.4217	186.2126	158.8848	150.6097	132.0593	127.9291	135.2161	139.0949	159.4338	174.7489	199.0844 (45)
Energy content (annual)												Total = Sum(45)m = 1942.5699
Distribution loss (46)m = 0.15 x (45)m												29.8627 (46)
	30.2812	26.6133	27.9319	23.8327	22.5915	19.8089	19.1894	20.2824	20.8642	23.9151	26.2123	
Water storage loss (or HIU loss):												300.0000 (47)
Store volume												2.0400 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												1.1016 (55)
Enter (49) or (54) in (55)												
Total storage loss												34.1496 (56)
	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	
If cylinder contains dedicated solar storage												34.1496 (57)
	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	
Primary loss												23.2624 (59)
	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	
Combi loss												0.0000 (61)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Total heat required for water heating calculated for each month												
	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (62)
WWHRS												0.0000 (63a)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
PV diverter												0.0000 (63b)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Solar input												0.0000 (63c)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
FGHRS												0.0000 (63d)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Output from w/h												
	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (64)
Total per year (kWh/year)												2618.5499 (64)
												2619
12Total per year (kWh/year)												
Electric shower(s)												0.0000 (64a)
	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												
	113.0529	100.4775	107.8453	97.2772	96.0073	88.3577	88.4660	90.8889	90.6971	98.9413	102.5520	112.1252 (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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (69)
Pumps, fans												
	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)
Water heating gains (Table 5)												
	151.9528	149.5201	144.9533	135.1072	129.0421	122.7191	118.9060	122.1626	125.9681	132.9857	142.4334	150.7059 (72)
Total internal gains												
	755.5494	778.6813	743.4006	722.2794	686.3727	662.3867	637.2692	637.1380	656.3802	677.6728	716.9620	739.8974 (73)

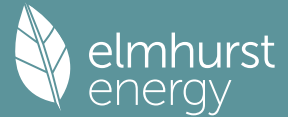
6. Solar gains

[Jan]												Gains	
					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d			W	
North					3.1900	10.6334	0.6300	0.7000	0.7700			10.3666 (74)	
East					3.9100	19.6403	0.6300	0.7000	0.7700			23.4691 (76)	
South					2.7300	46.7521	0.6300	0.7000	0.7700			39.0063 (78)	
Solar gains		72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains		828.3913	908.2851	934.0471	978.5929	990.1929	970.9371	931.8937	895.5462	869.7957	824.6350	805.2495	801.5444 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462
alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9773	0.9714	0.9639	0.9459	0.9145	0.8506	0.7665	0.7892	0.8874	0.9476	0.9699	0.9789 (86)
MIT	16.6805	16.9552	17.4791	18.3063	19.1380	19.9644	20.4398	20.3785	19.7451	18.6817	17.6034	16.6979 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9726	0.9654	0.9555	0.9314	0.8853	0.7822	0.6256	0.6623	0.8357	0.9307	0.9626	0.9746 (89)
MIT 2	14.5074	14.8550	15.5183	16.5699	17.6106	18.6245	19.1444	19.0918	18.3688	17.0497	15.6855	14.5354 (90)
Living area fraction	14.7748	15.1135	15.7596	16.7836	17.7986	18.7894	19.3038	19.2501	18.5382	17.2506	15.9215	14.8015 (92)
MIT												-0.1500
Temperature adjustment												
adjusted MIT	14.6248	14.9635	15.6096	16.6336	17.6486	18.6394	19.1538	19.1001	18.3882	17.1006	15.7715	14.6515 (93)

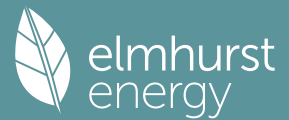
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9475	0.9360	0.9210	0.8883	0.8329	0.7285	0.5873	0.6197	0.7804	0.8875	0.9320	0.9509 (94)
Useful gains	784.8940	850.1278	860.2489	869.2914	824.7503	707.3241	547.3452	554.9714	678.8134	731.8493	750.4741	762.2226 (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	3187.0256	3085.7404	2774.9638	2282.8762	1745.4662	1152.0649	728.3712	765.9894	1236.6093	1907.4260	2575.3927	3143.0332 (97)
Space heating kWh	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98a)
Space heating requirement - total per year (kWh/year)												10376.7527
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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												10376.7527
Space heating per m2										(98c) / (4) =		66.7187 (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 %)												89.0000 (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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98)
Space heating efficiency (main heating system 1)	89.0000	89.0000	89.0000	89.0000	89.0000	0.0000	0.0000	0.0000	0.0000	89.0000	89.0000	89.0000 (210)
Space heating fuel (main heating system)	2008.0741	1688.0131	1600.6157	1143.5742	769.6771	0.0000	0.0000	0.0000	0.0000	982.7293	1476.3386	1990.2507 (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	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (64)
Efficiency of water heater (217)m	87.7493	87.6937	87.5614	87.2910	86.7273	80.0000	80.0000	80.0000	80.0000	87.0543	87.5314	87.7513 (217)
Fuel for water heating, kWh/month	295.4857	261.4528	278.2329	245.6667	239.8573	234.5241	231.6764	240.7851	243.3186	249.0926	263.1158	292.2992 (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	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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												11659.2727 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												80.0000
Water heating fuel used												3075.5074 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
central heating pump												41.0000 (230c)
main heating flue fan												45.0000 (230e)
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (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)

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Energy used	0.0000 (237)
Total delivered energy for all uses	15214.2455 (238)

----- 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	11659.2727	0.2100	2448.4473 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3075.5074	0.2100	645.8566 (264)
Space and water heating			3094.3038 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Total CO2, kg/year			3163.0223 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			20.3400 (273)

----- 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	11659.2727	1.1300	13174.9782 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3075.5074	1.1300	3475.3234 (278)
Space and water heating			16650.3016 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Total Primary energy kWh/year			17383.9126 (286)
Dwelling Primary energy Rate (DPER)			111.7700 (287)

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Proposed- Baseline	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	80 C	DER	20.34	TER	
Environmental	79 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	3.34	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	111.77	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820 (5)

2. Ventilation rate

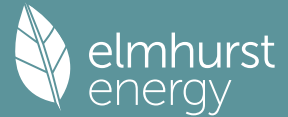
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	118.3191	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$
 Thermal mass parameter ($\text{TMP} = C_m / \text{TFA}$) in $\text{kJ/m}^2\text{K}$
 Thermal bridges (Default value $0.200 \times \text{total exposed area}$)
 Point Thermal bridges
 Total fabric heat loss

$(28) \dots (30) + (32) + (32a) \dots (32e) = 16289.2200$ (34)
 104.7336 (35)
 76.6220 (36)
 $(36a) = 0.0000$
 $(33) + (36) + (36a) = 194.9411$ (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850
Average = $\text{Sum}(39)\text{m} / 12 =$	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261
												295.1805
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9425											
Hot water usage for mixer showers	0.0000											
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hot water usage for other uses	31.7548	31.2832	30.6191	29.3945	28.4776	27.4609	26.9118	27.5713	28.2893	29.3772	30.6269	31.6474
Average daily hot water use (litres/day)	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	44.7643
												70.1365
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	76.5191	74.4197	72.1278	69.2755	66.7308	64.0863	63.5371	65.8244	68.1702	70.8859	73.7634	76.4117
Energy content (annual)	121.1875	105.9726	110.8577	94.8346	89.8324	78.8016	76.8426	81.5043	84.0607	96.1915	105.0895	119.6423
Distribution loss (46)m = $0.15 \times (45)\text{m}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water storage loss (or HIU 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
Total storage 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
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
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
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
Total heat required for water heating calculated for each month	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959
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
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
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
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
Output from w/h	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959
12Total per year (kWh/year)	Total per year (kWh/year) = $\text{Sum}(64)\text{m} =$											
Electric shower(s)	58.9062	52.4859	57.3126	54.6927	55.7190	53.1505	54.9222	55.7190	54.6927	57.3126	56.2349	58.9062
Heat gains from water heating, kWh/month	40.4789	35.6407	37.8854	33.8255	33.0191	30.0330	30.0596	31.2494	31.5361	34.7688	36.3903	40.1505

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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126
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
Losses e.g. evaporation (negative values) (Table 5)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006
Water heating gains (Table 5)	54.4071	53.0367	50.9213	46.9799	44.3806	41.7125	40.4027	42.0019	43.8001	46.7323	50.5420	53.9658
Total internal gains	655.0037	679.1978	646.3685	631.1520	598.7112	581.3801	558.7660	556.9774	574.2122	588.4195	622.0707	640.1574

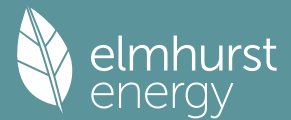
6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	3.1900	10.6334	0.6300	0.7000	0.7700	10.3666
East	3.9100	19.6403	0.6300	0.7000	0.7700	23.4691
South	2.7300	46.7521	0.6300	0.7000	0.7700	39.0063
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504
Total gains	727.8456	808.8017	837.0150	887.4656	902.5313	889.9305

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000											
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	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462

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alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9820	0.9768	0.9702	0.9543	0.9264	0.8685	0.7910	0.8137	0.9036	0.9571	0.9760	0.9834 (86)
MIT	16.5863	16.8631	17.3908	18.2261	19.0672	19.9095	20.3992	20.3336	19.6831	18.6025	17.5144	16.6027 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9783	0.9718	0.9632	0.9418	0.9006	0.8054	0.6560	0.6937	0.8573	0.9428	0.9701	0.9800 (89)
MIT 2	15.4354	15.7155	16.2459	17.0971	17.9298	18.7569	19.1853	19.1410	18.5437	17.4782	16.3883	15.4700 (90)
Living area fraction	15.5770	15.8567	16.3868	17.2360	18.0698	18.8988	19.3347	19.2877	18.6839	17.6165	16.5269	15.6094 (92)
MIT	15.5770	15.8567	16.3868	17.2360	18.0698	18.8988	19.3347	19.2877	18.6839	17.6165	16.5269	15.6094 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9638	0.9543	0.9423	0.9148	0.8672	0.7730	0.6422	0.6751	0.8234	0.9166	0.9522	0.9666 (94)
Useful gains	701.5160	771.8518	788.6957	811.8228	782.6822	687.8944	548.0841	550.4958	648.5492	674.0740	676.4149	678.3626 (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	3480.9631	3359.6392	3011.7100	2460.7051	1869.0529	1226.0517	779.9671	819.2201	1321.8831	2058.8251	2799.7401	3431.1049 (97)
Space heating kWh	2067.9086	1738.9931	1653.9226	1187.1953	808.2598	0.0000	0.0000	0.0000	0.0000	1030.2548	1528.7941	2048.0402 (98a)
Space heating requirement - total per year (kWh/year)												12063.3685
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	2067.9086	1738.9931	1653.9226	1187.1953	808.2598	0.0000	0.0000	0.0000	0.0000	1030.2548	1528.7941	2048.0402 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												12063.3685
Space heating per m2										(98c) / (4) =		77.5630 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	2680.9738	2110.5539	2156.0349	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.3175	0.3749	0.3548	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	851.2152	791.3494	764.9385	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	920.9546	883.3263	843.4058	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	50.2124	68.4308	58.3797	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	12.5531	17.1077	14.5949	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												44.2557 (107)
Energy for space heating												77.5630 (99)
Energy for space cooling												0.2845 (108)
Total												77.8475 (109)
Fabric Energy Efficiency (DFEE)												77.8 (109)

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Proposed- Baseline	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	80 C	DER	20.34	TER	
Environmental	79 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	3.34	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	111.77	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)... (3n)	= 369.5820 (5)

2. Ventilation rate

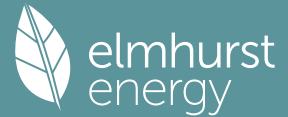
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 118.3191		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
 Point Thermal bridges (36a) = 76.6220 (36)
 Total fabric heat loss (33) + (36) + (36a) = 194.9411 (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	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Heat transfer coeff	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
Average = Sum(39)m / 12 =												295.1805
HLP	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
HLP (average)												1.8979
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

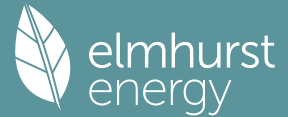
4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.9425 (42)
Hot water usage for mixer showers												82.3846 (42a)
	82.7014	81.4586	79.6475	76.1824	73.6252	70.7734	69.1525	70.9498	72.9201	75.9820	79.5216	
Hot water usage for baths												0.0000 (42b)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Hot water usage for other uses												44.7643 (42c)
	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	
Average daily hot water use (litres/day)												116.9427 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	127.4657	124.5951	121.1562	116.0633	111.8783	107.3988	105.7778	109.2030	112.8010	117.4907	122.6581	127.1488 (44)
Energy conte	201.8745	177.4217	186.2126	158.8848	150.6097	132.0593	127.9291	135.2161	139.0949	159.4338	174.7489	199.0844 (45)
Energy content (annual)												Total = Sum(45)m = 1942.5699
Distribution loss (46)m = 0.15 x (45)m												29.8627 (46)
	30.2812	26.6133	27.9319	23.8327	22.5915	19.8089	19.1894	20.2824	20.8642	23.9151	26.2123	
Water storage loss (or HIU loss):												300.0000 (47)
Store volume												2.0400 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												1.1016 (55)
Enter (49) or (54) in (55)												
Total storage loss												34.1496 (56)
	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	
If cylinder contains dedicated solar storage												34.1496 (57)
	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	
Primary loss												23.2624 (59)
	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	
Combi loss												0.0000 (61)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Total heat required for water heating calculated for each month												256.4964 (62)
	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	
WWHRS												0.0000 (63a)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
PV diverter												0.0000 (63b)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Solar input												0.0000 (63c)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
FGHRS												0.0000 (63d)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Output from w/h												256.4964 (64)
	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	
Total per year (kWh/year)												2618.5499 (64)
Electric shower(s)												2619 (64)
	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												112.1252 (65)
	113.0529	100.4775	107.8453	97.2772	96.0073	88.3577	88.4660	90.8889	90.6971	98.9413	102.5520	

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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (69)
Pumps, fans												
	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)
Water heating gains (Table 5)												
	151.9528	149.5201	144.9533	135.1072	129.0421	122.7191	118.9060	122.1626	125.9681	132.9857	142.4334	150.7059 (72)
Total internal gains	755.5494	778.6813	743.4006	722.2794	686.3727	662.3867	637.2692	637.1380	656.3802	677.6728	716.9620	739.8974 (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			
North			3.1900	10.6334	0.6300	0.7000			0.7700		10.3666 (74)	
East			3.9100	19.6403	0.6300	0.7000			0.7700		23.4691 (76)	
South			2.7300	46.7521	0.6300	0.7000			0.7700		39.0063 (78)	
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains	828.3913	908.2851	934.0471	978.5929	990.1929	970.9371	931.8937	895.5462	869.7957	824.6350	805.2495	801.5444 (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)												

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462
alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9773	0.9714	0.9639	0.9459	0.9145	0.8506	0.7665	0.7892	0.8874	0.9476	0.9699	0.9789 (86)
MIT	16.6805	16.9552	17.4791	18.3063	19.1380	19.9644	20.4398	20.3785	19.7451	18.6817	17.6034	16.6979 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9726	0.9654	0.9555	0.9314	0.8853	0.7822	0.6256	0.6623	0.8357	0.9307	0.9626	0.9746 (89)
MIT 2	14.5074	14.8550	15.5183	16.5699	17.6106	18.6245	19.1444	19.0918	18.3688	17.0497	15.6855	14.5354 (90)
Living area fraction	14.7748	15.1135	15.7596	16.7836	17.7986	18.7894	19.3038	19.2501	18.5382	17.2506	15.9215	14.8015 (92)
MIT												0.1231 (91)
Temperature adjustment												-0.1500
adjusted MIT	14.6248	14.9635	15.6096	16.6336	17.6486	18.6394	19.1538	19.1001	18.3882	17.1006	15.7715	14.6515 (93)

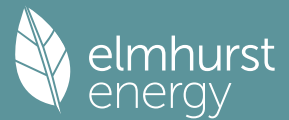
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9475	0.9360	0.9210	0.8883	0.8329	0.7285	0.5873	0.6197	0.7804	0.8875	0.9320	0.9509 (94)
Useful gains	784.8940	850.1278	860.2489	869.2914	824.7503	707.3241	547.3452	554.9714	678.8134	731.8493	750.4741	762.2226 (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	3187.0256	3085.7404	2774.9638	2282.8762	1745.4662	1152.0649	728.3712	765.9894	1236.6093	1907.4260	2575.3927	3143.0332 (97)
Space heating kWh	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98a)
Space heating requirement - total per year (kWh/year)												10376.7527
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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												10376.7527
Space heating per m2										(98c) / (4) =		66.7187 (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 %)												89.0000 (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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98)
Space heating efficiency (main heating system 1)	89.0000	89.0000	89.0000	89.0000	89.0000	0.0000	0.0000	0.0000	0.0000	89.0000	89.0000	89.0000 (210)
Space heating fuel (main heating system)	2008.0741	1688.0131	1600.6157	1143.5742	769.6771	0.0000	0.0000	0.0000	0.0000	982.7293	1476.3386	1990.2507 (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	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (64)
Efficiency of water heater (217)m	87.7493	87.6937	87.5614	87.2910	86.7273	80.0000	80.0000	80.0000	80.0000	87.0543	87.5314	87.7513 (217)
Fuel for water heating, kWh/month	295.4857	261.4528	278.2329	245.6667	239.8573	234.5241	231.6764	240.7851	243.3186	249.0926	263.1158	292.2992 (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	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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												11659.2727 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												80.0000
Water heating fuel used												3075.5074 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
central heating pump												41.0000 (230c)
main heating flue fan												45.0000 (230e)
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (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)

Full SAP Calculation Printout



Energy used	0.0000 (237)
Total delivered energy for all uses	15214.2455 (238)

----- 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	11659.2727	0.2100	2448.4473 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3075.5074	0.2100	645.8566 (264)
Space and water heating			3094.3038 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Total CO2, kg/year			3163.0223 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			20.3400 (273)

----- 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	11659.2727	1.1300	13174.9782 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3075.5074	1.1300	3475.3234 (278)
Space and water heating			16650.3016 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Total Primary energy kWh/year			17383.9126 (286)
Dwelling Primary energy Rate (DPER)			111.7700 (287)

Appendix 2: Be Green

Address: 1a Clarendon Road
Hinckley
Leicestershire
LE10 0PJ
Tel: 01455 634 855
Email: info@ukbuildingcompliance.co.uk
Website: www.ukbuildingcompliance.co.uk

4th August 2026

To whom it may concern,

Part L Justification Statement in support of proposed conversion at Basement Conversion, 10 Tottington Road, Bury, BL8 1LH- Option 1, Be Green.

In accordance with the criteria set out In Approved Document Part L we have used SAP10 to model the dwelling to a notional standard and the dwelling to the proposed standard. The SAP Output Reports for both scenarios are appended to this Statement.

The Notional Dwelling has a Dwelling CO2 Emission Rate of 24.85 kg/ m².
The Notional Dwelling has a Dwelling Fabric Energy Efficiency of 82.42 kWh/ m².
The Notional Dwelling has a Dwelling Primary Energy Rate of 135.85 kWh/ m².

The Proposed Dwelling has a Dwelling CO2 Emission Rate of -0.02 kg/ m².
The Proposed Dwelling has a Dwelling Fabric Energy Efficiency of 77.85 kWh/ m².
The Proposed Dwelling has a Dwelling Primary Energy Rate of 25.16 kWh/ m².

The proposed dwelling is more efficient than the notional dwelling and therefore compliant with regulations.

If any information contained in this report is unclear or requires additional explanation please do not hesitate to contact a member of our team.

