1 Whittington Road, London N22

Energy Statement for Planning

Job No: 7248

Issued: October, 2026

Issue No: 3

Contents

1.0 Introduction 3
2.0 Project Summary 4
3.0 Policy Requirements and Drivers 5
4.0 Energy Strategy and Approach 6
5.0 Baseline Emissions 7
6.0 Be Lean Strategy 8
7.0 Be Clean Strategy 10
8.0 Be Green Strategy 11
9.0 Summary of Results 12
10.0 Conclusions 13
Appendix A – SAP Calculations 15

Document Prepared By:	Document Authorised By:
Jim Westover	Sam Westover
Dated:	**Dated:**
13.10.26	13.10.26
Signed:	**Signed:**

This report has been prepared for the exclusive use of the commissioning party and may not be reproduced without prior written permission from T16 Design.

All work has been carried out within the terms of the brief using all reasonable skill, care, and diligence. No liability is accepted by T16 Design for the accuracy of data or opinions provided by others in the preparation of this report, or for any use of this report other than for the purpose for which it was produced.

1.0 Introduction

1.1 T16 Design has been appointed to produce this Energy Statement for the proposed development on land to the side and rear of 1 Whittington Road, London N22 8YS.

1.2 The report assesses the predicted energy performance and carbon dioxide emissions of the proposed development in the context of local and London-wide policy requirements and best practice methods.

1.3 The methodology used to demonstrate the effects of the proposed energy efficiency measures is the 3-stage Energy Hierarchy expounded by the London Plan, Policy SI 2.

1.4 Emissions reductions are shown for the proposed scheme at each of these stages and the strategy underpinning them is detailed in the relevant sections of the report.

1.5 The overarching position within these policies is that all developments should reduce emissions through the following stages.

- Residential development should achieve a 10% reduction in regulated emissions through energy efficiency measures.
- On site regulated emissions should be reduced by at least 35%.

2.0 Project Summary

2.1 The proposal site is on land to the side and rear of 1 Whittington Road, London, N22 8YS. The site is currently unoccupied.

2.2 The proposal involves the erection of two detached houses.

2.3 The site location is shown below.

Site Location

3.0 Policy Requirements and Drivers

3.1 The relevant planning policy documents for this site, relating to energy are:

3.1.1 The London Plan (2021)

- Policy SI 2 – Minimizing greenhouse gas emissions – developments should achieve a minimum of 35% reduction in on site CO2 emissions.
- Policy SI 4 – Managing Heat risk.

3.1.2 Haringey Council Local Plan

- Local Plan Policy SP4. 'Working Towards a Low Carbon Haringey'.
- Local Plan Policy CC2.3 'Minimising Energy Use'.

3.2 SP4 of the Haringey Local Plan, 'Working Towards a Low carbon Haringey' states that developments are expected to achieve a 20% reduction in predicted carbon dioxide emissions thorough the use of on-site renewable generation.

3.3 It is our understanding that Haringey Council is currently working on a new Local Plan, which is intended to come into force within the next few months.

3.4 In light of these policy requirements and through the developer and design team's commitment to reducing the impact of the development on the environment, this report sets out some of the measures that will be adopted to meet the policy targets

4.0 Energy Strategy and Approach

4.1 The London Borough of Haringey Explanatory Note: 'Energy Statement and Sustainability Assessment Information Requirements for minor Developments' provides the parameters by which Energy Statements should be formulated and the approach to be adopted

4.2 The three stages of the hierarchy are referred to as Be Lean (Use Less Energy), Be Clean (Supply Energy Efficiently) and Be Green (Use Renewable Energy).

4.3 The Be Lean stage of the hierarchy requires development must initially reduce the energy demand of the building through architectural and building fabric measures (passive design) and energy efficient services (active design).

4.4 The second part of the Hierarchy (Be Clean), is concerned with how energy systems will exploit local energy resources and supply energy efficiently and cleanly to reduce CO_2.

4.5 The third stage is the addition, where feasible to introduce renewable technology, which may include Heat pumps (Air and Ground), PV panel, Solar Hot Water panels and Wind Power.