Regards

Will Hughes

Environmental Consultant

UK Building Compliance

NOTIONAL DWELLING REPORT

Summary for Input Data



Plot Reference	Plot 1- Gas	Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	76 C	DER	24.85	TER	
Environmental	74 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	4.08	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	135.85	TPER	

Assessor Details	Mr. Will Hughes	Assessor ID	FJ65-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	West
Property Tenure	ND
Transaction Type	5
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
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	104.73 kJ/m ² K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.96 m	30.75 m ²	2.28 m
	2nd Storey:	38.50 m	62.39 m ²	2.40 m
		38.50 m	62.39 m ²	2.40 m

8.0 Living Area	19.14 m ²
-----------------	----------------------

9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Upgraded External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	202.87	187.37	0.00	None	15.50	Enter Gross Area
	Upgraded Basement Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	55.46	55.46	0.00	None	0.00	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	246.88

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Upgraded Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	62.39	62.39	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	30.75
	Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.39

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Upgraded GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.25	None	0.00	110.00	30.75
	Existing GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.70	None	0.00	110.00	31.64

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	+1	Plasterboard ceiling, carpeted chipboard floor	18.00	30.75
Internal Floor 2	+2	Plasterboard ceiling, carpeted chipboard floor	18.00	62.39

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door				0.63			1.80
Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.60

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Door	Door	Upgraded External Wall	West	1.89	
S Glazing	Glazing	Upgraded External Wall	South	2.73	
N Glazing	Glazing	Upgraded External Wall	North	3.19	
N Door	Door	Upgraded External Wall	North	1.89	
E Glazing	Glazing	Upgraded External Wall	East	3.91	
E Door	Door	Upgraded External Wall	East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	10.00	850.00	13

24.0 Main Heating 1

Percentage of Heat

 %

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Controls description

Delayed Start Stat

Flue Type

Fan Assisted Flue

Summary for Input Data

Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	No

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
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	No
Cold Water Source	From mains
Bath Count	0

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	
Cylinder Stat	No
Cylinder In Heated Space	No
Independent Time Control	No
Insulation Type	Measured Loss
Cylinder Volume	300.00
Loss	1.39
Pipes insulation	Fully insulated primary pipework

31.0 Thermal Store

None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	76 C	DER	24.85	TER	
Environmental	74 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	4.08	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	135.85	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

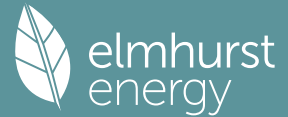
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 328.0125 325.9640 323.9560 314.5247 312.7601 304.5457 304.5457 303.0246 307.7098 312.7601 316.3298 320.0618 (39)
314.5163
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 2.1090 2.0958 2.0829 2.0223 2.0109 1.9581 1.9581 1.9483 1.9785 2.0109 2.0339 2.0579 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 1978.1465
30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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
294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 754.4703 777.5342 742.1545 720.8596 684.8373 626.7613 601.5911 601.5321 620.8555 676.2510 715.7091 738.7994 (73)

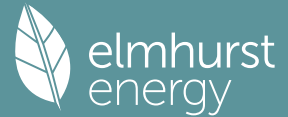
6. Solar gains

[Jan] Area Solar flux g FF Access Gains
m2 Table 6a Specific data Specific data factor W
or Table 6b or Table 6c Table 6d
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 827.3122 907.1381 932.8011 977.1732 988.6575 935.3117 896.2155 859.9403 834.2710 823.2132 803.9966 800.4464 (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)

Full SAP Calculation Printout



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372
alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9774	0.9717	0.9644	0.9473	0.9174	0.8643	0.7875	0.8089	0.8982	0.9489	0.9702	0.9789 (86)
MIT	16.5131	16.7899	17.3246	18.1663	19.0245	19.8578	20.3649	20.2989	19.6320	18.5607	17.4527	16.5242 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9726	0.9655	0.9559	0.9325	0.8880	0.7970	0.6442	0.6810	0.8481	0.9317	0.9627	0.9745 (89)
MIT 2	14.2836	14.6312	15.3065	16.3716	17.4419	18.4662	19.0265	18.9682	18.2023	16.8733	15.4769	14.3027 (90)
Living area fraction	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	FLA = Living area / (4) =	17.0809	15.7200	0.1231 (91)
MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (92)
Temperature adjustment												0.0000
adjusted MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9481	0.9370	0.9227	0.8917	0.8397	0.7515	0.6225	0.6534	0.8003	0.8913	0.9333	0.9514 (94)
Useful gains	784.3784	849.9738	860.6804	871.3259	830.1732	702.8877	557.8867	561.8994	667.6565	733.7681	750.3799	761.5523 (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	3364.7332	3258.5673	2933.3630	2419.4708	1856.7627	1229.5949	789.1438	827.8458	1316.4553	2026.9811	2726.7716	3320.9835 (97)
Space heating kWh	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98a)
Space heating requirement - total per year (kWh/year)												11248.2509
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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11248.2509
Space heating per m2										(98c) / (4) =		72.3221 (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 %)	79.0000	(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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98)
Space heating efficiency (main heating system 1)	79.0000	79.0000	79.0000	79.0000	79.0000	0.0000	0.0000	0.0000	0.0000	79.0000	79.0000	79.0000 (210)
Space heating fuel (main heating system)	2430.1063	2048.8288	1951.9948	1410.9675	966.8135	0.0000	0.0000	0.0000	0.0000	1217.9120	1801.2683	2410.4010 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)
Efficiency of water heater (217)m	77.5188	77.4550	77.3011	76.9878	76.3565	69.0000	69.0000	69.0000	69.0000	76.7162	77.2626	77.5207 (216)
Fuel for water heating, kWh/month	379.3581	336.4033	359.6822	321.3137	316.6566	274.5907	271.2073	282.0023	285.1032	327.0053	341.1708	375.6947 (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	3.4822	3.1452	3.4822	3.3699	3.4822	3.3699	3.4822	3.4822	3.3699	3.4822	3.3699	3.4822 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (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												14238.2922 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												74.0000
Water heating fuel used												3870.1882 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans: central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												41.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (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)

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Total delivered energy for all uses

18542.9458 (238)

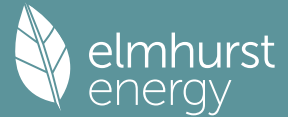
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	14238.2922	0.2100	2990.0414	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3870.1882	0.2100	812.7395	(264)
Space and water heating			3802.7809	(265)
Pumps, fans and electric keep-hot	41.0000	0.1387	5.6872	(267)
Energy for lighting	393.4653	0.1443	56.7892	(268)
Total CO2, kg/year			3865.2573	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			24.8500	(273)

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	14238.2922	1.1300	16089.2702	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3870.1882	1.1300	4373.3127	(278)
Space and water heating			20462.5829	(279)
Pumps, fans and electric keep-hot	41.0000	1.5128	62.0248	(281)
Energy for lighting	393.4653	1.5338	603.5102	(282)
Total Primary energy kWh/year			21128.1180	(286)
Dwelling Primary energy Rate (DPER)			135.8500	(287)

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Plot Reference	Plot 1- Gas				Issued on Date	04/08/2026	
Assessment Reference	Notional			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	76 C		DER	24.85		TER	
Environmental	74 C		% DER < TER				N/A
CO ₂ Emissions (t/year)	4.08		DFEE	82.42		TFEE	
Compliance Check	N/A		% DFEE < TFEE				
% DPER < TPER			DPER	135.85		TPER	
Assessor Details	Mr. Will Hughes				Assessor ID	FJ65-0001	
Client							

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

1. Overall dwelling characteristics

	Area (m ²)		Storey height (m)		Volume (m ³)	
Main dwelling						
Ground floor	30.7500 (1b)	x	2.2800 (2b)	=	70.1100 (1b)	- (3b)
First floor	62.3900 (1c)	x	2.4000 (2c)	=	149.7360 (1c)	- (3c)
Second floor	62.3900 (1d)	x	2.4000 (2d)	=	149.7360 (1d)	- (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820	(5)

2. Ventilation rate

	m ³ 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	4 * 10 =	40.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.1082 (8)
Pressure test	No	
Pressure Test Method	Blower Door	
Measured/design AP50	15.0000	(17)
Infiltration rate	0.8582	(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) =	0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674	(25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K	
Main dwelling								
Door			5.6700	1.8000	10.2060			(26)
Glazing			9.8300	1.5038	14.7820			(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000	(28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000	(28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900	(29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200	(29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100	(30)
Total net area of external elements Aum(A, m ²)			383.1100					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549		(33)
Main dwelling								
Internal Wall 1			246.8800			9.0000	2221.9200	(32c)
Internal Floor 1			30.7500			18.0000	553.5000	(32d)
Internal Floor 2			62.3900			18.0000	1123.0200	(32d)
Internal Ceiling 1			30.7500			9.0000	276.7500	(32e)
Internal Ceiling 2			62.3900			9.0000	561.5100	(32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$
 Thermal mass parameter ($\text{TMP} = C_m / \text{TFA}$) in $\text{kJ/m}^2\text{K}$
 Thermal bridges (Default value $0.200 \times \text{total exposed area}$)
 Point Thermal bridges
 Total fabric heat loss

$(28) \dots (30) + (32) + (32a) \dots (32e) = 16289.2200$ (34)
 104.7336 (35)
 76.6220 (36)
 $(36a) = 0.0000$
 $(33) + (36) + (36a) = 214.2769$ (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850
Average = $\text{Sum}(39)\text{m} / 12 =$	328.0125	325.9640	323.9560	314.5247	312.7601	304.5457	304.5457	303.0246	307.7098	312.7601	316.3298	320.0618
												314.5163
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.1090	2.0958	2.0829	2.0223	2.0109	1.9581	1.9581	1.9483	1.9785	2.0109	2.0339	2.0579
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9425											
Hot water usage for mixer showers	0.0000											
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hot water usage for other uses	31.7548	31.2832	30.6191	29.3945	28.4776	27.4609	26.9118	27.5713	28.2893	29.3772	30.6269	31.6474
Average daily hot water use (litres/day)	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	44.7643
Daily hot water use	76.5191	74.4197	72.1278	69.2755	66.7308	64.0863	63.5371	65.8244	68.1702	70.8859	73.7634	76.4117
Energy content (annual)	121.1875	105.9726	110.8577	94.8346	89.8324	78.8016	76.8426	81.5043	84.0607	96.1915	105.0895	119.6423
Distribution loss (46)m = $0.15 \times (45)\text{m}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water storage loss (or HIU 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
Total storage 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
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
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
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
Total heat required for water heating calculated for each month	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959
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
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
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
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
Output from w/h	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959
12Total per year (kWh/year)	Total per year (kWh/year) = $\text{Sum}(64)\text{m} = 990.0948$											
Electric shower(s)	58.9062	52.4859	57.3126	54.6927	55.7190	53.1505	54.9222	55.7190	54.6927	57.3126	56.2349	58.9062
Heat gains from water heating, kWh/month	40.4789	35.6407	37.8854	33.8255	33.0191	30.0330	30.0596	31.2494	31.5361	34.7688	36.3903	40.1505

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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126
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
Losses e.g. evaporation (negative values) (Table 5)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006
Water heating gains (Table 5)	54.4071	53.0367	50.9213	46.9799	44.3806	41.7125	40.4027	42.0019	43.8001	46.7323	50.5420	53.9658
Total internal gains	655.0037	679.1978	646.3685	631.1520	598.7112	581.3801	558.7660	556.9774	574.2122	588.4195	622.0707	640.1574

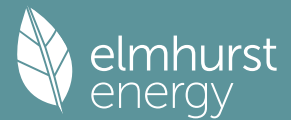
6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	3.1900	10.6334	0.6300	0.7000	0.7700	10.3666
East	3.9100	19.6403	0.6300	0.7000	0.7700	23.4691
South	2.7300	46.7521	0.6300	0.7000	0.7700	39.0063
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504
Total gains	727.8456	808.8017	837.0150	887.4656	902.5313	889.9305

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000											
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	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372

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alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9819	0.9768	0.9704	0.9551	0.9286	0.8738	0.8003	0.8219	0.9069	0.9578	0.9761	0.9833 (86)
MIT	16.4229	16.7008	17.2401	18.0896	18.9564	19.8270	20.3421	20.2734	19.5971	18.4849	17.3676	16.4332 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9781	0.9717	0.9633	0.9424	0.9024	0.8096	0.6607	0.6982	0.8599	0.9433	0.9699	0.9798 (89)
MIT 2	15.2298	15.5108	16.0526	16.9173	17.7759	18.6309	19.0839	19.0366	18.4142	17.3172	16.1982	15.2575 (90)
Living area fraction	15.3766	15.6573	16.1988	17.0616	17.9212	18.7781	19.2387	19.1888	18.5598	17.4609	16.3421	15.4022 (92)
MIT	15.3766	15.6573	16.1988	17.0616	17.9212	18.7781	19.2387	19.1888	18.5598	17.4609	16.3421	15.4022 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9631	0.9537	0.9418	0.9146	0.8679	0.7753	0.6454	0.6780	0.8246	0.9163	0.9515	0.9659 (94)
Useful gains	701.0206	771.3560	788.2740	811.7127	783.3114	689.9925	550.7977	552.8355	649.4639	673.8380	675.9288	677.8543 (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	3633.2684	3506.4783	3141.9722	2567.0169	1945.7355	1272.4148	803.6196	845.0830	1372.3235	2145.8044	2923.5649	3585.3854 (97)
Space heating kWh	2181.5923	1838.0022	1751.1515	1263.8190	864.8435	0.0000	0.0000	0.0000	0.0000	1095.1430	1618.2980	2163.2031 (98a)
Space heating requirement - total per year (kWh/year)												12776.0528
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	2181.5923	1838.0022	1751.1515	1263.8190	864.8435	0.0000	0.0000	0.0000	0.0000	1095.1430	1618.2980	2163.2031 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												12776.0528
Space heating per m2										(98c) / (4) =		82.1453 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	2862.7300	2253.6385	2302.9866	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.2981	0.3526	0.3333	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	853.3276	794.6892	767.6502	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	920.9546	883.3263	843.4058	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	48.6914	65.9460	56.3622	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	12.1729	16.4865	14.0905	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												42.7499 (107)
Energy for space heating												82.1453 (99)
Energy for space cooling												0.2749 (108)
Total												82.4201 (109)
Fabric Energy Efficiency (DFEE)												82.4 (109)

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	76 C	DER	24.85	TER	
Environmental	74 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	4.08	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	135.85	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)		Storey height (m)		Volume (m ³)	
Main dwelling						
Ground floor	30.7500 (1b)	x	2.2800 (2b)	=	70.1100 (1b)	- (3b)
First floor	62.3900 (1c)	x	2.4000 (2c)	=	149.7360 (1c)	- (3c)
Second floor	62.3900 (1d)	x	2.4000 (2d)	=	149.7360 (1d)	- (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	155.5300					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)... (3n) =	369.5820	(5)

2. Ventilation rate

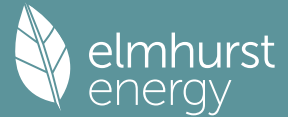
	m ³ per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	4 * 10 =	40.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.1082 (8)
Pressure test	No	
Pressure Test Method	Blower Door	
Measured/design AP50	15.0000	(17)
Infiltration rate	0.8582	(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) =	0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572	(22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674	(25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K	
Main dwelling								
Door			5.6700	1.8000	10.2060			(26)
Glazing			9.8300	1.5038	14.7820			(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000	(28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000	(28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900	(29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200	(29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100	(30)
Total net area of external elements Aum(A, m ²)			383.1100					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549		(33)
Main dwelling								
Internal Wall 1			246.8800			9.0000	2221.9200	(32c)
Internal Floor 1			30.7500			18.0000	553.5000	(32d)
Internal Floor 2			62.3900			18.0000	1123.0200	(32d)
Internal Ceiling 1			30.7500			9.0000	276.7500	(32e)
Internal Ceiling 2			62.3900			9.0000	561.5100	(32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336	(35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges
Total fabric heat loss (33) + (36) + (36a) = 76.6220 (36)
0.0000
214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
328.0125 325.9640 323.9560 314.5247 312.7601 304.5457 304.5457 303.0246 307.7098 312.7601 316.3298 320.0618 (39)
Average = Sum(39)m / 12 = 314.5163
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 2.1090 2.0958 2.0829 2.0223 2.0109 1.9581 1.9581 1.9483 1.9785 2.0109 2.0339 2.0579 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 1978.1465
30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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
294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 754.4703 777.5342 742.1545 720.8596 684.8373 626.7613 601.5911 601.5321 620.8555 676.2510 715.7091 738.7994 (73)

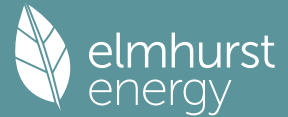
6. Solar gains

[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
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 827.3122 907.1381 932.8011 977.1732 988.6575 935.3117 896.2155 859.9403 834.2710 823.2132 803.9966 800.4464 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372
alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9774	0.9717	0.9644	0.9473	0.9174	0.8643	0.7875	0.8089	0.8982	0.9489	0.9702	0.9789 (86)
MIT	16.5131	16.7899	17.3246	18.1663	19.0245	19.8578	20.3649	20.2989	19.6320	18.5607	17.4527	16.5242 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9726	0.9655	0.9559	0.9325	0.8880	0.7970	0.6442	0.6810	0.8481	0.9317	0.9627	0.9745 (89)
MIT 2	14.2836	14.6312	15.3065	16.3716	17.4419	18.4662	19.0265	18.9682	18.2023	16.8733	15.4769	14.3027 (90)
Living area fraction	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	FLA = Living area / (4) =	17.0809	15.7200	0.1231 (91)
MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (92)
Temperature adjustment												0.0000
adjusted MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9481	0.9370	0.9227	0.8917	0.8397	0.7515	0.6225	0.6534	0.8003	0.8913	0.9333	0.9514 (94)
Useful gains	784.3784	849.9738	860.6804	871.3259	830.1732	702.8877	557.8867	561.8994	667.6565	733.7681	750.3799	761.5523 (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	3364.7332	3258.5673	2933.3630	2419.4708	1856.7627	1229.5949	789.1438	827.8458	1316.4553	2026.9811	2726.7716	3320.9835 (97)
Space heating kWh	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98a)
Space heating requirement - total per year (kWh/year)												11248.2509
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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11248.2509
Space heating per m2										(98c) / (4) =		72.3221 (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 %)	79.0000 (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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98)
Space heating efficiency (main heating system 1)	79.0000	79.0000	79.0000	79.0000	79.0000	0.0000	0.0000	0.0000	0.0000	79.0000	79.0000	79.0000 (210)
Space heating fuel (main heating system)	2430.1063	2048.8288	1951.9948	1410.9675	966.8135	0.0000	0.0000	0.0000	0.0000	1217.9120	1801.2683	2410.4010 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)
Efficiency of water heater (217)m	77.5188	77.4550	77.3011	76.9878	76.3565	69.0000	69.0000	69.0000	69.0000	76.7162	77.2626	77.5207 (216)
Fuel for water heating, kWh/month	379.3581	336.4033	359.6822	321.3137	316.6566	274.5907	271.2073	282.0023	285.1032	327.0053	341.1708	375.6947 (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	3.4822	3.1452	3.4822	3.3699	3.4822	3.3699	3.4822	3.4822	3.3699	3.4822	3.3699	3.4822 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (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												14238.2922 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												74.0000
Water heating fuel used												3870.1882 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans: central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												41.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (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)

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Total delivered energy for all uses

18542.9458 (238)

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	14238.2922	0.2100	2990.0414	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3870.1882	0.2100	812.7395	(264)
Space and water heating			3802.7809	(265)
Pumps, fans and electric keep-hot	41.0000	0.1387	5.6872	(267)
Energy for lighting	393.4653	0.1443	56.7892	(268)
Total CO2, kg/year			3865.2573	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			24.8500	(273)

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	14238.2922	1.1300	16089.2702	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3870.1882	1.1300	4373.3127	(278)
Space and water heating			20462.5829	(279)
Pumps, fans and electric keep-hot	41.0000	1.5128	62.0248	(281)
Energy for lighting	393.4653	1.5338	603.5102	(282)
Total Primary energy kWh/year			21128.1180	(286)
Dwelling Primary energy Rate (DPER)			135.8500	(287)

PROPOSED DWELLING REPORT

Summary for Input Data

Plot Reference	Plot 1- Gas	Issued on Date	04/08/2026
Assessment Reference	Proposed- PV	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	126 A	DER	-0.02	TER	
Environmental	100 A	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.17	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	25.16	TPER	

Assessor Details	Mr. Will Hughes	Assessor ID	FJ65-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	West	
Property Tenture	ND	
Transaction Type	5	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	3	
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	104.73	kJ/m²

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.96 m	30.75 m ²	2.28 m
	2nd Storey:	38.50 m	62.39 m ²	2.40 m
		38.50 m	62.39 m ²	2.40 m

8.0 Living Area	19.14	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Upgraded External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.25	17.00	202.87	187.37	0.00	None	15.50	Enter Gross Area
	Upgraded Basement Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.20	17.00	55.46	55.46	0.00	None	0.00	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	246.88

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Upgraded Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	62.39	62.39	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	30.75
	Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.39

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Upgraded GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.20	None	0.00	110.00	30.75
	Existing GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.70	None	0.00	110.00	31.64

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	+1	Plasterboard ceiling, carpeted chipboard floor	18.00	30.75
Internal Floor 2	+2	Plasterboard ceiling, carpeted chipboard floor	18.00	62.39

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door				0.63			1.60
Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Door	Door	Upgraded External Wall	West	1.89	
S Glazing	Glazing	Upgraded External Wall	South	2.73	
N Glazing	Glazing	Upgraded External Wall	North	3.19	
N Door	Door	Upgraded External Wall	North	1.89	
E Glazing	Glazing	Upgraded External Wall	East	3.91	
E Door	Door	Upgraded External Wall	East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	10.00	850.00	13

24.0 Main Heating 1

Percentage of Heat

 %

Database Ref. No.

Fuel Type

In Winter

In Summer

Model Name

Manufacturer

System Type

Controls SAP Code

Controls description

Summary for Input Data

Delayed Start Stat	Yes											
Flue Type	Balanced											
Fan Assisted Flue	Yes											
Is MHS Pumped	Pump in heated space											
Heating Pump Age	2013 or later											
Heat Emitter	Radiators											
Flow Temperature	Unknown											
Boiler Interlock	Yes											
25.0 Main Heating 2	None											
26.0 Heat Networks	None											
27.0 Secondary Heating	None											
28.0 Water Heating												
Water Heating	Main Heating 1											
SAP Code	901											
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											
Cold Water Source	From mains											
Bath Count	0											
28.1 Showers												
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To							
Shower	Vented hot water system	7.00		No								
28.3 Waste Water Heat Recovery System												
29.0 Hot Water Cylinder	Hot Water Cylinder											
Cylinder Stat	Yes											
Cylinder In Heated Space	Yes											
Independent Time Control	Yes											
Insulation Type	Measured Loss											
Cylinder Volume	300.00										L	
Loss	2.04										kWh/day	
Pipes insulation	Fully insulated primary pipework											
31.0 Thermal Store	None											
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				
13.00	East	30°	None Or Little		No	1.00						
13.00	West	30°	None Or Little		No	1.00						
7.00	South	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	

Summary for Input Data



Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Proposed- PV	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	126 A	DER	-0.02	TER	
Environmental	100 A	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.17	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	25.16	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

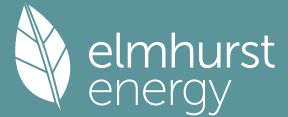
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 118.3191		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
 Point Thermal bridges (36a) = 76.6220 (36)
 Total fabric heat loss (33) + (36) + (36a) = 194.9411 (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	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Heat transfer coeff	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
Average = Sum(39)m / 12 =												295.1805
HLP	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
HLP (average)												1.8979
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9425 (42)
Hot water usage for mixer showers												82.3846 (42a)
	82.7014	81.4586	79.6475	76.1824	73.6252	70.7734	69.1525	70.9498	72.9201	75.9820	79.5216	
Hot water usage for baths												0.0000 (42b)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Hot water usage for other uses												44.7643 (42c)
	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	
Average daily hot water use (litres/day)												116.9427 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	127.4657	124.5951	121.1562	116.0633	111.8783	107.3988	105.7778	109.2030	112.8010	117.4907	122.6581	127.1488 (44)
Energy conte	201.8745	177.4217	186.2126	158.8848	150.6097	132.0593	127.9291	135.2161	139.0949	159.4338	174.7489	199.0844 (45)
Energy content (annual)												Total = Sum(45)m = 1942.5699
Distribution loss (46)m = 0.15 x (45)m												29.8627 (46)
	30.2812	26.6133	27.9319	23.8327	22.5915	19.8089	19.1894	20.2824	20.8642	23.9151	26.2123	
Water storage loss (or HIU loss):												300.0000 (47)
Store volume												2.0400 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												1.1016 (55)
Enter (49) or (54) in (55)												
Total storage loss												34.1496 (56)
	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	
If cylinder contains dedicated solar storage												34.1496 (57)
	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	
Primary loss												23.2624 (59)
	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	
Combi loss												0.0000 (61)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Total heat required for water heating calculated for each month												259.2865 (62)
	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	
WWHRS												0.0000 (63a)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
PV diverter												-0.0000 (63b)
	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	
Solar input												0.0000 (63c)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
FGHRS												0.0000 (63d)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Output from w/h												259.2865 (64)
	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	
Total per year (kWh/year)												2618.5499 (64)
												2619
Electric shower(s)												0.0000 (64a)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												112.1252 (65)
	113.0529	100.4775	107.8453	97.2772	96.0073	88.3577	88.4660	90.8889	90.6971	98.9413	102.5520	

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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (69)
Pumps, fans												
	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)
Water heating gains (Table 5)												
	151.9528	149.5201	144.9533	135.1072	129.0421	122.7191	118.9060	122.1626	125.9681	132.9857	142.4334	150.7059 (72)
Total internal gains	755.5494	778.6813	743.4006	722.2794	686.3727	662.3867	637.2692	637.1380	656.3802	677.6728	716.9620	739.8974 (73)

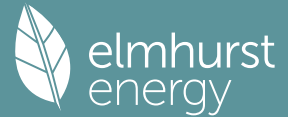
6. Solar gains

[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			
North				3.1900	10.6334	0.6300	0.7000	0.7700	10.3666 (74)			
East				3.9100	19.6403	0.6300	0.7000	0.7700	23.4691 (76)			
South				2.7300	46.7521	0.6300	0.7000	0.7700	39.0063 (78)			
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains	828.3913	908.2851	934.0471	978.5929	990.1929	970.9371	931.8937	895.5462	869.7957	824.6350	805.2495	801.5444 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462
alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9773	0.9714	0.9639	0.9459	0.9145	0.8506	0.7665	0.7892	0.8874	0.9476	0.9699	0.9789 (86)
MIT	16.6805	16.9552	17.4791	18.3063	19.1380	19.9644	20.4398	20.3785	19.7451	18.6817	17.6034	16.6979 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9726	0.9654	0.9555	0.9314	0.8853	0.7822	0.6256	0.6623	0.8357	0.9307	0.9626	0.9746 (89)
MIT 2	14.5074	14.8550	15.5183	16.5699	17.6106	18.6245	19.1444	19.0918	18.3688	17.0497	15.6855	14.5354 (90)
Living area fraction	14.7748	15.1135	15.7596	16.7836	17.7986	18.7894	19.3038	19.2501	18.5382	17.2506	15.9215	14.8015 (92)
MIT												0.1231 (91)
Temperature adjustment												-0.1500
adjusted MIT	14.6248	14.9635	15.6096	16.6336	17.6486	18.6394	19.1538	19.1001	18.3882	17.1006	15.7715	14.6515 (93)

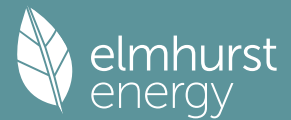
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9475	0.9360	0.9210	0.8883	0.8329	0.7285	0.5873	0.6197	0.7804	0.8875	0.9320	0.9509 (94)
Useful gains	784.8940	850.1278	860.2489	869.2914	824.7503	707.3241	547.3452	554.9714	678.8134	731.8493	750.4741	762.2226 (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	3187.0256	3085.7404	2774.9638	2282.8762	1745.4662	1152.0649	728.3712	765.9894	1236.6093	1907.4260	2575.3927	3143.0332 (97)
Space heating kWh	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98a)
Space heating requirement - total per year (kWh/year)												10376.7527
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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												10376.7527
Space heating per m2										(98c) / (4) =		66.7187 (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 %)												89.0000 (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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98)
Space heating efficiency (main heating system 1)	89.0000	89.0000	89.0000	89.0000	89.0000	0.0000	0.0000	0.0000	0.0000	89.0000	89.0000	89.0000 (210)
Space heating fuel (main heating system)	2008.0741	1688.0131	1600.6157	1143.5742	769.6771	0.0000	0.0000	0.0000	0.0000	982.7293	1476.3386	1990.2507 (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	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (64)
Efficiency of water heater (217)m	87.7493	87.6937	87.5614	87.2910	86.7273	80.0000	80.0000	80.0000	80.0000	87.0543	87.5314	87.7513 (217)
Fuel for water heating, kWh/month	295.4857	261.4528	278.2329	245.6667	239.8573	234.5241	231.6764	240.7851	243.3186	249.0926	263.1158	292.2992 (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	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-177.8836	-192.4078	-204.4406	-159.8940	-126.3600	-103.7628	-103.1307	-117.7692	-142.8898	-181.0206	-173.5915	-160.7172 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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)	-409.1713	-852.0066	-1732.1327	-2641.0002	-3495.1131	-3518.5733	-3445.5078	-2878.4422	-2057.1246	-1198.3996	-535.8628	-321.5040 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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												11659.2727 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												80.0000
Water heating fuel used												3075.5074 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
central heating pump												41.0000 (230c)
main heating flue fan												45.0000 (230e)
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-24928.7060 (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)

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Energy used	0.0000 (237)
Total delivered energy for all uses	-9714.4606 (238)

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	11659.2727	0.2100	2448.4473 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3075.5074	0.2100	645.8566 (264)
Space and water heating			3094.3038 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1843.8679	0.1422	-262.1538
PV Unit electricity exported	-23084.8381	0.1258	-2903.3552
Total			-3165.5091 (269)
Total CO2, kg/year			-2.4868 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			-0.0200 (273)

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	11659.2727	1.1300	13174.9782 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3075.5074	1.1300	3475.3234 (278)
Space and water heating			16650.3016 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1843.8679	1.5259	-2813.4659
PV Unit electricity exported	-23084.8381	0.4617	-10657.2388
Total			-13470.7047 (283)
Total Primary energy kWh/year			3913.2079 (286)
Dwelling Primary energy Rate (DPER)			25.1600 (287)

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Plot Reference	Plot 1- Gas				Issued on Date	04/08/2026	
Assessment Reference	Proposed- PV			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	126 A	DER	-0.02	TER			
Environmental	100 A	% DER < TER				N/A	
CO ₂ Emissions (t/year)	0.17	DFEE	77.85	TFEE			
Compliance Check	N/A	% DFEE < TFEE					
% DPER < TPER		DPER	25.16	TPER			
Assessor Details	Mr. Will Hughes				Assessor ID	FJ65-0001	
Client							

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820 (5)

2. Ventilation rate

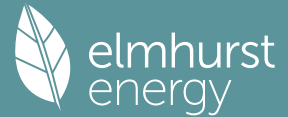
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	118.3191	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$
Thermal mass parameter (TMP = C_m / TFA) in $\text{kJ/m}^2\text{K}$
Thermal bridges (Default value $0.200 \times \text{total exposed area}$)
Point Thermal bridges
Total fabric heat loss

(28)...(30) + (32) + (32a)...(32e) = 16289.2200 (34)
104.7336 (35)
76.6220 (36)
(36a) = 0.0000
(33) + (36) + (36a) = 194.9411 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Average = $\text{Sum}(39)\text{m} / 12 =$	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
												295.1805
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9425 (42)											
Hot water usage for mixer showers	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42a)											
Hot water usage for baths	31.7548	31.2832	30.6191	29.3945	28.4776	27.4609	26.9118	27.5713	28.2893	29.3772	30.6269	31.6474 (42b)
Hot water usage for other uses	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	44.7643 (42c)
Average daily hot water use (litres/day)	70.1365 (43)											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	76.5191	74.4197	72.1278	69.2755	66.7308	64.0863	63.5371	65.8244	68.1702	70.8859	73.7634	76.4117 (44)
Energy content (annual)	121.1875	105.9726	110.8577	94.8346	89.8324	78.8016	76.8426	81.5043	84.0607	96.1915	105.0895	119.6423 (45)
Distribution loss (46)m = $0.15 \times (45)\text{m}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (or HIU 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 (56)											
Total storage 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 (57)
If cylinder contains dedicated solar storage	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)
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	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959 (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	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959 (64)
12Total per year (kWh/year)	990.0948 (64)											
Electric shower(s)	58.9062	52.4859	57.3126	54.6927	55.7190	53.1505	54.9222	55.7190	54.6927	57.3126	56.2349	58.9062 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = $\text{Sum}(64a)\text{m} =$	670.0548 (64a)											
Heat gains from water heating, kWh/month	40.4789	35.6407	37.8854	33.8255	33.0191	30.0330	30.0596	31.2494	31.5361	34.7688	36.3903	40.1505 (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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (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)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)
Water heating gains (Table 5)	54.4071	53.0367	50.9213	46.9799	44.3806	41.7125	40.4027	42.0019	43.8001	46.7323	50.5420	53.9658 (72)
Total internal gains	655.0037	679.1978	646.3685	631.1520	598.7112	581.3801	558.7660	556.9774	574.2122	588.4195	622.0707	640.1574 (73)

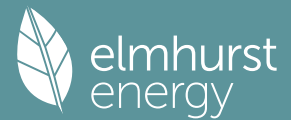
6. Solar gains

[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	
North					3.1900	10.6334	0.6300	0.7000	0.7700		10.3666 (74)	
East					3.9100	19.6403	0.6300	0.7000	0.7700		23.4691 (76)	
South					2.7300	46.7521	0.6300	0.7000	0.7700		39.0063 (78)	
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains	727.8456	808.8017	837.0150	887.4656	902.5313	889.9305	853.3904	815.3855	787.6277	735.3817	710.3582	701.8043 (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	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462

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alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9820	0.9768	0.9702	0.9543	0.9264	0.8685	0.7910	0.8137	0.9036	0.9571	0.9760	0.9834 (86)
MIT	16.5863	16.8631	17.3908	18.2261	19.0672	19.9095	20.3992	20.3336	19.6831	18.6025	17.5144	16.6027 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9783	0.9718	0.9632	0.9418	0.9006	0.8054	0.6560	0.6937	0.8573	0.9428	0.9701	0.9800 (89)
MIT 2	15.4354	15.7155	16.2459	17.0971	17.9298	18.7569	19.1853	19.1410	18.5437	17.4782	16.3883	15.4700 (90)
Living area fraction	15.5770	15.8567	16.3868	17.2360	18.0698	18.8988	19.3347	19.2877	18.6839	17.6165	16.5269	15.6094 (92)
MIT	15.5770	15.8567	16.3868	17.2360	18.0698	18.8988	19.3347	19.2877	18.6839	17.6165	16.5269	15.6094 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9638	0.9543	0.9423	0.9148	0.8672	0.7730	0.6422	0.6751	0.8234	0.9166	0.9522	0.9666 (94)
Useful gains	701.5160	771.8518	788.6957	811.8228	782.6822	687.8944	548.0841	550.4958	648.5492	674.0740	676.4149	678.3626 (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	3480.9631	3359.6392	3011.7100	2460.7051	1869.0529	1226.0517	779.9671	819.2201	1321.8831	2058.8251	2799.7401	3431.1049 (97)
Space heating kWh	2067.9086	1738.9931	1653.9226	1187.1953	808.2598	0.0000	0.0000	0.0000	0.0000	1030.2548	1528.7941	2048.0402 (98a)
Space heating requirement - total per year (kWh/year)												12063.3685
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	2067.9086	1738.9931	1653.9226	1187.1953	808.2598	0.0000	0.0000	0.0000	0.0000	1030.2548	1528.7941	2048.0402 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												12063.3685
Space heating per m2												77.5630 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	2680.9738	2110.5539	2156.0349	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.3175	0.3749	0.3548	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	851.2152	791.3494	764.9385	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	920.9546	883.3263	843.4058	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	50.2124	68.4308	58.3797	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	12.5531	17.1077	14.5949	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												44.2557 (107)
Energy for space heating												77.5630 (99)
Energy for space cooling												0.2845 (108)
Total												77.8475 (109)
Fabric Energy Efficiency (DFEE)												77.8 (109)

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Proposed- PV	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	126 A	DER	-0.02	TER	
Environmental	100 A	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.17	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	25.16	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)... (3n)	= 369.5820 (5)

2. Ventilation rate

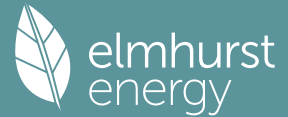
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	118.3191	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
 Point Thermal bridges (36a) = 76.6220 (36)
 Total fabric heat loss (33) + (36) + (36a) = 194.9411 (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	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Heat transfer coeff	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
Average = Sum(39)m / 12 =												295.1805
HLP	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
HLP (average)												1.8979
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9425 (42)
Hot water usage for mixer showers												82.3846 (42a)
	82.7014	81.4586	79.6475	76.1824	73.6252	70.7734	69.1525	70.9498	72.9201	75.9820	79.5216	
Hot water usage for baths												0.0000 (42b)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Hot water usage for other uses												44.7643 (42c)
	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	116.9427 (43)
Average daily hot water use (litres/day)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	127.4657	124.5951	121.1562	116.0633	111.8783	107.3988	105.7778	109.2030	112.8010	117.4907	122.6581	127.1488 (44)
Energy conte	201.8745	177.4217	186.2126	158.8848	150.6097	132.0593	127.9291	135.2161	139.0949	159.4338	174.7489	199.0844 (45)
Energy content (annual)												Total = Sum(45)m = 1942.5699
Distribution loss (46)m = 0.15 x (45)m												29.8627 (46)
	30.2812	26.6133	27.9319	23.8327	22.5915	19.8089	19.1894	20.2824	20.8642	23.9151	26.2123	
Water storage loss (or HIU loss):												300.0000 (47)
Store volume												2.0400 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												1.1016 (55)
Enter (49) or (54) in (55)												
Total storage loss												34.1496 (56)
	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	
If cylinder contains dedicated solar storage												34.1496 (57)
	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	
Primary loss												23.2624 (59)
	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	
Combi loss												0.0000 (61)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Total heat required for water heating calculated for each month												
	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (62)
WWHRS												0.0000 (63a)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
PV diverter												-0.0000 (63b)
	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	
Solar input												0.0000 (63c)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
FGHRS												0.0000 (63d)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Output from w/h												
	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (64)
Total per year (kWh/year)												2618.5499 (64)
												2619
Electric shower(s)												0.0000 (64a)
	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												
	113.0529	100.4775	107.8453	97.2772	96.0073	88.3577	88.4660	90.8889	90.6971	98.9413	102.5520	112.1252 (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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (69)
Pumps, fans												
	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)
Water heating gains (Table 5)												
	151.9528	149.5201	144.9533	135.1072	129.0421	122.7191	118.9060	122.1626	125.9681	132.9857	142.4334	150.7059 (72)
Total internal gains												
	755.5494	778.6813	743.4006	722.2794	686.3727	662.3867	637.2692	637.1380	656.3802	677.6728	716.9620	739.8974 (73)

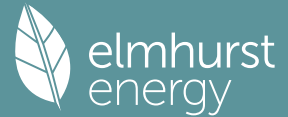
6. Solar gains

[Jan]												Gains	
					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d			W	
North					3.1900	10.6334	0.6300	0.7000	0.7700			10.3666 (74)	
East					3.9100	19.6403	0.6300	0.7000	0.7700			23.4691 (76)	
South					2.7300	46.7521	0.6300	0.7000	0.7700			39.0063 (78)	
Solar gains		72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains		828.3913	908.2851	934.0471	978.5929	990.1929	970.9371	931.8937	895.5462	869.7957	824.6350	805.2495	801.5444 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462
alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9773	0.9714	0.9639	0.9459	0.9145	0.8506	0.7665	0.7892	0.8874	0.9476	0.9699	0.9789 (86)
MIT	16.6805	16.9552	17.4791	18.3063	19.1380	19.9644	20.4398	20.3785	19.7451	18.6817	17.6034	16.6979 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9726	0.9654	0.9555	0.9314	0.8853	0.7822	0.6256	0.6623	0.8357	0.9307	0.9626	0.9746 (89)
MIT 2	14.5074	14.8550	15.5183	16.5699	17.6106	18.6245	19.1444	19.0918	18.3688	17.0497	15.6855	14.5354 (90)
Living area fraction	14.7748	15.1135	15.7596	16.7836	17.7986	18.7894	19.3038	19.2501	18.5382	17.2506	15.9215	14.8015 (92)
MIT												0.1231 (91)
Temperature adjustment												-0.1500
adjusted MIT	14.6248	14.9635	15.6096	16.6336	17.6486	18.6394	19.1538	19.1001	18.3882	17.1006	15.7715	14.6515 (93)