4.6 The first stage of this process is to establish the baseline emissions on which the reductions will be based.

4.7 This is done using SAP (Standard Assessment Procedure) for residential buildings.

5.0 Baseline Emissions

5.1 The baseline emissions on which reduction figures are based are calculated using SAP for residential buildings.

5.2 SAP calculates a notional building using the baseline Building Regulations parameters and represents the minimum allowable standard for the energy performance of the building to meet Part L1.

5.3 The parameters used are defined by the methodology and represent a target upon which improvements can be measured.

5.4 The GLA emissions reporting tool provides the baseline emissions. The baseline emissions are shown below.

Baseline Emissions	
	SAP 10 (Tonnes CO_2/Year)
Regulated	2.5 Tonnes CO_2

Table 1 – Baseline Emissions

6.0 Be Lean Strategy

6.1 The next stage once the baseline has been established is to make improvements within the 'Be Lean' category. This includes improving the U Values and the reduction of thermal bridging.

6.2 Gas combi boilers with an 89.5% efficiency have been assumed **at this stage** to provide heating and hot water.

6.3 Low energy lighting with an efficacy of 120 lumens per circuit watt is proposed to reduce emissions.

6.4 It is assumed that the dwellings will be naturally ventilated.

6.5 Improved thermal bridging is also proposed.

6.6 The proposed U-values, with the relevant Part L backstop, are shown below.

6.7 Following the implementation of these passive design measures, including the building services, the reduction in emissions at the 'Be Lean' stage has been calculated and this is shown on the following page.

Be Lean Fabric Specification	
Element or system	**Proposed Value**
External walls	U = 0.18 W/(m²k)
Ground floors	U = 0.10 W/(m²k)
Roofs	U = 0.11 W/(m²k)
Glazing	U = 1.2 W/(m²k) g-value 0.63
Air Permeability	5 m³/(hm²) at 50 Pa

Table 2 – Be Lean Fabric Specification

6.0 Be Lean Strategy

Be Lean Emissions			
	Baseline Emissions (Tonnes CO_2/Year)	Be Lean Emissions (Tonnes CO_2/Year)	% Reduction
Regulated	2.5	2.1	14%