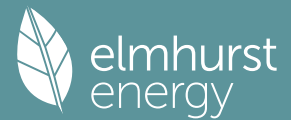
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9475	0.9360	0.9210	0.8883	0.8329	0.7285	0.5873	0.6197	0.7804	0.8875	0.9320	0.9509 (94)
Useful gains	784.8940	850.1278	860.2489	869.2914	824.7503	707.3241	547.3452	554.9714	678.8134	731.8493	750.4741	762.2226 (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	3187.0256	3085.7404	2774.9638	2282.8762	1745.4662	1152.0649	728.3712	765.9894	1236.6093	1907.4260	2575.3927	3143.0332 (97)
Space heating kWh	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98a)
Space heating requirement - total per year (kWh/year)												10376.7527
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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												10376.7527
Space heating per m2										(98c) / (4) =		66.7187 (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 %)												89.0000 (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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98)
Space heating efficiency (main heating system 1)	89.0000	89.0000	89.0000	89.0000	89.0000	0.0000	0.0000	0.0000	0.0000	89.0000	89.0000	89.0000 (210)
Space heating fuel (main heating system)	2008.0741	1688.0131	1600.6157	1143.5742	769.6771	0.0000	0.0000	0.0000	0.0000	982.7293	1476.3386	1990.2507 (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	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (64)
Efficiency of water heater (217)m	87.7493	87.6937	87.5614	87.2910	86.7273	80.0000	80.0000	80.0000	80.0000	87.0543	87.5314	87.7513 (217)
Fuel for water heating, kWh/month	295.4857	261.4528	278.2329	245.6667	239.8573	234.5241	231.6764	240.7851	243.3186	249.0926	263.1158	292.2992 (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	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-177.8836	-192.4078	-204.4406	-159.8940	-126.3600	-103.7628	-103.1307	-117.7692	-142.8898	-181.0206	-173.5915	-160.7172 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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)	-409.1713	-852.0066	-1732.1327	-2641.0002	-3495.1131	-3518.5733	-3445.5078	-2878.4422	-2057.1246	-1198.3996	-535.8628	-321.5040 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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												11659.2727 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												80.0000
Water heating fuel used												3075.5074 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
central heating pump												41.0000 (230c)
main heating flue fan												45.0000 (230e)
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-24928.7060 (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)

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Energy used	0.0000 (237)
Total delivered energy for all uses	-9714.4606 (238)

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	11659.2727	0.2100	2448.4473 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3075.5074	0.2100	645.8566 (264)
Space and water heating			3094.3038 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1843.8679	0.1422	-262.1538
PV Unit electricity exported	-23084.8381	0.1258	-2903.3552
Total			-3165.5091 (269)
Total CO2, kg/year			-2.4868 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			-0.0200 (273)

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	11659.2727	1.1300	13174.9782 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3075.5074	1.1300	3475.3234 (278)
Space and water heating			16650.3016 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1843.8679	1.5259	-2813.4659
PV Unit electricity exported	-23084.8381	0.4617	-10657.2388
Total			-13470.7047 (283)
Total Primary energy kWh/year			3913.2079 (286)
Dwelling Primary energy Rate (DPER)			25.1600 (287)

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LE10 0PJ
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Email: info@ukbuildingcompliance.co.uk
Website: www.ukbuildingcompliance.co.uk

4th August 2026

To whom it may concern,

Part L Justification Statement in support of proposed conversion at Basement Conversion, 10 Tottington Road, Bury, BL8 1LH- Option 2, Be Green.

In accordance with the criteria set out In Approved Document Part L we have used SAP10 to model the dwelling to a notional standard and the dwelling to the proposed standard. The SAP Output Reports for both scenarios are appended to this Statement.

The Notional Dwelling has a Dwelling CO2 Emission Rate of 8.44 kg/ m².

The Notional Dwelling has a Dwelling Fabric Energy Efficiency of 82.42 kWh/ m².

The Notional Dwelling has a Dwelling Primary Energy Rate of 87.25 kWh/ m².

The Proposed Dwelling has a Dwelling CO2 Emission Rate of -0.17 kg/ m².

The Proposed Dwelling has a Dwelling Fabric Energy Efficiency of 77.85 kWh/ m².

The Proposed Dwelling has a Dwelling Primary Energy Rate of 22.80 kWh/ m².

The proposed dwelling is more efficient than the notional dwelling and therefore compliant with regulations.

If any information contained in this report is unclear or requires additional explanation please do not hesitate to contact a member of our team.

Regards

Will Hughes

Environmental Consultant

UK Building Compliance

NOTIONAL DWELLING REPORT

Summary for Input Data

Plot Reference	Plot 1- ASHP	Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	58 D	DER	8.44	TER	
Environmental	91 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.38	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	87.25	TPER	

Assessor Details	Mr. Will Hughes	Assessor ID	FJ65-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	West
Property Tenure	ND
Transaction Type	5
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
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	104.73 kJ/m ² K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.96 m	30.75 m ²	2.28 m
	2nd Storey:	38.50 m	62.39 m ²	2.40 m
		38.50 m	62.39 m ²	2.40 m

8.0 Living Area	19.14 m ²
-----------------	----------------------

9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Upgraded External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	202.87	187.37	0.00	None	15.50	Enter Gross Area
	Upgraded Basement Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	55.46	55.46	0.00	None	0.00	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	246.88

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Upgraded Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	62.39	62.39	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	30.75
	Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.39

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Upgraded GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.25	None	0.00	110.00	30.75
	Existing GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.70	None	0.00	110.00	31.64

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	+1	Plasterboard ceiling, carpeted chipboard floor	18.00	30.75
Internal Floor 2	+2	Plasterboard ceiling, carpeted chipboard floor	18.00	62.39

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door				0.63			1.80
Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.60

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Door	Door	Upgraded External Wall	West	1.89	
S Glazing	Glazing	Upgraded External Wall	South	2.73	
N Glazing	Glazing	Upgraded External Wall	North	3.19	
N Door	Door	Upgraded External Wall	North	1.89	
E Glazing	Glazing	Upgraded External Wall	East	3.91	
E Door	Door	Upgraded External Wall	East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	10.00	850.00	13

24.0 Main Heating 1

Percentage of Heat

 %

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Controls description

Is MHS Pumped

Heating Pump Age

Heat Emitter

Summary for Input Data

Flow Temperature	Unknown				
25.0 Main Heating 2	None				
26.0 Heat Networks	None				
27.0 Secondary Heating	None				
28.0 Water Heating					
Water Heating	Main Heating 1				
SAP Code	901				
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	No				
Cold Water Source	From mains				
Bath Count	0				
Supplementary Immersion	No				
Immersion Only Heating Hot Water	No				
28.1 Showers					
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	
28.3 Waste Water Heat Recovery System					
29.0 Hot Water Cylinder	Hot Water Cylinder				
Cylinder Stat	No				
Cylinder In Heated Space	No				
Independent Time Control	No				
Insulation Type	Measured Loss				
Cylinder Volume	300.00				L
Loss	1.39				kWh/day
Pipes insulation	Fully insulated primary pipework				
31.0 Thermal Store	None				
Recommendations					
Lower cost measures	None				
Further measures to achieve even higher standards	None				

Full SAP Calculation Printout



Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026	
Assessment Reference	Notional		Plot Type Ref			
Plot Address				SAP Version	10.2	
SAP Rating	58 D	DER	8.44	TER		
Environmental	91 B	% DER < TER				N/A
CO ₂ Emissions (t/year)	1.38	DFEE	82.42	TFEE		
Compliance Check	N/A	% DFEE < TFEE				
% DPER < TPER		DPER	87.25	TPER		
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001	
Client						

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)... (3n) =	369.5820 (5)

2. Ventilation rate

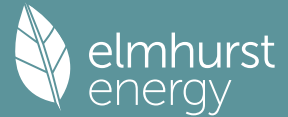
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 328.0125 325.9640 323.9560 314.5247 312.7601 304.5457 304.5457 303.0246 307.7098 312.7601 316.3298 320.0618 (39)
314.5163
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 2.1090 2.0958 2.0829 2.0223 2.0109 1.9581 1.9581 1.9483 1.9785 2.0109 2.0339 2.0579 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 1978.1465
30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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
294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 754.4703 777.5342 742.1545 720.8596 684.8373 626.7613 601.5911 601.5321 620.8555 676.2510 715.7091 738.7994 (73)

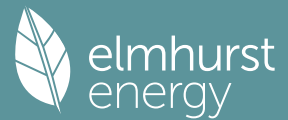
6. Solar gains

[Jan] Area Solar flux g FF Access Gains
m2 Table 6a Specific data Specific data Access factor W
W/m2 or Table 6b or Table 6c Table 6d
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 827.3122 907.1381 932.8011 977.1732 988.6575 935.3117 896.2155 859.9403 834.2710 823.2132 803.9966 800.4464 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372
alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9774	0.9717	0.9644	0.9473	0.9174	0.8643	0.7875	0.8089	0.8982	0.9489	0.9702	0.9789 (86)
MIT	16.5131	16.7899	17.3246	18.1663	19.0245	19.8578	20.3649	20.2989	19.6320	18.5607	17.4527	16.5242 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9726	0.9655	0.9559	0.9325	0.8880	0.7970	0.6442	0.6810	0.8481	0.9317	0.9627	0.9745 (89)
MIT 2	14.2836	14.6312	15.3065	16.3716	17.4419	18.4662	19.0265	18.9682	18.2023	16.8733	15.4769	14.3027 (90)
Living area fraction	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	FLA = Living area / (4) =	17.0809	15.7200	0.1231 (91)
MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (92)
Temperature adjustment												0.0000
adjusted MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9481	0.9370	0.9227	0.8917	0.8397	0.7515	0.6225	0.6534	0.8003	0.8913	0.9333	0.9514 (94)
Useful gains	784.3784	849.9738	860.6804	871.3259	830.1732	702.8877	557.8867	561.8994	667.6565	733.7681	750.3799	761.5523 (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	3364.7332	3258.5673	2933.3630	2419.4708	1856.7627	1229.5949	789.1438	827.8458	1316.4553	2026.9811	2726.7716	3320.9835 (97)
Space heating kWh	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98a)
Space heating requirement - total per year (kWh/year)												11248.2509
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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11248.2509
Space heating per m2										(98c) / (4) =		72.3221 (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 %)												170.0000 (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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98)
Space heating efficiency (main heating system 1)	170.0000	170.0000	170.0000	170.0000	170.0000	0.0000	0.0000	0.0000	0.0000	170.0000	170.0000	170.0000 (210)
Space heating fuel (main heating system)	1129.2847	952.1028	907.1035	655.6849	449.2839	0.0000	0.0000	0.0000	0.0000	565.9709	837.0600	1120.1275 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)
Efficiency of water heater	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000 (216)
Fuel for water heating, kWh/month	172.9845	153.2712	163.5519	145.5131	142.2281	111.4515	110.0783	114.4598	115.7183	147.5683	155.0573	171.3183 (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	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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												6616.6182 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												170.0000
Water heating fuel used												1703.2006 (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)												393.4653 (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												8713.2841 (238)

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----- 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	6616.6182	0.1533	1014.2140	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1703.2006	0.1417	241.2636	(264)
Space and water heating			1255.4776	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	393.4653	0.1443	56.7892	(268)
Total CO2, kg/year			1312.2668	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			8.4400	(273)

----- 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	6616.6182	1.5675	10371.4794	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1703.2006	1.5238	2595.3960	(278)
Space and water heating			12966.8753	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	393.4653	1.5338	603.5102	(282)
Total Primary energy kWh/year			13570.3855	(286)
Dwelling Primary energy Rate (DPER)			87.2500	(287)

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Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026	
Assessment Reference	Notional		Plot Type Ref			
Plot Address				SAP Version	10.2	
SAP Rating	58 D	DER	8.44	TER		
Environmental	91 B	% DER < TER				N/A
CO ₂ Emissions (t/year)	1.38	DFEE	82.42	TFEE		
Compliance Check	N/A	% DFEE < TFEE				
% DPER < TPER		DPER	87.25	TPER		
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001	
Client						

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820 (5)

2. Ventilation rate

	m ³ 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	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum (A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$
 Thermal mass parameter ($\text{TMP} = C_m / \text{TFA}$) in $\text{kJ/m}^2\text{K}$
 Thermal bridges (Default value $0.200 \times \text{total exposed area}$)
 Point Thermal bridges
 Total fabric heat loss

$(28) \dots (30) + (32) + (32a) \dots (32e) = 16289.2200$ (34)
 104.7336 (35)
 76.6220 (36)
 $(36a) = 0.0000$
 $(33) + (36) + (36a) = 214.2769$ (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850
Average = $\text{Sum}(39)\text{m} / 12 =$	328.0125	325.9640	323.9560	314.5247	312.7601	304.5457	304.5457	303.0246	307.7098	312.7601	316.3298	320.0618
												314.5163
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.1090	2.0958	2.0829	2.0223	2.0109	1.9581	1.9581	1.9483	1.9785	2.0109	2.0339	2.0579
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9425											
Hot water usage for mixer showers	0.0000											
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hot water usage for other uses	31.7548	31.2832	30.6191	29.3945	28.4776	27.4609	26.9118	27.5713	28.2893	29.3772	30.6269	31.6474
Average daily hot water use (litres/day)	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	44.7643
Daily hot water use	76.5191	74.4197	72.1278	69.2755	66.7308	64.0863	63.5371	65.8244	68.1702	70.8859	73.7634	76.4117
Energy content (annual)	121.1875	105.9726	110.8577	94.8346	89.8324	78.8016	76.8426	81.5043	84.0607	96.1915	105.0895	119.6423
Distribution loss (46)m = $0.15 \times (45)\text{m}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water storage loss (or HIU 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
Total storage 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
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
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
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
Total heat required for water heating calculated for each month	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959
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
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
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
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
Output from w/h	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959
12Total per year (kWh/year)	Total per year (kWh/year) = $\text{Sum}(64)\text{m} =$											
Electric shower(s)	58.9062	52.4859	57.3126	54.6927	55.7190	53.1505	54.9222	55.7190	54.6927	57.3126	56.2349	58.9062
Heat gains from water heating, kWh/month	40.4789	35.6407	37.8854	33.8255	33.0191	30.0330	30.0596	31.2494	31.5361	34.7688	36.3903	40.1505

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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126
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
Losses e.g. evaporation (negative values) (Table 5)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006
Water heating gains (Table 5)	54.4071	53.0367	50.9213	46.9799	44.3806	41.7125	40.4027	42.0019	43.8001	46.7323	50.5420	53.9658
Total internal gains	655.0037	679.1978	646.3685	631.1520	598.7112	581.3801	558.7660	556.9774	574.2122	588.4195	622.0707	640.1574

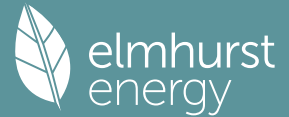
6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	3.1900	10.6334	0.6300	0.7000	0.7700	10.3666
East	3.9100	19.6403	0.6300	0.7000	0.7700	23.4691
South	2.7300	46.7521	0.6300	0.7000	0.7700	39.0063
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504
Total gains	727.8456	808.8017	837.0150	887.4656	902.5313	889.9305

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000											
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	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372

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alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9819	0.9768	0.9704	0.9551	0.9286	0.8738	0.8003	0.8219	0.9069	0.9578	0.9761	0.9833 (86)
MIT	16.4229	16.7008	17.2401	18.0896	18.9564	19.8270	20.3421	20.2734	19.5971	18.4849	17.3676	16.4332 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9781	0.9717	0.9633	0.9424	0.9024	0.8096	0.6607	0.6982	0.8599	0.9433	0.9699	0.9798 (89)
MIT 2	15.2298	15.5108	16.0526	16.9173	17.7759	18.6309	19.0839	19.0366	18.4142	17.3172	16.1982	15.2575 (90)
Living area fraction	15.3766	15.6573	16.1988	17.0616	17.9212	18.7781	19.2387	19.1888	18.5598	17.4609	16.3421	15.4022 (92)
MIT	15.3766	15.6573	16.1988	17.0616	17.9212	18.7781	19.2387	19.1888	18.5598	17.4609	16.3421	15.4022 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9631	0.9537	0.9418	0.9146	0.8679	0.7753	0.6454	0.6780	0.8246	0.9163	0.9515	0.9659 (94)
Useful gains	701.0206	771.3560	788.2740	811.7127	783.3114	689.9925	550.7977	552.8355	649.4639	673.8380	675.9288	677.8543 (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	3633.2684	3506.4783	3141.9722	2567.0169	1945.7355	1272.4148	803.6196	845.0830	1372.3235	2145.8044	2923.5649	3585.3854 (97)
Space heating kWh	2181.5923	1838.0022	1751.1515	1263.8190	864.8435	0.0000	0.0000	0.0000	0.0000	1095.1430	1618.2980	2163.2031 (98a)
Space heating requirement - total per year (kWh/year)												12776.0528
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	2181.5923	1838.0022	1751.1515	1263.8190	864.8435	0.0000	0.0000	0.0000	0.0000	1095.1430	1618.2980	2163.2031 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												12776.0528
Space heating per m2										(98c) / (4) =		82.1453 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	2862.7300	2253.6385	2302.9866	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.2981	0.3526	0.3333	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	853.3276	794.6892	767.6502	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	920.9546	883.3263	843.4058	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	48.6914	65.9460	56.3622	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	12.1729	16.4865	14.0905	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												42.7499 (107)
Energy for space heating												82.1453 (99)
Energy for space cooling												0.2749 (108)
Total												82.4201 (109)
Fabric Energy Efficiency (DFEE)												82.4 (109)

Full SAP Calculation Printout



Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026	
Assessment Reference	Notional		Plot Type Ref			
Plot Address				SAP Version	10.2	
SAP Rating	58 D		DER	8.44	TER	
Environmental	91 B		% DER < TER			N/A
CO ₂ Emissions (t/year)	1.38		DFEE	82.42	TFEE	
Compliance Check	N/A		% DFEE < TFEE			
% DPER < TPER			DPER	87.25	TPER	
Assessor Details	Mr. Will Hughes				Assessor ID	FJ65-0001
Client						

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820 (5)

2. Ventilation rate

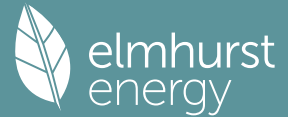
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

Full SAP Calculation Printout



Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 328.0125 325.9640 323.9560 314.5247 312.7601 304.5457 304.5457 303.0246 307.7098 312.7601 316.3298 320.0618 (39)
314.5163
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 2.1090 2.0958 2.0829 2.0223 2.0109 1.9581 1.9581 1.9483 1.9785 2.0109 2.0339 2.0579 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 1978.1465
30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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
294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 754.4703 777.5342 742.1545 720.8596 684.8373 626.7613 601.5911 601.5321 620.8555 676.2510 715.7091 738.7994 (73)