Table 3 - Be Lean Emissions

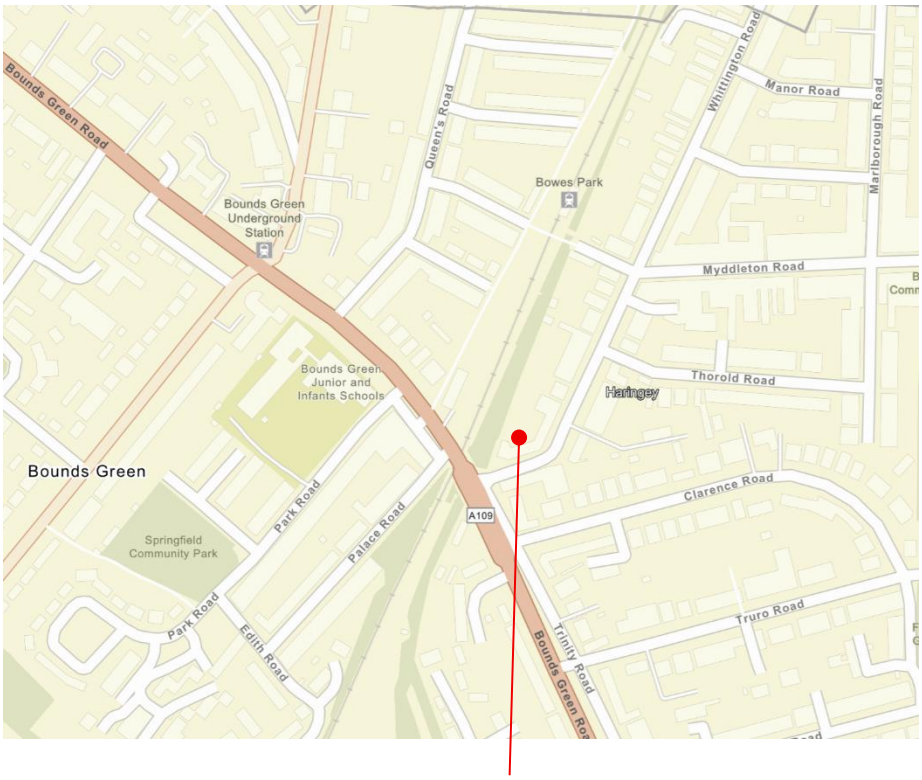
7.0 Be Clean Strategy

7.1 The Be Clean element of the hierarchy refers to supplying energy in a clean manner. This encompasses the use of energy efficient heating sources (such as heat pumps), decentralised energy and heat networks and the consideration of Combined Heat and Power.

7.2 The site does not sit within 800m of any existing or proposed decentralized energy or heating networks (as shown on the map below)

7.3 Due to the small scale of the proposal, CHP is also not a viable solution. London Plan guidance suggests that CHP is most suitable for developments of at least 500 units.

7.4 As there are currently no existing opportunities to connect to a heat network, and CHP is not suitable here, no changes have been made at the Be Clean stage.



Site Location

8.0 Be Green Strategy

8.1 The Be Green element of the hierarchy requires the consideration of renewable technologies to reduce emissions still further beyond the savings made at the Be Lean and Be Clean stages.

8.2 The technologies that are considered here are wind power and solar panels (photovoltaic (PV) or Solar Thermal and ground and air source heat pumps.

8.3 Wind power is not suitable in a location such as this. Wind turbines tend to perform poorly in built-up areas.

8.4 Any wind that is received on the site would be too intermittent and turbulent to provide any meaningful reduction in emissions.

8.5 Ground Source Heat pumps are also unlikely to be a viable proposition due to the ground disturbance required in their installation.

8.6 Air Source Heat Pumps (ASHP) however are a suitable solution in this instance and provide substantial improvements in CO2 emissions when combined with a high-performing fabric such as proposed here.

8.7 It is proposed that individual ASHPs with an efficiency of 252% will provide heating and hot water to the dwellings.

8.8 The results below show a 51% reduction in CO2 emissions from LZC technology in accordance with policy SP4 of the Haringey Local Plan.

8.9 Photovoltaics panels are not considered suitable here due to a lack of available roof space.

Be Green Emissions			
	Be Lean Emissions (Tonnes CO_2/Year)	Be Green Emissions (Tonnes CO_2/Year)	% Reduction
Regulated	2.1	0.9	51%

Table 4 - Be Green Emissions

9.0 Summary of Results

9.1 The tables below give the percentage improvement in emissions at each stage of the hierarchy and the overall savings made over Part L of the Building Regulations

9.2 It is proposed that the development will be provided with increased U values (as shown above), and individual ASHPs.

9.3 The figures below have been calculated using the GLA carbon emission reporting tool and show the total CO2 emissions expected.

1 Whittington Road	CO_2 Emissions (Tonnes)	% Reduction
Baseline (Part L 2022)	2.5	
After energy demand reduction	2.1	14.00%
After heat network / CHP	2.1	0.00%
After renewable energy	0.9	51.00%
Total Savings	1.6	65.00%

Table 5–Carbon emissions savings at each stage of the Energy Hierarchy

10.0 Conclusions

10.1 This Energy Statement has been produced to accompany an application for the proposed development at 1 Whittington Road, London, N22 8YS, to show how the site will meet the policy requirement of achieving a 35% reduction in emissions through the Be Lean, Be Clean, Be Green hierarchy.

10.2 In doing so, preliminary SAP calculations have been undertaken using the information available and sensible assumptions on construction and M&E parameters.

10.3 The baseline figures have been calculated and improvements made to the fabric and plant proposed for the scheme.

10.4 The measures proposed are detailed above summarise at Be Lean as

- Significant fabric improvements
- Energy-efficient lighting

10.5 The measures proposed at Be Green can be summarised as

- ASHPs with an efficiency of at least 252%

10.6 The results in Section 10 show that an overall reduction of 66% in regulated CO2 emissions is achieved using the GLA's carbon emission reporting spreadsheet. This exceeds the target and provides room for changes should they be required through the detailed design process.