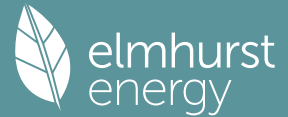
6. Solar gains

[Jan] Area Solar flux g FF Access Gains
m2 Table 6a Specific data Specific data factor Table 6d W
W/m2 or Table 6b or Table 6c
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 827.3122 907.1381 932.8011 977.1732 988.6575 935.3117 896.2155 859.9403 834.2710 823.2132 803.9966 800.4464 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372
alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9774	0.9717	0.9644	0.9473	0.9174	0.8643	0.7875	0.8089	0.8982	0.9489	0.9702	0.9789 (86)
MIT	16.5131	16.7899	17.3246	18.1663	19.0245	19.8578	20.3649	20.2989	19.6320	18.5607	17.4527	16.5242 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9726	0.9655	0.9559	0.9325	0.8880	0.7970	0.6442	0.6810	0.8481	0.9317	0.9627	0.9745 (89)
MIT 2	14.2836	14.6312	15.3065	16.3716	17.4419	18.4662	19.0265	18.9682	18.2023	16.8733	15.4769	14.3027 (90)
Living area fraction	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	FLA = Living area / (4) =			0.1231 (91)
MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (92)
Temperature adjustment												0.0000
adjusted MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9481	0.9370	0.9227	0.8917	0.8397	0.7515	0.6225	0.6534	0.8003	0.8913	0.9333	0.9514 (94)
Useful gains	784.3784	849.9738	860.6804	871.3259	830.1732	702.8877	557.8867	561.8994	667.6565	733.7681	750.3799	761.5523 (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	3364.7332	3258.5673	2933.3630	2419.4708	1856.7627	1229.5949	789.1438	827.8458	1316.4553	2026.9811	2726.7716	3320.9835 (97)
Space heating kWh	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98a)
Space heating requirement - total per year (kWh/year)												11248.2509
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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11248.2509
Space heating per m2										(98c) / (4) =		72.3221 (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 %)												170.0000 (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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98)
Space heating efficiency (main heating system 1)	170.0000	170.0000	170.0000	170.0000	170.0000	0.0000	0.0000	0.0000	0.0000	170.0000	170.0000	170.0000 (210)
Space heating fuel (main heating system)	1129.2847	952.1028	907.1035	655.6849	449.2839	0.0000	0.0000	0.0000	0.0000	565.9709	837.0600	1120.1275 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)
Efficiency of water heater	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000 (216)
Fuel for water heating, kWh/month	172.9845	153.2712	163.5519	145.5131	142.2281	111.4515	110.0783	114.4598	115.7183	147.5683	155.0573	171.3183 (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	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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												6616.6182 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												170.0000
Water heating fuel used												1703.2006 (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)												393.4653 (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												8713.2841 (238)

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----- 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	6616.6182	0.1533	1014.2140 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1703.2006	0.1417	241.2636 (264)
Space and water heating			1255.4776 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Total CO2, kg/year			1312.2668 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			8.4400 (273)

----- 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	6616.6182	1.5675	10371.4794 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1703.2006	1.5238	2595.3960 (278)
Space and water heating			12966.8753 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Total Primary energy kWh/year			13570.3855 (286)
Dwelling Primary energy Rate (DPER)			87.2500 (287)

PROPOSED DWELLING REPORT

Summary for Input Data

Plot Reference	Plot 1- ASHP	Issued on Date	04/08/2026
Assessment Reference	Proposed PV	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	91 B	DER	-0.17	TER	
Environmental	100 A	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.01	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	22.80	TPER	

Assessor Details	Mr. Will Hughes	Assessor ID	FJ65-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	West
Property Tenture	ND
Transaction Type	5
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
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	104.73 kJ/m ² K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.96 m	30.75 m ²	2.28 m
	2nd Storey:	38.50 m	62.39 m ²	2.40 m
		38.50 m	62.39 m ²	2.40 m

8.0 Living Area	19.14 m ²
-----------------	----------------------

9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Upgraded External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.25	17.00	202.87	187.37	0.00	None	15.50	Enter Gross Area
	Upgraded Basement Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.20	17.00	55.46	55.46	0.00	None	0.00	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	246.88

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Upgraded Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	62.39	62.39	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	30.75
	Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.39

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Upgraded GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.20	None	0.00	110.00	30.75
	Existing GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.70	None	0.00	110.00	31.64

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	+1	Plasterboard ceiling, carpeted chipboard floor	18.00	30.75
Internal Floor 2	+2	Plasterboard ceiling, carpeted chipboard floor	18.00	62.39

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door				0.63			1.60
Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Door	Door	Upgraded External Wall	West	1.89	
S Glazing	Glazing	Upgraded External Wall	South	2.73	
N Glazing	Glazing	Upgraded External Wall	North	3.19	
N Door	Door	Upgraded External Wall	North	1.89	
E Glazing	Glazing	Upgraded External Wall	East	3.91	
E Door	Door	Upgraded External Wall	East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	10.00	850.00	13

24.0 Main Heating 1

Percentage of Heat

 %

Database Ref. No.

Fuel Type

In Winter

In Summer

Model Name

Manufacturer

System Type

Controls SAP Code

Controls description

Summary for Input Data

Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Enter value
Flow Temperature Value	45.00

25.0 Main Heating 2	None
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26.0 Heat Networks	None
--------------------	------

27.0 Secondary Heating	None
------------------------	------

28.0 Water Heating	
Water Heating	Main Heating 1
SAP Code	901
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
Cold Water Source	From mains
Bath Count	0
Immersion Only Heating Hot Water	No

28.1 Showers		Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Description						
Shower		Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	300.00	L
Loss	2.04	kWh/day
Pipes insulation	Fully insulated primary pipework	

31.0 Thermal Store	None
--------------------	------

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
3.00	East	30°	None Or Little		No	1.00		
3.00	West	30°	None Or Little		No	1.00		
3.50	South	30°	None Or Little		No	1.00		

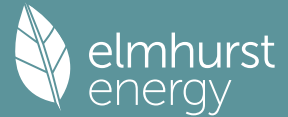
34.0 Small-scale Hydro	None
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Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations
Lower cost measures
None

Further measures to achieve even higher standards
None

Full SAP Calculation Printout



Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026
Assessment Reference	Proposed PV	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	91 B	DER	-0.17	TER	
Environmental	100 A	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.01	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	22.80	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

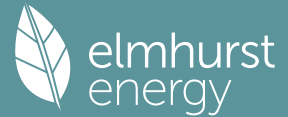
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	118.3191	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 194.9411 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 308.6768 306.6282 304.6203 295.1889 293.4244 285.2100 285.2100 283.6888 288.3740 293.4244 296.9941 300.7261 (39)
295.1805
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 1.9847 1.9715 1.9586 1.8980 1.8866 1.8338 1.8338 1.8240 1.8541 1.8866 1.9096 1.9336 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

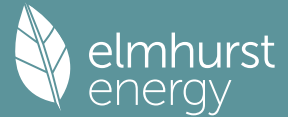
4. Water heating energy requirements (kWh/year)
Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 44.7643 43.1365 41.5087 39.8809 38.2531 36.6253 36.6253 38.2531 39.8809 41.5087 43.1365 44.7643 (42c)
Average daily hot water use (litres/day) 116.9427 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 127.4657 124.5951 121.1562 116.0633 111.8783 107.3988 105.7778 109.2030 112.8010 117.4907 122.6581 127.1488 (44)
Energy content (annual) 201.8745 177.4217 186.2126 158.8848 150.6097 132.0593 127.9291 135.2161 139.0949 159.4338 174.7489 199.0844 (45)
Distribution loss (46)m = 0.15 x (45)m 30.2812 26.6133 27.9319 23.8327 22.5915 19.8089 19.1894 20.2824 20.8642 23.9151 26.2123 29.8627 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 2.0400 (48)
Temperature factor from Table 2b 0.5400 (49)
Enter (49) or (54) in (55) 1.1016 (55)
Total storage loss 34.1496 30.8448 34.1496 33.0480 34.1496 33.0480 34.1496 34.1496 33.0480 34.1496 33.0480 34.1496 (56)
If cylinder contains dedicated solar storage 34.1496 30.8448 34.1496 33.0480 34.1496 33.0480 34.1496 34.1496 33.0480 34.1496 33.0480 34.1496 (57)
Primary loss 23.2624 21.0112 23.2624 22.5120 23.2624 22.5120 23.2624 23.2624 22.5120 23.2624 22.5120 23.2624 (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 259.2865 229.2777 243.6246 214.4448 208.0217 187.6193 185.3411 192.6281 194.6549 216.8458 230.3089 256.4964 (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 259.2865 229.2777 243.6246 214.4448 208.0217 187.6193 185.3411 192.6281 194.6549 216.8458 230.3089 256.4964 (64)
Total per year (kWh/year) = Sum(64)m = 2618.5499 (64)
12Total per year (kWh/year) = 2619 (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 113.0529 100.4775 107.8453 97.2772 96.0073 88.3577 88.4660 90.8889 90.6971 98.9413 102.5520 112.1252 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (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) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 151.9528 149.5201 144.9533 135.1072 129.0421 122.7191 118.9060 122.1626 125.9681 132.9857 142.4334 150.7059 (72)
Total internal gains 752.5494 775.6813 740.4006 719.2794 683.3727 662.3867 637.2692 637.1380 656.3802 674.6728 713.9620 736.8974 (73)

6. Solar gains
[Jan] Area Solar flux g Specific data FF Access Gains
m2 Table 6a W/m2 or Table 6b or Table 6c factor Table 6d W
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 825.3913 905.2851 931.0471 975.5929 987.1929 970.9371 931.8937 895.5462 869.7957 821.6350 802.2495 798.5444 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462	
alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031	
util living area	0.9775	0.9716	0.9641	0.9462	0.9149	0.8506	0.7665	0.7892	0.8874	0.9480	0.9701	0.9790	(86)
Living	16.6778	16.9524	17.4764	18.3037	19.1357	19.9644	20.4398	20.3785	19.7451	18.6791	17.6006	16.6950	
Non living	14.5039	14.8516	15.5149	16.5668	17.6079	18.6245	19.1444	19.0918	18.3688	17.0466	15.6820	14.5318	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	18.7906	16.9524	17.4764	18.3037	19.1357	19.9644	20.4398	20.3785	19.7451	18.6791	17.6006	17.2975	(87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780	(88)
util rest of house	0.9728	0.9656	0.9557	0.9318	0.8859	0.7822	0.6256	0.6623	0.8357	0.9311	0.9628	0.9747	(89)
MIT 2	17.3920	14.8516	15.5149	16.5668	17.6079	18.6245	19.1444	19.0918	18.3688	17.0466	15.6820	15.3980	(90)
Living area fraction									fLA = Living area /	(4) =		0.1231	(91)
MIT	17.5641	15.1101	15.7563	16.7805	17.7959	18.7894	19.3038	19.2501	18.5382	17.2475	15.9181	15.6318	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5641	15.1101	15.7563	16.7805	17.7959	18.7894	19.3038	19.2501	18.5382	17.2475	15.9181	15.6318	(93)

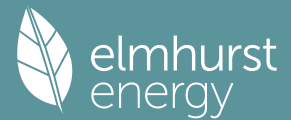
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9661	0.9378	0.9234	0.8920	0.8392	0.7397	0.6075	0.6386	0.7898	0.8919	0.9343	0.9582	(94)
Useful gains	797.3775	848.9947	859.7197	870.2152	828.4277	718.2385	566.1511	571.8761	686.9848	732.7959	749.5016	765.1996	(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	4094.3310	3130.7069	2819.6603	2326.2375	1788.6804	1194.8464	771.1527	808.5427	1279.8654	1950.5264	2618.9363	3437.8397	(97)
Space heating kWh	2452.9334	1533.3106	1458.1958	1048.3361	714.4280	0.0000	0.0000	0.0000	0.0000	905.9914	1345.9929	1988.4442	(98a)
Space heating requirement - total per year (kWh/year)												11447.6325	
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	2452.9334	1533.3106	1458.1958	1048.3361	714.4280	0.0000	0.0000	0.0000	0.0000	905.9914	1345.9929	1988.4442	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11447.6325	
Space heating per m2										(98c) / (4) =		73.6040	(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 %)													278.1687	(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	2452.9334	1533.3106	1458.1958	1048.3361	714.4280	0.0000	0.0000	0.0000	0.0000	905.9914	1345.9929	1988.4442	(98)	
Space heating efficiency (main heating system 1)	278.1687	278.1687	278.1687	278.1687	278.1687	0.0000	0.0000	0.0000	0.0000	278.1687	278.1687	278.1687	(210)	
Space heating fuel (main heating system)	881.8151	551.2161	524.2128	376.8706	256.8327	0.0000	0.0000	0.0000	0.0000	325.6986	483.8765	714.8340	(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	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964	(64)	
Efficiency of water heater	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	(216)	
Fuel for water heating, kWh/month	152.9362	135.2359	143.6982	126.4870	122.6984	110.6644	109.3206	113.6187	114.8142	127.9031	135.8442	151.2904	(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	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081	(232)	
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-128.1441	-183.8961	-274.7979	-304.3425	-305.4643	-204.9185	-202.0266	-197.7597	-183.7403	-201.2025	-136.6848	-106.8755	(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	-54.5270	-135.8806	-306.2376	-521.7837	-752.3459	-849.3508	-832.3501	-681.9223	-471.3917	-217.8069	-83.0177	-43.9020	(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													4115.3564	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													169.5391	
Water heating fuel used													1544.5113	(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)													393.4653	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-7380.3693	(233)
Wind generation													0.0000	(234)
Hydro-electric generation (Appendix N)													0.0000	(235a)

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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	-1327.0362 (238)

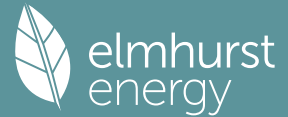
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	4115.3564	0.1540	633.8077 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1544.5113	0.1409	217.5506 (264)
Space and water heating			851.3583 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-2429.8529	0.1371	-333.2015
PV Unit electricity exported	-4950.5164	0.1215	-601.5970
Total			-934.7985 (269)
Total CO2, kg/year			-26.6510 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			-0.1700 (273)

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	4115.3564	1.5701	6461.5670 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1544.5113	1.5208	2348.9308 (278)
Space and water heating			8810.4978 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-2429.8529	1.5070	-3661.7971
PV Unit electricity exported	-4950.5164	0.4458	-2206.7807
Total			-5868.5778 (283)
Total Primary energy kWh/year			3545.4302 (286)
Dwelling Primary energy Rate (DPER)			22.8000 (287)

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Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026
Assessment Reference	Proposed PV	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	91 B	DER	-0.17	TER	
Environmental	100 A	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.01	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	22.80	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820 (5)

2. Ventilation rate

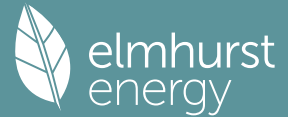
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	118.3191	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$
 Thermal mass parameter (TMP = C_m / TFA) in $\text{kJ/m}^2\text{K}$
 Thermal bridges (Default value 0.200 * total exposed area)
 Point Thermal bridges
 Total fabric heat loss

(28)...(30) + (32) + (32a)...(32e) = 16289.2200 (34)
 104.7336 (35)
 76.6220 (36)
 (36a) = 0.0000
 (33) + (36) + (36a) = 194.9411 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Average = $\text{Sum}(39)\text{m} / 12 =$	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
												295.1805
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9425 (42)											
Hot water usage for mixer showers												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths												
31.7548	31.2832	30.6191	29.3945	28.4776	27.4609	26.9118	27.5713	28.2893	29.3772	30.6269	31.6474	(42b)
Hot water usage for other uses												
44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	44.7643	(42c)
Average daily hot water use (litres/day)	70.1365 (43)											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
76.5191	74.4197	72.1278	69.2755	66.7308	64.0863	63.5371	65.8244	68.1702	70.8859	73.7634	76.4117	(44)
Energy conte	121.1875	105.9726	110.8577	94.8346	89.8324	78.8016	76.8426	81.5043	84.0607	96.1915	105.0895	119.6423 (45)
Energy content (annual)	Total = $\text{Sum}(45)\text{m} = 1164.8174$											
Distribution loss (46)m = $0.15 \times (45)\text{m}$												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss (or HIU loss):												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(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	(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	(61)
Total heat required for water heating calculated for each month												
103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959	(62)
WWHRS	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	(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	(63c)
FGHRS	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	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	(64)
12Total per year (kWh/year)	Total per year (kWh/year) = $\text{Sum}(64)\text{m} = 990.0948$ (64)											
Electric shower(s)	58.9062	52.4859	57.3126	54.6927	55.7190	53.1505	54.9222	55.7190	54.6927	57.3126	56.2349	58.9062 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = $\text{Sum}(64a)\text{m} =$	670.0548 (64a)											
Heat gains from water heating, kWh/month	40.4789	35.6407	37.8854	33.8255	33.0191	30.0330	30.0596	31.2494	31.5361	34.7688	36.3903	40.1505 (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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (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)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)
Water heating gains (Table 5)	54.4071	53.0367	50.9213	46.9799	44.3806	41.7125	40.4027	42.0019	43.8001	46.7323	50.5420	53.9658 (72)
Total internal gains	655.0037	679.1978	646.3685	631.1520	598.7112	581.3801	558.7660	556.9774	574.2122	588.4195	622.0707	640.1574 (73)

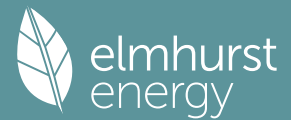
6. Solar gains

[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					
North			3.1900	10.6334	0.6300	0.7000	0.7700			10.3666	(74)	
East			3.9100	19.6403	0.6300	0.7000	0.7700			23.4691	(76)	
South			2.7300	46.7521	0.6300	0.7000	0.7700			39.0063	(78)	
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains	727.8456	808.8017	837.0150	887.4656	902.5313	889.9305	853.3904	815.3855	787.6277	735.3817	710.3582	701.8043 (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	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462

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alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9820	0.9768	0.9702	0.9543	0.9264	0.8685	0.7910	0.8137	0.9036	0.9571	0.9760	0.9834 (86)
MIT	16.5863	16.8631	17.3908	18.2261	19.0672	19.9095	20.3992	20.3336	19.6831	18.6025	17.5144	16.6027 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9783	0.9718	0.9632	0.9418	0.9006	0.8054	0.6560	0.6937	0.8573	0.9428	0.9701	0.9800 (89)
MIT 2	15.4354	15.7155	16.2459	17.0971	17.9298	18.7569	19.1853	19.1410	18.5437	17.4782	16.3883	15.4700 (90)
Living area fraction	15.5770	15.8567	16.3868	17.2360	18.0698	18.8988	19.3347	19.2877	18.6839	17.6165	16.5269	15.6094 (92)
MIT	15.5770	15.8567	16.3868	17.2360	18.0698	18.8988	19.3347	19.2877	18.6839	17.6165	16.5269	15.6094 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

8. Space heating requirement

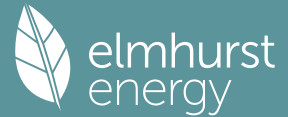
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9638	0.9543	0.9423	0.9148	0.8672	0.7730	0.6422	0.6751	0.8234	0.9166	0.9522	0.9666 (94)
Useful gains	701.5160	771.8518	788.6957	811.8228	782.6822	687.8944	548.0841	550.4958	648.5492	674.0740	676.4149	678.3626 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	3480.9631	3359.6392	3011.7100	2460.7051	1869.0529	1226.0517	779.9671	819.2201	1321.8831	2058.8251	2799.7401	3431.1049 (97)
Space heating kWh	2067.9086	1738.9931	1653.9226	1187.1953	808.2598	0.0000	0.0000	0.0000	0.0000	1030.2548	1528.7941	2048.0402 (98a)
Space heating requirement - total per year (kWh/year)												12063.3685
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	2067.9086	1738.9931	1653.9226	1187.1953	808.2598	0.0000	0.0000	0.0000	0.0000	1030.2548	1528.7941	2048.0402 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												12063.3685
Space heating per m2												77.5630 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	2680.9738	2110.5539	2156.0349	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.3175	0.3749	0.3548	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	851.2152	791.3494	764.9385	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	920.9546	883.3263	843.4058	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	50.2124	68.4308	58.3797	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	12.5531	17.1077	14.5949	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												44.2557 (107)
Energy for space heating												77.5630 (99)
Energy for space cooling												0.2845 (108)
Total												77.8475 (109)
Fabric Energy Efficiency (DFEE)												77.8 (109)

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Plot Reference	Plot 1- ASHP			Issued on Date	04/08/2026
Assessment Reference	Proposed PV	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	91 B	DER	-0.17	TER	
Environmental	100 A	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.01	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	22.80	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