10.7 The requirement for a 10% improvement at the Be Lean stage has also been achieved.

10.8 The requirement to achieve a reduction of at least 20% in emissions form on-site renewable energy at the Be Green stage has also been achieved.

T16 Design Ltd.

T: 01206 572452

E: info@t16design.com

W: www.t16design.com

© 2026

Appendix A – SAP Calculations

Summary for Input Data

Plot Reference	Plot 1	Issued on Date	02/09/2026
Assessment Reference	P1 - BL	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	15.69	TER	13.33
Environmental	86 B	% DER < TER			-17.70
CO_2 Emissions (t/year)	1.32	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	-29.50	DPER	91.09	TPER	70.34

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	215.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	37.70 m	67.20 m²	2.50 m
1st Storey:	21.10 m	27.50 m²	2.55 m

8.0 Living Area 21.50 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		148.06	118.46	0.00	None	29.60	Calculate Wall Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
FR	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	39.70	39.70	None	0.00	Enter Gross Area	0.00
Sloping Roof	External Slope Roof	Plasterboard, insulated slope	0.11	9.00	30.40	30.40	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.10	None	0.00	75.00	67.30

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Triple Low-E Soft 0.05			0.63		0.70	1.20
Front Door	Manufacturer	Solid Door				0.00			1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W	Windows	External Wall 1	West	7.16	
N	Windows	External Wall 1	North	10.42	
S	Windows	External Wall 1	South	6.69	

E	Windows	External Wall 1	East	3.31
Front Door	Front Door	External Wall 1	West	2.02

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	User Input	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate		14.46			Yes
E3 Sill		13.52			Yes
E4 Jamb		40.20			Yes
E5 Ground floor (normal)		37.70			Yes
E6 Intermediate floor within a dwelling		21.10			Yes
E16 Corner (normal)		27.50			No
E15 Flat roof with parapet		28.00			No
E17 Corner (inverted – internal area greater than external area)		7.50			No
E11 Eaves (insulation at rafter level)		9.30			No
E13 Gable (insulation at rafter level)		12.00			No

Y-value	0.03	W/m²K
Description	ROI	

19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	3	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	5.01	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting: No

Name	Efficacy	Power	Capacity	Count
Lighting 1	120.00	6.00	720.00	25

24.0 Main Heating 1	Manufacturer	
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	104	
In Winter	89.50	
In Summer	81.00	
Model Name	Gb	
Manufacturer	GB	
Controls SAP Code	2110	
Controls description	Time and temperature zone control by arrangement	
Delayed Start Stat	Yes	

Summary for Input Data

Burner Control	On/Off
Flue Type	None or Unknown
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	Yes
Combi boiler type	Standard Combi
Combi keep hot type	Electric, time clock

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	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
S1	Vented hot water system	9.00		No	
s2	Vented hot water system	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating			B 81	B 88
Photovoltaic	£8,000 - £10,000	£234	B 86	B 87
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Plot 1	Issued on Date	02/09/2026
Assessment Reference	P1 - BL	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	15.69	TER	13.33
Environmental	86 B	% DER < TER			-17.70
CO_2 Emissions (t/year)	1.32	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	-29.50	DPER	91.09	TPER	70.34

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		238.1250	(5)

---

2. Ventilation rate

---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(22b)
Effective ac	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)							8.5636	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)
Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)

Average = Sum(39)m / 12 = 122.0849

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

---

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	77.8885	76.7179	75.0123	71.7488	69.3404	66.6546	65.1280	66.8208	68.6764	71.5601	74.8937	77.5900	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 137.8240 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.9092	146.7628	142.9001	136.9520	132.1486	126.9738	124.9302	128.7756	132.8390	138.2788	144.3207	149.5097	(44)
Energy conte	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(45)
Energy content (annual)										Total = Sum(45)m =		2289.2444	
Distribution loss (46)m = 0.15 x (45)m	35.6129	31.3482	32.9448	28.1221	26.6846	23.4194	22.6638	23.9177	24.5706	28.1464	30.8417	35.1144	(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	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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(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	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(64)
								Total per year (kWh/year) = Sum(64)m =				2889.2444	(64)
12Total per year (kWh/year)												2889	(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	91.6817	80.9955	85.7674	74.6660	71.8906	64.2417	62.9779	65.7572	66.7935	75.1310	80.6945	90.5766	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	123.2281	120.5290	115.2788	103.7028	96.6272	89.2246	84.6477	88.3834	92.7688	100.9825	112.0757	121.7428	(72)
Total internal gains	561.7805	575.0225	549.9281	528.7366	500.1106	477.5246	457.8684	459.0362	474.0532	494.8824	527.5260	549.3764	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	754.0737	919.2180	1061.7615	1226.0172	1334.7721	1328.6965	1269.1837	1165.1084	1050.0411	886.6387	760.9616	711.8814	(84)

---

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9892	0.9759	0.9472	0.8705	0.7331	0.5542	0.4121	0.4644	0.7040	0.9170	0.9789	0.9913	(86)
MIT	19.3711	19.6534	20.0352	20.4925	20.8083	20.9540	20.9892	20.9827	20.8794	20.4374	19.8184	19.3232	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9861	0.9693	0.9326	0.8366	0.6712	0.4661	0.3086	0.3551	0.6172	0.8869	0.9719	0.9889	(89)
MIT 2	17.9697	18.3273	18.8036	19.3553	19.6963	19.8337	19.8561	19.8549	19.7770	19.3092	18.5466	17.9143	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)

MIT	18.2879	18.6284	19.0832	19.6135	19.9488	20.0880	20.1134	20.1110	20.0273	19.5654	18.8353	18.2342	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.1379	18.4784	18.9332	19.4635	19.7988	19.9380	19.9634	19.9610	19.8773	19.4154	18.6853	18.0842	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9794	0.9585	0.9179	0.8233	0.6681	0.4725	0.3182	0.3650	0.6189	0.8724	0.9618	0.9831	(94)
Useful gains	738.5571	881.0676	974.6059	1009.3262	891.7887	627.7550	403.9139	425.2103	649.8933	773.5247	731.8955	699.8862	(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	1712.5499	1676.9893	1532.4623	1289.6542	986.9733	645.0936	406.4564	429.6658	700.4451	1074.3017	1416.9999	1704.5981	(97)
Space heating kWh	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98a)
Space heating requirement - total per year (kWh/year)												3411.7676	
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	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3411.7676	
Space heating per m2											(98c) / (4) =	36.0271	(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 %)	89.5000	(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	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98)
Space heating efficiency (main heating system 1)	89.5000	89.5000	89.5000	89.5000	89.5000	0.0000	0.0000	0.0000	0.0000	89.5000	89.5000	89.5000	(210)
Space heating fuel (main heating system)	809.6655	597.6082	463.7376	225.5152	79.1256	0.0000	0.0000	0.0000	0.0000	250.0314	551.1454	835.2019	(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	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(64)
Efficiency of water heater												81.0000	(216)
(217)m	86.9039	86.5671	85.9408	84.7016	82.8596	81.0000	81.0000	81.0000	81.0000	84.9024	86.4104	86.9802	(217)
Fuel for water heating, kWh/month	273.1976	241.4177	255.5622	221.3423	214.6973	192.7520	186.5336	196.8532	202.2269	221.0101	237.9473	269.1371	(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	54.4411	49.1726	54.4411	52.6849	54.4411	52.6849	54.4411	54.4411	52.6849	54.4411	52.6849	54.4411	(231)
Lighting	22.9307	18.3959	16.5634	12.1351	9.3735	7.6582	8.5508	11.1147	14.4368	18.9419	21.3949	23.5680	(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	3812.0308	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	81.0000	
Water heating fuel used	2712.6775	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	41.0000	(230c)
maintaining electric keep-hot facility for gas combi boiler	600.0000	(230f)
Total electricity for the above, kWh/year	641.0000	(231)
Electricity for lighting (calculated in Appendix L)	185.0639	(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	7350.7722	(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	3812.0308	0.2100	800.5265	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2712.6775	0.2100	569.6623	(264)
Space and water heating			1370.1887	(265)
Pumps, fans and electric keep-hot	641.0000	0.1387	88.9146	(267)
Energy for lighting	185.0639	0.1443	26.7104	(268)
Total CO2, kg/year			1485.8138	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			15.6900	(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	3812.0308	1.1300	4307.5948	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2712.6775	1.1300	3065.3255	(278)
Space and water heating			7372.9203	(279)
Pumps, fans and electric keep-hot	641.0000	1.5128	969.7048	(281)
Energy for lighting	185.0639	1.5338	283.8572	(282)
Total Primary energy kWh/year			8626.4823	(286)
Dwelling Primary energy Rate (DPER)			91.0900	(287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	238.1250	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3760	(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) =	0.3196	(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	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(22b)
Effective ac	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750