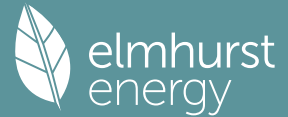
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 118.3191		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges (36a) = 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 194.9411 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Average = Sum(39)m / 12 =	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
												295.1805
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9425 (42)
Hot water usage for mixer showers	82.7014	81.4586	79.6475	76.1824	73.6252	70.7734	69.1525	70.9498	72.9201	75.9820	79.5216	82.3846 (42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	44.7643 (42c)
Average daily hot water use (litres/day)												116.9427 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	127.4657	124.5951	121.1562	116.0633	111.8783	107.3988	105.7778	109.2030	112.8010	117.4907	122.6581	127.1488 (44)
Energy content (annual)	201.8745	177.4217	186.2126	158.8848	150.6097	132.0593	127.9291	135.2161	139.0949	159.4338	174.7489	199.0844 (45)
Distribution loss (46)m = 0.15 x (45)m	30.2812	26.6133	27.9319	23.8327	22.5915	19.8089	19.1894	20.2824	20.8642	23.9151	26.2123	29.8627 (46)
Water storage loss (or HIU loss):												
Store volume												300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												2.0400 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.1016 (55)
Total storage loss	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	34.1496 (56)
If cylinder contains dedicated solar storage	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	34.1496 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (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	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (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	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (64)
12Total per year (kWh/year)												2618.5499 (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	113.0529	100.4775	107.8453	97.2772	96.0073	88.3577	88.4660	90.8889	90.6971	98.9413	102.5520	112.1252 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
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 (69)
Losses e.g. evaporation (negative values) (Table 5)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (70)
Water heating gains (Table 5)	151.9528	149.5201	144.9533	135.1072	129.0421	122.7191	118.9060	122.1626	125.9681	132.9857	142.4334	150.7059 (71)
Total internal gains	752.5494	775.6813	740.4006	719.2794	683.3727	662.3867	637.2692	637.1380	656.3802	674.6728	713.9620	736.8974 (73)

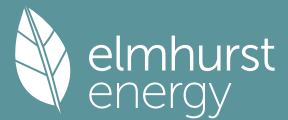
6. Solar gains

[Jan]						Area m2	Solar flux Table 6a	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d		Gains W
North						3.1900	10.6334	0.6300	0.7000	0.7700		10.3666 (74)
East						3.9100	19.6403	0.6300	0.7000	0.7700		23.4691 (76)
South						2.7300	46.7521	0.6300	0.7000	0.7700		39.0063 (78)
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains	825.3913	905.2851	931.0471	975.5929	987.1929	970.9371	931.8937	895.5462	869.7957	821.6350	802.2495	798.5444 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462	
alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031	
util living area	0.9775	0.9716	0.9641	0.9462	0.9149	0.8506	0.7665	0.7892	0.8874	0.9480	0.9701	0.9790	(86)
Living	16.6778	16.9524	17.4764	18.3037	19.1357	19.9644	20.4398	20.3785	19.7451	18.6791	17.6006	16.6950	
Non living	14.5039	14.8516	15.5149	16.5668	17.6079	18.6245	19.1444	19.0918	18.3688	17.0466	15.6820	14.5318	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	18.7906	16.9524	17.4764	18.3037	19.1357	19.9644	20.4398	20.3785	19.7451	18.6791	17.6006	17.2975	(87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780	(88)
util rest of house	0.9728	0.9656	0.9557	0.9318	0.8859	0.7822	0.6256	0.6623	0.8357	0.9311	0.9628	0.9747	(89)
MIT 2	17.3920	14.8516	15.5149	16.5668	17.6079	18.6245	19.1444	19.0918	18.3688	17.0466	15.6820	15.3980	(90)
Living area fraction									fLA = Living area /	(4) =		0.1231	(91)
MIT	17.5641	15.1101	15.7563	16.7805	17.7959	18.7894	19.3038	19.2501	18.5382	17.2475	15.9181	15.6318	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5641	15.1101	15.7563	16.7805	17.7959	18.7894	19.3038	19.2501	18.5382	17.2475	15.9181	15.6318	(93)

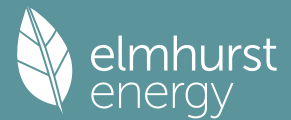
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9661	0.9378	0.9234	0.8920	0.8392	0.7397	0.6075	0.6386	0.7898	0.8919	0.9343	0.9582	(94)
Useful gains	797.3775	848.9947	859.7197	870.2152	828.4277	718.2385	566.1511	571.8761	686.9848	732.7959	749.5016	765.1996	(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	4094.3310	3130.7069	2819.6603	2326.2375	1788.6804	1194.8464	771.1527	808.5427	1279.8654	1950.5264	2618.9363	3437.8397	(97)
Space heating kWh	2452.9334	1533.3106	1458.1958	1048.3361	714.4280	0.0000	0.0000	0.0000	0.0000	905.9914	1345.9929	1988.4442	(98a)
Space heating requirement - total per year (kWh/year)												11447.6325	
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	2452.9334	1533.3106	1458.1958	1048.3361	714.4280	0.0000	0.0000	0.0000	0.0000	905.9914	1345.9929	1988.4442	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11447.6325	
Space heating per m2										(98c) / (4) =		73.6040	(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 %)													278.1687	(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	2452.9334	1533.3106	1458.1958	1048.3361	714.4280	0.0000	0.0000	0.0000	0.0000	905.9914	1345.9929	1988.4442	(98)	
Space heating efficiency (main heating system 1)	278.1687	278.1687	278.1687	278.1687	278.1687	0.0000	0.0000	0.0000	0.0000	278.1687	278.1687	278.1687	(210)	
Space heating fuel (main heating system)	881.8151	551.2161	524.2128	376.8706	256.8327	0.0000	0.0000	0.0000	0.0000	325.6986	483.8765	714.8340	(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	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964	(64)	
Efficiency of water heater (217)m	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	169.5391	(216)	
Fuel for water heating, kWh/month	152.9362	135.2359	143.6982	126.4870	122.6984	110.6644	109.3206	113.6187	114.8142	127.9031	135.8442	151.2904	(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	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081	(232)	
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-128.1441	-183.8961	-274.7979	-304.3425	-305.4643	-204.9185	-202.0266	-197.7597	-183.7403	-201.2025	-136.6848	-106.8755	(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	-54.5270	-135.8806	-306.2376	-521.7837	-752.3459	-849.3508	-832.3501	-681.9223	-471.3917	-217.8069	-83.0177	-43.9020	(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													4115.3564	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													169.5391	
Water heating fuel used													1544.5113	(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)													393.4653	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-7380.3693	(233)
Wind generation													0.0000	(234)
Hydro-electric generation (Appendix N)													0.0000	(235a)

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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	-1327.0362 (238)

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	4115.3564	0.1540	633.8077 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1544.5113	0.1409	217.5506 (264)
Space and water heating			851.3583 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-2429.8529	0.1371	-333.2015
PV Unit electricity exported	-4950.5164	0.1215	-601.5970
Total			-934.7985 (269)
Total CO2, kg/year			-26.6510 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			-0.1700 (273)

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	4115.3564	1.5701	6461.5670 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1544.5113	1.5208	2348.9308 (278)
Space and water heating			8810.4978 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-2429.8529	1.5070	-3661.7971
PV Unit electricity exported	-4950.5164	0.4458	-2206.7807
Total			-5868.5778 (283)
Total Primary energy kWh/year			3545.4302 (286)
Dwelling Primary energy Rate (DPER)			22.8000 (287)

Appendix 3: Minimal PV

Address: 1a Clarendon Road
Hinckley
Leicestershire
LE10 0PJ
Tel: 01455 634 855
Email: info@ukbuildingcompliance.co.uk
Website: www.ukbuildingcompliance.co.uk

4th August 2026

To whom it may concern,

Part L Justification Statement in support of proposed conversion at Basement Conversion, 10 Tottington Road, Bury, BL8 1LH- Option 1, Minimal PV.

In accordance with the criteria set out In Approved Document Part L we have used SAP10 to model the dwelling to a notional standard and the dwelling to the proposed standard. The SAP Output Reports for both scenarios are appended to this Statement.

The Notional Dwelling has a Dwelling CO2 Emission Rate of 24.85 kg/ m².
The Notional Dwelling has a Dwelling Fabric Energy Efficiency of 82.42 kWh/ m².
The Notional Dwelling has a Dwelling Primary Energy Rate of 135.85 kWh/ m².

The Proposed Dwelling has a Dwelling CO2 Emission Rate of 14.65 kg/ m².
The Proposed Dwelling has a Dwelling Fabric Energy Efficiency of 77.85 kWh/ m².
The Proposed Dwelling has a Dwelling Primary Energy Rate of 80.20 kWh/ m².

The proposed dwelling is more efficient than the notional dwelling and therefore compliant with regulations.

If any information contained in this report is unclear or requires additional explanation please do not hesitate to contact a member of our team.

Regards

Will Hughes

Environmental Consultant

UK Building Compliance

NOTIONAL DWELLING REPORT

Summary for Input Data

Plot Reference	Plot 1- Gas	Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	76 C	DER	24.85	TER	
Environmental	74 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	4.08	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	135.85	TPER	

Assessor Details	Mr. Will Hughes	Assessor ID	FJ65-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	West
Property Tenture	ND
Transaction Type	5
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
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	104.73 kJ/m ² K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.96 m	30.75 m ²	2.28 m
	2nd Storey:	38.50 m	62.39 m ²	2.40 m
		38.50 m	62.39 m ²	2.40 m

8.0 Living Area	19.14 m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Upgraded External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	202.87	187.37	0.00	None	15.50	Enter Gross Area
	Upgraded Basement Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.30	17.00	55.46	55.46	0.00	None	0.00	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	246.88

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Upgraded Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	62.39	62.39	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	30.75
	Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.39

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Upgraded GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.25	None	0.00	110.00	30.75
	Existing GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.70	None	0.00	110.00	31.64

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	+1	Plasterboard ceiling, carpeted chipboard floor	18.00	30.75
Internal Floor 2	+2	Plasterboard ceiling, carpeted chipboard floor	18.00	62.39

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door				0.63			1.80
Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.60

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Door	Door	Upgraded External Wall	West	1.89	
S Glazing	Glazing	Upgraded External Wall	South	2.73	
N Glazing	Glazing	Upgraded External Wall	North	3.19	
N Door	Door	Upgraded External Wall	North	1.89	
E Glazing	Glazing	Upgraded External Wall	East	3.91	
E Door	Door	Upgraded External Wall	East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	10.00	850.00	13

24.0 Main Heating 1

Percentage of Heat

 %

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Controls description

Delayed Start Stat

Flue Type

Fan Assisted Flue

Summary for Input Data

Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	No

25.0 Main Heating 2	None
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26.0 Heat Networks	None
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27.0 Secondary Heating	None
-------------------------------	------

28.0 Water Heating	
Water Heating	Main Heating 1
SAP Code	901
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	No
Cold Water Source	From mains
Bath Count	0

28.1 Showers					
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System	
--	--

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	300.00	L
Loss	1.39	kWh/day
Pipes insulation	Fully insulated primary pipework	

31.0 Thermal Store	None
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Recommendations	
Lower cost measures	None
Further measures to achieve even higher standards	None

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	76 C	DER	24.85	TER	
Environmental	74 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	4.08	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	135.85	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

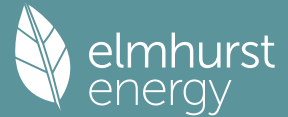
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 137.6549		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges
Total fabric heat loss (33) + (36) + (36a) = 76.6220 (36)
0.0000
214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 328.0125 325.9640 323.9560 314.5247 312.7601 304.5457 304.5457 303.0246 307.7098 312.7601 316.3298 320.0618 (39)
314.5163
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 2.1090 2.0958 2.0829 2.0223 2.0109 1.9581 1.9581 1.9483 1.9785 2.0109 2.0339 2.0579 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 1978.1465
30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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
294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 754.4703 777.5342 742.1545 720.8596 684.8373 626.7613 601.5911 601.5321 620.8555 676.2510 715.7091 738.7994 (73)

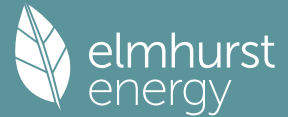
6. Solar gains

[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
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 827.3122 907.1381 932.8011 977.1732 988.6575 935.3117 896.2155 859.9403 834.2710 823.2132 803.9966 800.4464 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372
alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9774	0.9717	0.9644	0.9473	0.9174	0.8643	0.7875	0.8089	0.8982	0.9489	0.9702	0.9789 (86)
MIT	16.5131	16.7899	17.3246	18.1663	19.0245	19.8578	20.3649	20.2989	19.6320	18.5607	17.4527	16.5242 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9726	0.9655	0.9559	0.9325	0.8880	0.7970	0.6442	0.6810	0.8481	0.9317	0.9627	0.9745 (89)
MIT 2	14.2836	14.6312	15.3065	16.3716	17.4419	18.4662	19.0265	18.9682	18.2023	16.8733	15.4769	14.3027 (90)
Living area fraction	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (92)
MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)
Temperature adjustment												0.0000
adjusted MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9481	0.9370	0.9227	0.8917	0.8397	0.7515	0.6225	0.6534	0.8003	0.8913	0.9333	0.9514 (94)
Useful gains	784.3784	849.9738	860.6804	871.3259	830.1732	702.8877	557.8867	561.8994	667.6565	733.7681	750.3799	761.5523 (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	3364.7332	3258.5673	2933.3630	2419.4708	1856.7627	1229.5949	789.1438	827.8458	1316.4553	2026.9811	2726.7716	3320.9835 (97)
Space heating kWh	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98a)
Space heating requirement - total per year (kWh/year)												11248.2509
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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11248.2509
Space heating per m2										(98c) / (4) =		72.3221 (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 %)												79.0000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98)
Space heating efficiency (main heating system 1)	79.0000	79.0000	79.0000	79.0000	79.0000	0.0000	0.0000	0.0000	0.0000	79.0000	79.0000	79.0000 (210)
Space heating fuel (main heating system)	2430.1063	2048.8288	1951.9948	1410.9675	966.8135	0.0000	0.0000	0.0000	0.0000	1217.9120	1801.2683	2410.4010 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)
Efficiency of water heater (217)m	77.5188	77.4550	77.3011	76.9878	76.3565	69.0000	69.0000	69.0000	69.0000	76.7162	77.2626	77.5207 (217)
Fuel for water heating, kWh/month	379.3581	336.4033	359.6822	321.3137	316.6566	274.5907	271.2073	282.0023	285.1032	327.0053	341.1708	375.6947 (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	3.4822	3.1452	3.4822	3.3699	3.4822	3.3699	3.4822	3.4822	3.3699	3.4822	3.3699	3.4822 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (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												14238.2922 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												74.0000
Water heating fuel used												3870.1882 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans: central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												41.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (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)

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Total delivered energy for all uses

18542.9458 (238)

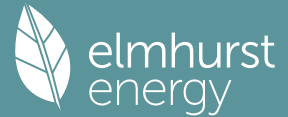
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	14238.2922	0.2100	2990.0414	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3870.1882	0.2100	812.7395	(264)
Space and water heating			3802.7809	(265)
Pumps, fans and electric keep-hot	41.0000	0.1387	5.6872	(267)
Energy for lighting	393.4653	0.1443	56.7892	(268)
Total CO2, kg/year			3865.2573	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			24.8500	(273)

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	14238.2922	1.1300	16089.2702	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3870.1882	1.1300	4373.3127	(278)
Space and water heating			20462.5829	(279)
Pumps, fans and electric keep-hot	41.0000	1.5128	62.0248	(281)
Energy for lighting	393.4653	1.5338	603.5102	(282)
Total Primary energy kWh/year			21128.1180	(286)
Dwelling Primary energy Rate (DPER)			135.8500	(287)

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Plot Reference	Plot 1- Gas				Issued on Date	04/08/2026	
Assessment Reference	Notional			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	76 C		DER	24.85		TER	
Environmental	74 C		% DER < TER				N/A
CO ₂ Emissions (t/year)	4.08		DFEE	82.42		TFEE	
Compliance Check	N/A		% DFEE < TFEE				
% DPER < TPER			DPER	135.85		TPER	
Assessor Details	Mr. Will Hughes				Assessor ID	FJ65-0001	
Client							

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820 (5)

2. Ventilation rate

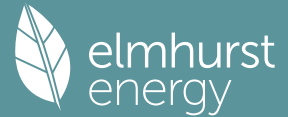
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$
 Thermal mass parameter ($\text{TMP} = C_m / \text{TFA}$) in $\text{kJ/m}^2\text{K}$
 Thermal bridges (Default value $0.200 \times \text{total exposed area}$)
 Point Thermal bridges
 Total fabric heat loss

$(28) \dots (30) + (32) + (32a) \dots (32e) = 16289.2200$ (34)
 104.7336 (35)
 76.6220 (36)
 $(36a) = 0.0000$
 $(33) + (36) + (36a) = 214.2769$ (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850
Average = $\text{Sum}(39)\text{m} / 12 =$	328.0125	325.9640	323.9560	314.5247	312.7601	304.5457	304.5457	303.0246	307.7098	312.7601	316.3298	320.0618
												314.5163
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.1090	2.0958	2.0829	2.0223	2.0109	1.9581	1.9581	1.9483	1.9785	2.0109	2.0339	2.0579
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9425											
Hot water usage for mixer showers	0.0000											
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hot water usage for other uses	31.7548	31.2832	30.6191	29.3945	28.4776	27.4609	26.9118	27.5713	28.2893	29.3772	30.6269	31.6474
Average daily hot water use (litres/day)	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	44.7643
Daily hot water use	76.5191	74.4197	72.1278	69.2755	66.7308	64.0863	63.5371	65.8244	68.1702	70.8859	73.7634	76.4117
Energy content (annual)	121.1875	105.9726	110.8577	94.8346	89.8324	78.8016	76.8426	81.5043	84.0607	96.1915	105.0895	119.6423
Distribution loss (46)m = $0.15 \times (45)\text{m}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water storage loss (or HIU 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
Total storage 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
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
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
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
Total heat required for water heating calculated for each month	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959
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
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
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
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
Output from w/h	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959
12Total per year (kWh/year)	Total per year (kWh/year) = $\text{Sum}(64)\text{m} =$											
Electric shower(s)	58.9062	52.4859	57.3126	54.6927	55.7190	53.1505	54.9222	55.7190	54.6927	57.3126	56.2349	58.9062
Heat gains from water heating, kWh/month	40.4789	35.6407	37.8854	33.8255	33.0191	30.0330	30.0596	31.2494	31.5361	34.7688	36.3903	40.1505

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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126
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
Losses e.g. evaporation (negative values) (Table 5)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006
Water heating gains (Table 5)	54.4071	53.0367	50.9213	46.9799	44.3806	41.7125	40.4027	42.0019	43.8001	46.7323	50.5420	53.9658
Total internal gains	655.0037	679.1978	646.3685	631.1520	598.7112	581.3801	558.7660	556.9774	574.2122	588.4195	622.0707	640.1574

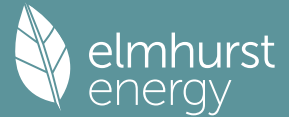
6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	3.1900	10.6334	0.6300	0.7000	0.7700	10.3666
East	3.9100	19.6403	0.6300	0.7000	0.7700	23.4691
South	2.7300	46.7521	0.6300	0.7000	0.7700	39.0063
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504
Total gains	727.8456	808.8017	837.0150	887.4656	902.5313	889.9305

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000											
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	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372