E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720	
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600	

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 28.2530 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 93.9220 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)

Average = Sum(39)m / 12 = 138.0673

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	69.2342	68.1937	66.6776	63.7767	61.6359	59.2486	57.8916	59.3963	61.0457	63.6090	66.5721	68.9689	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 129.8451 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	141.2549	138.2386	134.5654	128.9799	124.4441	119.5678	117.6937	121.3511	125.2083	130.3276	135.9992	140.8885	(44)
Energy conte	223.7132	196.8500	206.8221	176.5671	167.5257	147.0225	142.3404	150.2580	154.3944	176.8534	193.7558	220.5974	(45)

Energy content (annual) Total = Sum(45)m = 2156.6998

Distribution loss (46)m = 0.15 x (45)m	33.5570	29.5275	31.0233	26.4851	25.1289	22.0534	21.3511	22.5387	23.1592	26.5280	29.0634	33.0896	(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	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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	274.6721	242.8774	257.7810	225.8821	218.4846	196.3376	193.2993	201.2169	203.7094	227.8123	243.0709	271.5563	(62)
WWHRS	-31.6510	-27.9924	-29.3120	-24.2715	-22.6202	-19.3562	-18.1434	-19.2937	-20.0267	-23.6093	-26.7465	-31.0648	(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	243.0211	214.8850	228.4689	201.6106	195.8644	176.9813	175.1559	181.9232	183.6827	204.2030	216.3244	240.4915	(64)

Total per year (kWh/year) = Sum(64)m = 2462.6122 (64)

12Total per year (kWh/year) 2463 (64)

Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month	87.1244	76.9595	81.5081	71.0373	68.4420	61.2137	60.0679	62.7005	63.6649	71.5435	76.7526	86.0884	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	117.1026	114.5230	109.5538	98.6629	91.9920	85.0191	80.7364	84.2749	88.4235	96.1606	106.6008	115.7102	(72)
Total internal gains	555.6550	569.0166	544.2031	523.6967	495.4754	473.3191	453.9571	454.9277	469.7079	490.0605	522.0510	543.3438	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	706.6214	839.2477	946.0722	1071.2107	1150.8982	1141.7222	1091.0556	1009.3583	921.9613	797.6383	705.3192	670.9229	(84)