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alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9819	0.9768	0.9704	0.9551	0.9286	0.8738	0.8003	0.8219	0.9069	0.9578	0.9761	0.9833 (86)
MIT	16.4229	16.7008	17.2401	18.0896	18.9564	19.8270	20.3421	20.2734	19.5971	18.4849	17.3676	16.4332 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9781	0.9717	0.9633	0.9424	0.9024	0.8096	0.6607	0.6982	0.8599	0.9433	0.9699	0.9798 (89)
MIT 2	15.2298	15.5108	16.0526	16.9173	17.7759	18.6309	19.0839	19.0366	18.4142	17.3172	16.1982	15.2575 (90)
Living area fraction	15.3766	15.6573	16.1988	17.0616	17.9212	18.7781	19.2387	19.1888	18.5598	17.4609	16.3421	15.4022 (92)
MIT	15.3766	15.6573	16.1988	17.0616	17.9212	18.7781	19.2387	19.1888	18.5598	17.4609	16.3421	15.4022 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9631	0.9537	0.9418	0.9146	0.8679	0.7753	0.6454	0.6780	0.8246	0.9163	0.9515	0.9659 (94)
Useful gains	701.0206	771.3560	788.2740	811.7127	783.3114	689.9925	550.7977	552.8355	649.4639	673.8380	675.9288	677.8543 (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	3633.2684	3506.4783	3141.9722	2567.0169	1945.7355	1272.4148	803.6196	845.0830	1372.3235	2145.8044	2923.5649	3585.3854 (97)
Space heating kWh	2181.5923	1838.0022	1751.1515	1263.8190	864.8435	0.0000	0.0000	0.0000	0.0000	1095.1430	1618.2980	2163.2031 (98a)
Space heating requirement - total per year (kWh/year)												12776.0528
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	2181.5923	1838.0022	1751.1515	1263.8190	864.8435	0.0000	0.0000	0.0000	0.0000	1095.1430	1618.2980	2163.2031 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												12776.0528
Space heating per m2										(98c) / (4) =		82.1453 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	2862.7300	2253.6385	2302.9866	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.2981	0.3526	0.3333	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	853.3276	794.6892	767.6502	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	920.9546	883.3263	843.4058	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	48.6914	65.9460	56.3622	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	12.1729	16.4865	14.0905	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												42.7499 (107)
Energy for space heating												82.1453 (99)
Energy for space cooling												0.2749 (108)
Total												82.4201 (109)
Fabric Energy Efficiency (DFEE)												82.4 (109)

Full SAP Calculation Printout



Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Notional	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	76 C	DER	24.85	TER	
Environmental	74 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	4.08	DFEE	82.42	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	135.85	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

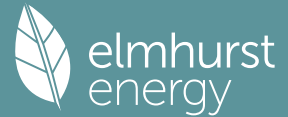
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.8000	10.2060		(26)
Glazing			9.8300	1.5038	14.7820		(27)
Upgraded GF			30.7500	0.2500	7.6875	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.3000	56.2110	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.3000	16.6380	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	137.6549	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 214.2769 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 328.0125 325.9640 323.9560 314.5247 312.7601 304.5457 304.5457 303.0246 307.7098 312.7601 316.3298 320.0618 (39)
314.5163
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 2.1090 2.0958 2.0829 2.0223 2.0109 1.9581 1.9581 1.9483 1.9785 2.0109 2.0339 2.0579 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 47.1203 45.4068 43.6934 41.9799 40.2664 38.5530 38.5530 40.2664 41.9799 43.6934 45.4068 47.1203 (42c)
Average daily hot water use (litres/day) 119.0846 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 129.8217 126.8654 123.3409 118.1623 113.8916 109.3264 107.7055 111.2163 114.9000 119.6754 124.9284 129.5049 (44)
Energy content (annual) 205.6059 180.6547 189.5704 161.7583 153.3200 134.4296 130.2604 137.7090 141.6832 162.3984 177.9834 202.7733 (45)
Distribution loss (46)m = 0.15 x (45)m 30.8409 27.0982 28.4356 24.2637 22.9980 20.1644 19.5391 20.6564 21.2525 24.3598 26.6975 30.4160 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3900 (48)
Temperature factor from Table 2b 0.7800 (49)
Enter (49) or (54) in (55) 1.0842 (55)
Total storage loss 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (56)
If cylinder contains dedicated solar storage 33.6102 30.3576 33.6102 32.5260 33.6102 32.5260 33.6102 33.6102 32.5260 33.6102 32.5260 33.6102 (57)
Primary loss 54.8576 49.5488 54.8576 53.0880 54.8576 22.5120 23.2624 23.2624 22.5120 54.8576 53.0880 54.8576 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (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 294.0737 260.5611 278.0382 247.3723 241.7878 189.4676 187.1330 194.5816 196.7212 250.8662 263.5974 291.2411 (64)
Total per year (kWh/year) = Sum(64)m = 2895.4411 (64)
2895 (64)
12Total per year (kWh/year)
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 112.2500 99.7067 106.9182 96.2550 94.8650 62.7074 61.9215 64.3982 65.1193 97.8835 101.6499 111.3082 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 150.8737 148.3731 143.7073 133.6875 127.5067 87.0937 83.2278 86.5567 90.4434 131.5639 141.1804 149.6078 (72)
Total internal gains 754.4703 777.5342 742.1545 720.8596 684.8373 626.7613 601.5911 601.5321 620.8555 676.2510 715.7091 738.7994 (73)

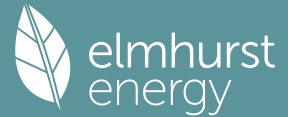
6. Solar gains

[Jan] Area Solar flux g FF Access Gains
m2 Table 6a Specific data Specific data Access factor W
W/m2 or Table 6b or Table 6c Table 6d
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 827.3122 907.1381 932.8011 977.1732 988.6575 935.3117 896.2155 859.9403 834.2710 823.2132 803.9966 800.4464 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.7945	13.8812	13.9673	14.3861	14.4673	14.8575	14.8575	14.9321	14.7047	14.4673	14.3040	14.1372
alpha	1.9196	1.9254	1.9312	1.9591	1.9645	1.9905	1.9905	1.9955	1.9803	1.9645	1.9536	1.9425
util living area	0.9774	0.9717	0.9644	0.9473	0.9174	0.8643	0.7875	0.8089	0.8982	0.9489	0.9702	0.9789 (86)
MIT	16.5131	16.7899	17.3246	18.1663	19.0245	19.8578	20.3649	20.2989	19.6320	18.5607	17.4527	16.5242 (87)
Th 2	19.2617	19.2702	19.2786	19.3185	19.3261	19.3614	19.3614	19.3680	19.3477	19.3261	19.3108	19.2950 (88)
util rest of house	0.9726	0.9655	0.9559	0.9325	0.8880	0.7970	0.6442	0.6810	0.8481	0.9317	0.9627	0.9745 (89)
MIT 2	14.2836	14.6312	15.3065	16.3716	17.4419	18.4662	19.0265	18.9682	18.2023	16.8733	15.4769	14.3027 (90)
Living area fraction	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	FLA = Living area / (4) =	17.0809	15.7200	0.1231 (91)
MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (92)
Temperature adjustment												0.0000
adjusted MIT	14.5579	14.8967	15.5548	16.5925	17.6367	18.6375	19.1912	19.1319	18.3782	17.0809	15.7200	14.5761 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9481	0.9370	0.9227	0.8917	0.8397	0.7515	0.6225	0.6534	0.8003	0.8913	0.9333	0.9514 (94)
Useful gains	784.3784	849.9738	860.6804	871.3259	830.1732	702.8877	557.8867	561.8994	667.6565	733.7681	750.3799	761.5523 (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	3364.7332	3258.5673	2933.3630	2419.4708	1856.7627	1229.5949	789.1438	827.8458	1316.4553	2026.9811	2726.7716	3320.9835 (97)
Space heating kWh	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98a)
Space heating requirement - total per year (kWh/year)												11248.2509
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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												11248.2509
Space heating per m2										(98c) / (4) =		72.3221 (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 %)	79.0000 (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	1919.7840	1618.5748	1542.0759	1114.6643	763.7826	0.0000	0.0000	0.0000	0.0000	962.1505	1423.0020	1904.2168 (98)
Space heating efficiency (main heating system 1)	79.0000	79.0000	79.0000	79.0000	79.0000	0.0000	0.0000	0.0000	0.0000	79.0000	79.0000	79.0000 (210)
Space heating fuel (main heating system)	2430.1063	2048.8288	1951.9948	1410.9675	966.8135	0.0000	0.0000	0.0000	0.0000	1217.9120	1801.2683	2410.4010 (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	294.0737	260.5611	278.0382	247.3723	241.7878	189.4676	187.1330	194.5816	196.7212	250.8662	263.5974	291.2411 (64)
Efficiency of water heater (217)m	77.5188	77.4550	77.3011	76.9878	76.3565	69.0000	69.0000	69.0000	69.0000	76.7162	77.2626	74.0000 (216)
Fuel for water heating, kWh/month	379.3581	336.4033	359.6822	321.3137	316.6566	274.5907	271.2073	282.0023	285.1032	327.0053	341.1708	77.5207 (217)
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 (219)
Pumps and Fa	3.4822	3.1452	3.4822	3.3699	3.4822	3.3699	3.4822	3.4822	3.3699	3.4822	3.3699	0.0000 (221)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	3.4822 (231)

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												14238.2922 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												74.0000
Water heating fuel used												3870.1882 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans: central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												41.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (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)

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Total delivered energy for all uses

18542.9458 (238)

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	14238.2922	0.2100	2990.0414	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3870.1882	0.2100	812.7395	(264)
Space and water heating			3802.7809	(265)
Pumps, fans and electric keep-hot	41.0000	0.1387	5.6872	(267)
Energy for lighting	393.4653	0.1443	56.7892	(268)
Total CO2, kg/year			3865.2573	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			24.8500	(273)

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	14238.2922	1.1300	16089.2702	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3870.1882	1.1300	4373.3127	(278)
Space and water heating			20462.5829	(279)
Pumps, fans and electric keep-hot	41.0000	1.5128	62.0248	(281)
Energy for lighting	393.4653	1.5338	603.5102	(282)
Total Primary energy kWh/year			21128.1180	(286)
Dwelling Primary energy Rate (DPER)			135.8500	(287)

PROPOSED DWELLING REPORT

Summary for Input Data



Plot Reference	Plot 1- Gas	Issued on Date	04/08/2026
Assessment Reference	Proposed- Minimal PV	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	96 A	DER	14.65	TER	
Environmental	85 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	2.45	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	80.20	TPER	

Assessor Details	Mr. Will Hughes	Assessor ID	FJ65-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	West
Property Tenure	ND
Transaction Type	5
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
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	104.73 kJ/m ² K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.96 m	30.75 m ²	2.28 m
	2nd Storey:	38.50 m	62.39 m ²	2.40 m
		38.50 m	62.39 m ²	2.40 m

8.0 Living Area	19.14 m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Upgraded External Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.25	17.00	202.87	187.37	0.00	None	15.50	Enter Gross Area
	Upgraded Basement Wall	Solid Wall	Solid wall : dense plaster, insulation, any outside structure	0.20	17.00	55.46	55.46	0.00	None	0.00	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	246.88

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Upgraded Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	62.39	62.39	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	30.75
	Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.39

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	Upgraded GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.20	None	0.00	110.00	30.75
	Existing GF	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.70	None	0.00	110.00	31.64

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	+1	Plasterboard ceiling, carpeted chipboard floor	18.00	30.75
Internal Floor 2	+2	Plasterboard ceiling, carpeted chipboard floor	18.00	62.39

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Solid Door				0.63			1.60
Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Door	Door	Upgraded External Wall	West	1.89	
S Glazing	Glazing	Upgraded External Wall	South	2.73	
N Glazing	Glazing	Upgraded External Wall	North	3.19	
N Door	Door	Upgraded External Wall	North	1.89	
E Glazing	Glazing	Upgraded External Wall	East	3.91	
E Door	Door	Upgraded External Wall	East	1.89	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

Number of open flues

Number of chimneys/flues attached to closed fire

Number of flues attached to solid fuel boiler

Number of flues attached to other heater

Number of blocked chimneys

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	10.00	850.00	13

24.0 Main Heating 1

Percentage of Heat

 %

Database Ref. No.

Fuel Type

In Winter

In Summer

Model Name

Manufacturer

System Type

Controls SAP Code

Controls description

Summary for Input Data

Delayed Start Stat	Yes											
Flue Type	Balanced											
Fan Assisted Flue	Yes											
Is MHS Pumped	Pump in heated space											
Heating Pump Age	2013 or later											
Heat Emitter	Radiators											
Flow Temperature	Unknown											
Boiler Interlock	Yes											
25.0 Main Heating 2												
None												
26.0 Heat Networks												
None												
27.0 Secondary Heating												
None												
28.0 Water Heating												
Water Heating	Main Heating 1											
SAP Code	901											
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											
Cold Water Source	From mains											
Bath Count	0											
28.1 Showers												
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To							
Shower	Vented hot water system	7.00		No								
28.3 Waste Water Heat Recovery System												
29.0 Hot Water Cylinder												
Hot Water Cylinder	Hot Water Cylinder											
Cylinder Stat	Yes											
Cylinder In Heated Space	Yes											
Independent Time Control	Yes											
Insulation Type	Measured Loss											
Cylinder Volume	300.00											L
Loss	2.04											kWh/day
Pipes insulation	Fully insulated primary pipework											
31.0 Thermal Store												
None												
32.0 Photovoltaic Unit												
One Dwelling	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				
3.00	South	30°	None Or Little		No	1.00						
3.00	East	30°	None Or Little		No	1.00						
3.00	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	

Summary for Input Data



Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Proposed- Minimal PV	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	96 A	DER	14.65	TER	
Environmental	85 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	2.45	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	80.20	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

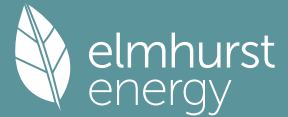
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 118.3191		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
 Point Thermal bridges (36a) = 76.6220 (36)
 Total fabric heat loss (33) + (36) + (36a) = 194.9411 (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	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Heat transfer coeff	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
Average = Sum(39)m / 12 =												295.1805
HLP	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
HLP (average)												1.8979
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9425 (42)
Hot water usage for mixer showers												82.3846 (42a)
	82.7014	81.4586	79.6475	76.1824	73.6252	70.7734	69.1525	70.9498	72.9201	75.9820	79.5216	
Hot water usage for baths												0.0000 (42b)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Hot water usage for other uses												44.7643 (42c)
	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	
Average daily hot water use (litres/day)												116.9427 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	127.4657	124.5951	121.1562	116.0633	111.8783	107.3988	105.7778	109.2030	112.8010	117.4907	122.6581	127.1488 (44)
Energy conte	201.8745	177.4217	186.2126	158.8848	150.6097	132.0593	127.9291	135.2161	139.0949	159.4338	174.7489	199.0844 (45)
Energy content (annual)												Total = Sum(45)m = 1942.5699
Distribution loss (46)m = 0.15 x (45)m												29.8627 (46)
	30.2812	26.6133	27.9319	23.8327	22.5915	19.8089	19.1894	20.2824	20.8642	23.9151	26.2123	
Water storage loss (or HIU loss):												300.0000 (47)
Store volume												2.0400 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												1.1016 (55)
Enter (49) or (54) in (55)												
Total storage loss												34.1496 (56)
	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	
If cylinder contains dedicated solar storage												34.1496 (57)
	34.1496	30.8448	34.1496	33.0480	34.1496	33.0480	34.1496	34.1496	33.0480	34.1496	33.0480	
Primary loss												23.2624 (59)
	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	
Combi loss												0.0000 (61)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Total heat required for water heating calculated for each month												259.2865 (62)
	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	
WWHRS												0.0000 (63a)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
PV diverter												-0.0000 (63b)
	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	
Solar input												0.0000 (63c)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
FGHRS												0.0000 (63d)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Output from w/h												259.2865 (64)
	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	
Total per year (kWh/year)												2618.5499 (64)
												2619
Electric shower(s)												0.0000 (64a)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												112.1252 (65)
	113.0529	100.4775	107.8453	97.2772	96.0073	88.3577	88.4660	90.8889	90.6971	98.9413	102.5520	

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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (69)
Pumps, fans												
	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)
Water heating gains (Table 5)												
	151.9528	149.5201	144.9533	135.1072	129.0421	122.7191	118.9060	122.1626	125.9681	132.9857	142.4334	150.7059 (72)
Total internal gains	755.5494	778.6813	743.4006	722.2794	686.3727	662.3867	637.2692	637.1380	656.3802	677.6728	716.9620	739.8974 (73)

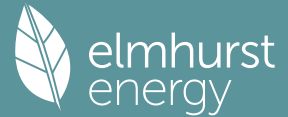
6. Solar gains

[Jan]												Gains	
					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d			W	
North					3.1900	10.6334	0.6300	0.7000	0.7700			10.3666 (74)	
East					3.9100	19.6403	0.6300	0.7000	0.7700			23.4691 (76)	
South					2.7300	46.7521	0.6300	0.7000	0.7700			39.0063 (78)	
Solar gains		72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains		828.3913	908.2851	934.0471	978.5929	990.1929	970.9371	931.8937	895.5462	869.7957	824.6350	805.2495	801.5444 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462
alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9773	0.9714	0.9639	0.9459	0.9145	0.8506	0.7665	0.7892	0.8874	0.9476	0.9699	0.9789 (86)
MIT	16.6805	16.9552	17.4791	18.3063	19.1380	19.9644	20.4398	20.3785	19.7451	18.6817	17.6034	16.6979 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9726	0.9654	0.9555	0.9314	0.8853	0.7822	0.6256	0.6623	0.8357	0.9307	0.9626	0.9746 (89)
MIT 2	14.5074	14.8550	15.5183	16.5699	17.6106	18.6245	19.1444	19.0918	18.3688	17.0497	15.6855	14.5354 (90)
Living area fraction	14.7748	15.1135	15.7596	16.7836	17.7986	18.7894	19.3038	19.2501	18.5382	17.2506	15.9215	14.8015 (91)
MIT	14.7748	15.1135	15.7596	16.7836	17.7986	18.7894	19.3038	19.2501	18.5382	17.2506	15.9215	14.8015 (92)
Temperature adjustment	14.6248	14.9635	15.6096	16.6336	17.6486	18.6394	19.1538	19.1001	18.3882	17.1006	15.7715	-0.1500
adjusted MIT	14.6248	14.9635	15.6096	16.6336	17.6486	18.6394	19.1538	19.1001	18.3882	17.1006	15.7715	14.6515 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9475	0.9360	0.9210	0.8883	0.8329	0.7285	0.5873	0.6197	0.7804	0.8875	0.9320	0.9509 (94)
Useful gains	784.8940	850.1278	860.2489	869.2914	824.7503	707.3241	547.3452	554.9714	678.8134	731.8493	750.4741	762.2226 (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	3187.0256	3085.7404	2774.9638	2282.8762	1745.4662	1152.0649	728.3712	765.9894	1236.6093	1907.4260	2575.3927	3143.0332 (97)
Space heating kWh	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98a)
Space heating requirement - total per year (kWh/year)												10376.7527
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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												10376.7527
Space heating per m2										(98c) / (4) =		66.7187 (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 %)												89.0000 (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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98)
Space heating efficiency (main heating system 1)	89.0000	89.0000	89.0000	89.0000	89.0000	0.0000	0.0000	0.0000	0.0000	89.0000	89.0000	89.0000 (210)
Space heating fuel (main heating system)	2008.0741	1688.0131	1600.6157	1143.5742	769.6771	0.0000	0.0000	0.0000	0.0000	982.7293	1476.3386	1990.2507 (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	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (64)
Efficiency of water heater (217)m	87.7493	87.6937	87.5614	87.2910	86.7273	80.0000	80.0000	80.0000	80.0000	87.0543	87.5314	87.7513 (217)
Fuel for water heating, kWh/month	295.4857	261.4528	278.2329	245.6667	239.8573	234.5241	231.6764	240.7851	243.3186	249.0926	263.1158	292.2992 (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	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-90.2492	-122.4249	-168.1523	-175.7336	-175.7674	-158.7112	-156.6597	-154.7612	-147.9098	-134.8142	-97.1320	-78.1876 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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)	-79.9003	-176.4568	-377.2966	-602.6995	-823.1222	-837.6297	-820.5541	-674.9773	-468.1065	-257.4837	-107.7181	-62.1115 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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												11659.2727 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												80.0000
Water heating fuel used												3075.5074 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
central heating pump												41.0000 (230c)
main heating flue fan												45.0000 (230e)
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-6948.5594 (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)

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Energy used	0.0000 (237)
Total delivered energy for all uses	8265.6860 (238)

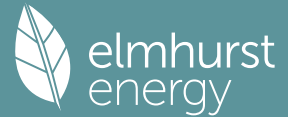
----- 12a. Carbon dioxide emissions - Individual heating systems including micro-CHP -----

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	11659.2727	0.2100	2448.4473 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3075.5074	0.2100	645.8566 (264)
Space and water heating			3094.3038 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1660.5031	0.1361	-225.9162
PV Unit electricity exported	-5288.0564	0.1245	-658.1274
Total			-884.0435 (269)
Total CO2, kg/year			2278.9788 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			14.6500 (273)

----- 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	11659.2727	1.1300	13174.9782 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3075.5074	1.1300	3475.3234 (278)
Space and water heating			16650.3016 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1660.5031	1.5029	-2495.6004
PV Unit electricity exported	-5288.0564	0.4568	-2415.4484
Total			-4911.0488 (283)
Total Primary energy kWh/year			12472.8638 (286)
Dwelling Primary energy Rate (DPER)			80.2000 (287)

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Proposed- Minimal PV	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	96 A	DER	14.65	TER	
Environmental	85 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	2.45	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	80.20	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	369.5820 (5)

2. Ventilation rate

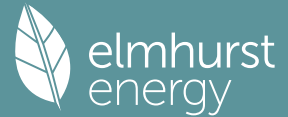
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	118.3191	(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$ (28)...(30) + (32) + (32a)...(32e) = 16289.2200 (34)
Thermal mass parameter (TMP = C_m / TFA) in $\text{kJ/m}^2\text{K}$ 104.7336 (35)
Thermal bridges (Default value 0.200 * total exposed area) 76.6220 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 194.9411 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	113.7357	111.6872	109.6792	100.2479	98.4833	90.2689	90.2689	88.7477	93.4329	98.4833	102.0530	105.7850 (38)
Average = $\text{Sum}(39)\text{m} / 12 =$	308.6768	306.6282	304.6203	295.1889	293.4244	285.2100	285.2100	283.6888	288.3740	293.4244	296.9941	300.7261 (39)
												295.1805
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.9847	1.9715	1.9586	1.8980	1.8866	1.8338	1.8338	1.8240	1.8541	1.8866	1.9096	1.9336 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9425 (42)											
Hot water usage for mixer showers	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42a)											
Hot water usage for baths	31.7548	31.2832	30.6191	29.3945	28.4776	27.4609	26.9118	27.5713	28.2893	29.3772	30.6269	31.6474 (42b)
Hot water usage for other uses	44.7643	43.1365	41.5087	39.8809	38.2531	36.6253	36.6253	38.2531	39.8809	41.5087	43.1365	44.7643 (42c)
Average daily hot water use (litres/day)	70.1365 (43)											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	76.5191	74.4197	72.1278	69.2755	66.7308	64.0863	63.5371	65.8244	68.1702	70.8859	73.7634	76.4117 (44)
Energy content (annual)	121.1875	105.9726	110.8577	94.8346	89.8324	78.8016	76.8426	81.5043	84.0607	96.1915	105.0895	119.6423 (45)
Distribution loss (46)m = $0.15 \times (45)\text{m}$	Total = $\text{Sum}(45)\text{m} = 1164.8174$											
Water storage loss (or HIU 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 (46)
Total storage 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 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (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	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959 (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	103.0094	90.0767	94.2290	80.6094	76.3576	66.9813	65.3162	69.2787	71.4516	81.7628	89.3261	101.6959 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = $\text{Sum}(64)\text{m} = 990.0948$ (64)											
Electric shower(s)	58.9062	52.4859	57.3126	54.6927	55.7190	53.1505	54.9222	55.7190	54.6927	57.3126	56.2349	58.9062 (64a)
Heat gains from water heating, kWh/month	40.4789	35.6407	37.8854	33.8255	33.0191	30.0330	30.0596	31.2494	31.5361	34.7688	36.3903	40.1505 (65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = $\text{Sum}(64a)\text{m} = 670.0548$ (64a)												

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	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258	147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	206.9833	229.1601	206.9833	213.8827	206.9833	213.8827	206.9833	206.9833	213.8827	206.9833	213.8827	206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	326.4756	329.8633	321.3262	303.1517	280.2096	258.6472	244.2423	240.8545	249.3916	267.5661	290.5082	312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126	37.7126 (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)	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006	-117.7006 (71)
Water heating gains (Table 5)	54.4071	53.0367	50.9213	46.9799	44.3806	41.7125	40.4027	42.0019	43.8001	46.7323	50.5420	53.9658 (72)
Total internal gains	655.0037	679.1978	646.3685	631.1520	598.7112	581.3801	558.7660	556.9774	574.2122	588.4195	622.0707	640.1574 (73)

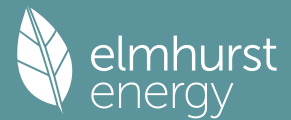
6. Solar gains

[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			
North				3.1900	10.6334	0.6300	0.7000	0.7700	10.3666 (74)			
East				3.9100	19.6403	0.6300	0.7000	0.7700	23.4691 (76)			
South				2.7300	46.7521	0.6300	0.7000	0.7700	39.0063 (78)			
Solar gains	72.8420	129.6038	190.6465	256.3136	303.8202	308.5504	294.6244	258.4082	213.4156	146.9622	88.2875	61.6470 (83)
Total gains	727.8456	808.8017	837.0150	887.4656	902.5313	889.9305	853.3904	815.3855	787.6277	735.3817	710.3582	701.8043 (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	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462

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alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9820	0.9768	0.9702	0.9543	0.9264	0.8685	0.7910	0.8137	0.9036	0.9571	0.9760	0.9834 (86)
MIT	16.5863	16.8631	17.3908	18.2261	19.0672	19.9095	20.3992	20.3336	19.6831	18.6025	17.5144	16.6027 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9783	0.9718	0.9632	0.9418	0.9006	0.8054	0.6560	0.6937	0.8573	0.9428	0.9701	0.9800 (89)
MIT 2	15.4354	15.7155	16.2459	17.0971	17.9298	18.7569	19.1853	19.1410	18.5437	17.4782	16.3883	15.4700 (90)
Living area fraction	15.5770	15.8567	16.3868	17.2360	18.0698	18.8988	19.3347	19.2877	18.6839	17.6165	16.5269	15.6094 (92)
MIT	15.5770	15.8567	16.3868	17.2360	18.0698	18.8988	19.3347	19.2877	18.6839	17.6165	16.5269	15.6094 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9638	0.9543	0.9423	0.9148	0.8672	0.7730	0.6422	0.6751	0.8234	0.9166	0.9522	0.9666 (94)
Useful gains	701.5160	771.8518	788.6957	811.8228	782.6822	687.8944	548.0841	550.4958	648.5492	674.0740	676.4149	678.3626 (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	3480.9631	3359.6392	3011.7100	2460.7051	1869.0529	1226.0517	779.9671	819.2201	1321.8831	2058.8251	2799.7401	3431.1049 (97)
Space heating kWh	2067.9086	1738.9931	1653.9226	1187.1953	808.2598	0.0000	0.0000	0.0000	0.0000	1030.2548	1528.7941	2048.0402 (98a)
Space heating requirement - total per year (kWh/year)												12063.3685
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	2067.9086	1738.9931	1653.9226	1187.1953	808.2598	0.0000	0.0000	0.0000	0.0000	1030.2548	1528.7941	2048.0402 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												12063.3685
Space heating per m2												77.5630 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	2680.9738	2110.5539	2156.0349	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.3175	0.3749	0.3548	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	851.2152	791.3494	764.9385	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	920.9546	883.3263	843.4058	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	50.2124	68.4308	58.3797	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	12.5531	17.1077	14.5949	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												44.2557 (107)
Energy for space heating												77.5630 (99)
Energy for space cooling												0.2845 (108)
Total												77.8475 (109)
Fabric Energy Efficiency (DFEE)												77.8 (109)

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Plot Reference	Plot 1- Gas			Issued on Date	04/08/2026
Assessment Reference	Proposed- Minimal PV	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	96 A	DER	14.65	TER	
Environmental	85 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	2.45	DFEE	77.85	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	80.20	TPER	
Assessor Details	Mr. Will Hughes			Assessor ID	FJ65-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	30.7500 (1b)	x 2.2800 (2b)	= 70.1100 (1b) - (3b)
First floor	62.3900 (1c)	x 2.4000 (2c)	= 149.7360 (1c) - (3c)
Second floor	62.3900 (1d)	x 2.4000 (2d)	= 149.7360 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	155.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 369.5820 (5)

2. Ventilation rate

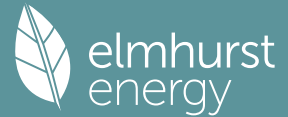
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) = 0.1082 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8582 (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) = 0.7295 (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	0.9301	0.9119	0.8936	0.8024	0.7842	0.6930	0.6930	0.6748	0.7295	0.7842	0.8207	0.8572 (22b)
Effective ac	0.9325	0.9158	0.8993	0.8220	0.8075	0.7401	0.7401	0.7277	0.7661	0.8075	0.8368	0.8674 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			5.6700	1.6000	9.0720		(26)
Glazing			9.8300	1.3258	13.0322		(27)
Upgraded GF			30.7500	0.2000	6.1500	110.0000	3382.5000 (28a)
Existing GF			31.6400	0.7000	22.1480	110.0000	3480.4000 (28a)
Upgraded External Wall	202.8700	15.5000	187.3700	0.2500	46.8425	17.0000	3185.2900 (29a)
Upgraded Basement Wall	55.4600		55.4600	0.2000	11.0920	17.0000	942.8200 (29a)
Upgraded Roof	62.3900		62.3900	0.1600	9.9824	9.0000	561.5100 (30)
Total net area of external elements Aum(A, m ²)			383.1100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 118.3191		(33)
Main dwelling							
Internal Wall 1			246.8800			9.0000	2221.9200 (32c)
Internal Floor 1			30.7500			18.0000	553.5000 (32d)
Internal Floor 2			62.3900			18.0000	1123.0200 (32d)
Internal Ceiling 1			30.7500			9.0000	276.7500 (32e)
Internal Ceiling 2			62.3900			9.0000	561.5100 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16289.2200 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							104.7336 (35)

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Thermal bridges (Default value 0.200 * total exposed area)
Point Thermal bridges (36a) = 76.6220 (36)
Total fabric heat loss (33) + (36) + (36a) = 194.9411 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(39)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 113.7357 111.6872 109.6792 100.2479 98.4833 90.2689 90.2689 88.7477 93.4329 98.4833 102.0530 105.7850 (38)
Average = Sum(39)m / 12 = 308.6768 306.6282 304.6203 295.1889 293.4244 285.2100 285.2100 283.6888 288.3740 293.4244 296.9941 300.7261 (39)
295.1805
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 1.9847 1.9715 1.9586 1.8980 1.8866 1.8338 1.8338 1.8240 1.8541 1.8866 1.9096 1.9336 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

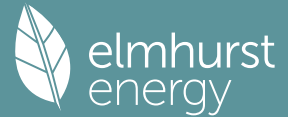
4. Water heating energy requirements (kWh/year)
Assumed occupancy 2.9425 (42)
Hot water usage for mixer showers 82.7014 81.4586 79.6475 76.1824 73.6252 70.7734 69.1525 70.9498 72.9201 75.9820 79.5216 82.3846 (42a)
Hot water usage for baths 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42b)
Hot water usage for other uses 44.7643 43.1365 41.5087 39.8809 38.2531 36.6253 36.6253 38.2531 39.8809 41.5087 43.1365 44.7643 (42c)
Average daily hot water use (litres/day) 116.9427 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 127.4657 124.5951 121.1562 116.0633 111.8783 107.3988 105.7778 109.2030 112.8010 117.4907 122.6581 127.1488 (44)
Energy content (annual) 201.8745 177.4217 186.2126 158.8848 150.6097 132.0593 127.9291 135.2161 139.0949 159.4338 174.7489 199.0844 (45)
Distribution loss (46)m = 0.15 x (45)m 30.2812 26.6133 27.9319 23.8327 22.5915 19.8089 19.1894 20.2824 20.8642 23.9151 26.2123 29.8627 (46)
Water storage loss (or HIU loss):
Store volume 300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 2.0400 (48)
Temperature factor from Table 2b 0.5400 (49)
Enter (49) or (54) in (55) 1.1016 (55)
Total storage loss 34.1496 30.8448 34.1496 33.0480 34.1496 33.0480 34.1496 34.1496 33.0480 34.1496 33.0480 34.1496 (56)
If cylinder contains dedicated solar storage 34.1496 30.8448 34.1496 33.0480 34.1496 33.0480 34.1496 34.1496 33.0480 34.1496 33.0480 34.1496 (57)
Primary loss 23.2624 21.0112 23.2624 22.5120 23.2624 22.5120 23.2624 23.2624 22.5120 23.2624 22.5120 23.2624 (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 259.2865 229.2777 243.6246 214.4448 208.0217 187.6193 185.3411 192.6281 194.6549 216.8458 230.3089 256.4964 (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 259.2865 229.2777 243.6246 214.4448 208.0217 187.6193 185.3411 192.6281 194.6549 216.8458 230.3089 256.4964 (64)
Total per year (kWh/year) = Sum(64)m = 2618.5499 (64)
12Total per year (kWh/year) = 2619 (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 113.0529 100.4775 107.8453 97.2772 96.0073 88.3577 88.4660 90.8889 90.6971 98.9413 102.5520 112.1252 (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 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 147.1258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 206.9833 229.1601 206.9833 213.8827 206.9833 213.8827 206.9833 206.9833 213.8827 206.9833 213.8827 206.9833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 326.4756 329.8633 321.3262 303.1517 280.2096 258.6472 244.2423 240.8545 249.3916 267.5661 290.5082 312.0706 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 37.7126 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 -117.7006 (71)
Water heating gains (Table 5) 151.9528 149.5201 144.9533 135.1072 129.0421 122.7191 118.9060 122.1626 125.9681 132.9857 142.4334 150.7059 (72)
Total internal gains 755.5494 778.6813 743.4006 722.2794 686.3727 662.3867 637.2692 637.1380 656.3802 677.6728 716.9620 739.8974 (73)

6. Solar gains
[Jan] Area Solar flux g Specific data FF Access Gains
m2 Table 6a W/m2 or Table 6b or Table 6c factor Table 6d W
North 3.1900 10.6334 0.6300 0.7000 0.7700 10.3666 (74)
East 3.9100 19.6403 0.6300 0.7000 0.7700 23.4691 (76)
South 2.7300 46.7521 0.6300 0.7000 0.7700 39.0063 (78)
Solar gains 72.8420 129.6038 190.6465 256.3136 303.8202 308.5504 294.6244 258.4082 213.4156 146.9622 88.2875 61.6470 (83)
Total gains 828.3913 908.2851 934.0471 978.5929 990.1929 970.9371 931.8937 895.5462 869.7957 824.6350 805.2495 801.5444 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	14.6586	14.7566	14.8538	15.3284	15.4206	15.8647	15.8647	15.9498	15.6907	15.4206	15.2353	15.0462
alpha	1.9772	1.9838	1.9903	2.0219	2.0280	2.0576	2.0576	2.0633	2.0460	2.0280	2.0157	2.0031
util living area	0.9773	0.9714	0.9639	0.9459	0.9145	0.8506	0.7665	0.7892	0.8874	0.9476	0.9699	0.9789 (86)
MIT	16.6805	16.9552	17.4791	18.3063	19.1380	19.9644	20.4398	20.3785	19.7451	18.6817	17.6034	16.6979 (87)
Th 2	19.3436	19.3524	19.3611	19.4022	19.4100	19.4464	19.4464	19.4532	19.4323	19.4100	19.3943	19.3780 (88)
util rest of house	0.9726	0.9654	0.9555	0.9314	0.8853	0.7822	0.6256	0.6623	0.8357	0.9307	0.9626	0.9746 (89)
MIT 2	14.5074	14.8550	15.5183	16.5699	17.6106	18.6245	19.1444	19.0918	18.3688	17.0497	15.6855	14.5354 (90)
Living area fraction	14.7748	15.1135	15.7596	16.7836	17.7986	18.7894	19.3038	19.2501	18.5382	17.2506	15.9215	14.8015 (92)
MIT	14.7748	15.1135	15.7596	16.7836	17.7986	18.7894	19.3038	19.2501	18.5382	17.2506	15.9215	14.8015 (92)
Temperature adjustment	14.6248	14.9635	15.6096	16.6336	17.6486	18.6394	19.1538	19.1001	18.3882	17.1006	15.7715	-0.1500
adjusted MIT	14.6248	14.9635	15.6096	16.6336	17.6486	18.6394	19.1538	19.1001	18.3882	17.1006	15.7715	14.6515 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9475	0.9360	0.9210	0.8883	0.8329	0.7285	0.5873	0.6197	0.7804	0.8875	0.9320	0.9509 (94)
Useful gains	784.8940	850.1278	860.2489	869.2914	824.7503	707.3241	547.3452	554.9714	678.8134	731.8493	750.4741	762.2226 (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	3187.0256	3085.7404	2774.9638	2282.8762	1745.4662	1152.0649	728.3712	765.9894	1236.6093	1907.4260	2575.3927	3143.0332 (97)
Space heating kWh	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98a)
Space heating requirement - total per year (kWh/year)												10376.7527
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	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												10376.7527
Space heating per m2										(98c) / (4) =		66.7187 (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 %)												89.0000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	1787.1859	1502.3317	1424.5479	1017.7811	685.0126	0.0000	0.0000	0.0000	0.0000	874.6291	1313.9414	1771.3231 (98)
Space heating efficiency (main heating system 1)	89.0000	89.0000	89.0000	89.0000	89.0000	0.0000	0.0000	0.0000	0.0000	89.0000	89.0000	89.0000 (210)
Space heating fuel (main heating system)	2008.0741	1688.0131	1600.6157	1143.5742	769.6771	0.0000	0.0000	0.0000	0.0000	982.7293	1476.3386	1990.2507 (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	259.2865	229.2777	243.6246	214.4448	208.0217	187.6193	185.3411	192.6281	194.6549	216.8458	230.3089	256.4964 (64)
Efficiency of water heater (217)m	87.7493	87.6937	87.5614	87.2910	86.7273	80.0000	80.0000	80.0000	80.0000	87.0543	87.5314	87.7513 (217)
Fuel for water heating, kWh/month	295.4857	261.4528	278.2329	245.6667	239.8573	234.5241	231.6764	240.7851	243.3186	249.0926	263.1158	292.2992 (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	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	48.7531	39.1115	35.2156	25.8005	19.9290	16.2822	18.1799	23.6309	30.6943	40.2725	45.4877	50.1081 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-90.2492	-122.4249	-168.1523	-175.7336	-175.7674	-158.7112	-156.6597	-154.7612	-147.9098	-134.8142	-97.1320	-78.1876 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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)	-79.9003	-176.4568	-377.2966	-602.6995	-823.1222	-837.6297	-820.5541	-674.9773	-468.1065	-257.4837	-107.7181	-62.1115 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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												11659.2727 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												80.0000
Water heating fuel used												3075.5074 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
central heating pump												41.0000 (230c)
main heating flue fan												45.0000 (230e)
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												393.4653 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-6948.5594 (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)

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Energy used	0.0000 (237)
Total delivered energy for all uses	8265.6860 (238)

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	11659.2727	0.2100	2448.4473 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3075.5074	0.2100	645.8566 (264)
Space and water heating			3094.3038 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	393.4653	0.1443	56.7892 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1660.5031	0.1361	-225.9162
PV Unit electricity exported	-5288.0564	0.1245	-658.1274
Total			-884.0435 (269)
Total CO2, kg/year			2278.9788 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			14.6500 (273)

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	11659.2727	1.1300	13174.9782 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3075.5074	1.1300	3475.3234 (278)
Space and water heating			16650.3016 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	393.4653	1.5338	603.5102 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1660.5031	1.5029	-2495.6004
PV Unit electricity exported	-5288.0564	0.4568	-2415.4484
Total			-4911.0488 (283)
Total Primary energy kWh/year			12472.8638 (286)
Dwelling Primary energy Rate (DPER)			80.2000 (287)