7. Mean internal temperature (heating season)

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

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

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

tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area													
	0.9916	0.9835	0.9671	0.9221	0.8291	0.6749	0.5236	0.5785	0.7998	0.9471	0.9848	0.9930	(86)
MIT	19.0515	19.3043	19.6813	20.1824	20.6074	20.8738	20.9631	20.9464	20.7487	20.1876	19.5307	19.0095	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house													
	0.9890	0.9785	0.9568	0.8968	0.7727	0.5724	0.3852	0.4382	0.7144	0.9244	0.9793	0.9909	(89)
MIT 2	17.4797	17.8018	18.2782	18.9001	19.3884	19.6547	19.7170	19.7108	19.5514	18.9217	18.0986	17.4312	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)
MIT	17.8365	18.1429	18.5968	19.1912	19.6651	19.9315	19.9999	19.9913	19.8233	19.2091	18.4237	17.7895	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8365	18.1429	18.5968	19.1912	19.6651	19.9315	19.9999	19.9913	19.8233	19.2091	18.4237	17.7895	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9834	0.9699	0.9447	0.8836	0.7699	0.5903	0.4163	0.4690	0.7220	0.9123	0.9712	0.9861	(94)
Useful gains	694.9037	813.9660	893.7603	946.5688	886.0427	673.9384	454.1635	473.4243	665.6629	727.6888	685.0089	661.5743	(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													
	1891.5449	1847.1619	1684.2906	1420.8892	1097.9945	729.5320	465.2205	490.7444	785.3782	1186.7676	1565.9758	1885.5828	(97)
Space heating kWh													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98a)
Space heating requirement - total per year (kWh/year)												4558.4793	
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													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4558.4793	
Space heating per m2											(98c) / (4) =	48.1360	(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 %)	92.4000	(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													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98)
Space heating efficiency (main heating system 1)													
	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000	(210)
Space heating fuel (main heating system)													
	963.5293	751.4152	636.5309	369.6003	170.6625	0.0000	0.0000	0.0000	0.0000	369.6478	686.4677	985.5653	(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													
	243.0211	214.8850	228.4689	201.6106	195.8644	176.9813	175.1559	181.9232	183.6827	204.2030	216.3244	240.4915	(64)
Efficiency of water heater												80.3000	(216)
(217)m	86.9042	86.7053	86.3138	85.5009	83.9209	80.3000	80.3000	80.3000	80.3000	85.4748	86.5429	86.9545	(217)
Fuel for water heating, kWh/month													
	279.6425	247.8338	264.6958	235.7995	233.3917	220.4002	218.1269	226.5545	228.7456	238.9043	249.9622	276.5718	(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	25.9345	20.8057	18.7332	13.7247	10.6014	8.6614	9.6709	12.5706	16.3280	21.4233	24.1975	26.6553	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-56.3832	-76.3966	-105.5928	-114.0140	-119.1075	-109.8007	-108.3737	-104.0900	-96.0968	-84.9968	-60.8468	-49.1123	(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	-42.0108	-86.9697	-170.3566	-252.3624	-330.4165	-330.8520	-327.0076	-278.3976	-206.0737	-123.2342	-55.7020	-33.3340	(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	4933.4191	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	80.3000	
Water heating fuel used	2920.6287	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	209.3066	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3321.5284	(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	4827.8261	(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	4933.4191	0.2100	1036.0180	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2920.6287	0.2100	613.3320	(264)
Space and water heating			1649.3500	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	209.3066	0.1443	30.2094	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	0.1354	-146.9360	
PV Unit electricity exported	-2236.7170	0.1263	-282.5068	
Total			-429.4428	(269)
Total CO2, kg/year			1262.0459	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.3300	(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	4933.4191	1.1300	5574.7636	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2920.6287	1.1300	3300.3104	(278)
Space and water heating			8875.0740	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	209.3066	1.5338	321.0415	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	1.5006	-1627.9134	
PV Unit electricity exported	-2236.7170	0.4636	-1037.0348	
Total			-2664.9483	(283)
Total Primary energy kWh/year			6661.2681	(286)
Target Primary Energy Rate (TPER)			70.3400	(287)

Full SAP Calculation Printout

Plot Reference	Plot 1	Issued on Date	02/09/2026
Assessment Reference	P1 - BL	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	15.69	TER	13.33
Environmental	86 B	% DER < TER			-17.70
CO_2 Emissions (t/year)	1.32	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	-29.50	DPER	91.09	TPER	70.34

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(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	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)							8.5636	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss						(33) + (36) + (36a) =	77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)

Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)
Average = Sum(39)m / 12 =												122.0849	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6847	(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	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												66.0135	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	72.0207	70.0449	67.8879	65.2032	62.8082	60.3192	59.8022	61.9548	64.1627	66.7187	69.4271	71.9196	(44)
Energy conte	114.0632	99.7430	104.3411	89.2599	84.5519	74.1695	72.3255	76.7130	79.1190	90.5366	98.9116	112.6088	(45)
Energy content (annual)										Total = Sum(45)m =		1096.3430	
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):													
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	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(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	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(64)
								Total per year (kWh/year) = Sum(64)m =				931.8916	(64)
12Total per year (kWh/year)												932	(64)
Electric shower(s)	55.4450	49.4020	53.9451	51.4791	52.4451	50.0275	51.6951	52.4451	51.4791	53.9451	52.9307	55.4450	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							630.6841	(64a)
Heat gains from water heating, kWh/month	38.0997	33.5459	35.6588	31.8375	31.0786	28.2679	28.2930	29.4128	29.6826	32.7253	34.2514	37.7906	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	51.2093	49.9195	47.9284	44.2188	41.7722	39.2610	38.0282	39.5333	41.2258	43.9856	47.5714	50.7938	(72)
Total internal gains	486.7617	501.4130	479.5777	466.2526	442.2557	427.5610	411.2489	410.1861	422.5102	434.8855	460.0216	475.4275	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	679.0548	845.6085	991.4112	1163.5332	1276.9172	1278.7329	1222.5642	1116.2583	998.4981	826.6418	693.4572	637.9325	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9925	0.9818	0.9571	0.8862	0.7531	0.5722	0.4269	0.4828	0.7275	0.9318	0.9846	0.9942	(86)
MIT	19.2824	19.5709	19.9651	20.4479	20.7874	20.9483	20.9878	20.9800	20.8634	20.3845	19.7416	19.2349	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9904	0.9766	0.9448	0.8549	0.6923	0.4826	0.3201	0.3700	0.6414	0.9057	0.9793	0.9925	(89)

MIT 2	18.2938	18.5802	18.9662	19.4260	19.7158	19.8367	19.8565	19.8555	19.7851	19.3822	18.7589	18.2526	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)
MIT	18.5182	18.8051	19.1930	19.6580	19.9590	20.0891	20.1133	20.1108	20.0299	19.6098	18.9820	18.4756	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5182	18.8051	19.1930	19.6580	19.9590	20.0891	20.1133	20.1108	20.0299	19.6098	18.9820	18.4756	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9869	0.9704	0.9361	0.8489	0.6985	0.5014	0.3444	0.3955	0.6558	0.8989	0.9739	0.9895	(94)
Useful gains	670.1349	820.6080	928.1072	987.7230	891.9623	641.2088	421.0112	441.4948	654.7905	743.0487	675.3562	631.2652	(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	1759.6239	1717.3439	1564.4769	1313.4059	1006.5068	663.3444	424.5777	447.7458	718.9526	1097.9945	1453.2867	1752.6500	(97)
Space heating kWh	810.5799	602.6065	473.4590	234.4917	85.2211	0.0000	0.0000	0.0000	0.0000	264.0797	560.1100	834.3102	(98a)
Space heating requirement - total per year (kWh/year)												3864.8581	
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	810.5799	602.6065	473.4590	234.4917	85.2211	0.0000	0.0000	0.0000	0.0000	264.0797	560.1100	834.3102	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3864.8581	
Space heating per m2											(98c) / (4) =	40.8116	(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	1135.9775	894.2802	917.0165	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8880	0.9342	0.9087	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1008.7341	835.4140	833.2948	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1445.1599	1381.9244	1260.1237	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	314.2266	406.6038	317.5607	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	78.5566	101.6509	79.3902	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												259.5978	(107)
Energy for space heating												40.8116	(99)
Energy for space cooling												2.7413	(108)
Total												43.5529	(109)
Fabric Energy Efficiency (DFEE)												43.6	(109)

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)			Volume (m3)	
Main dwelling							
Ground floor	67.2000	(1b)	x	2.5000	(2b) =	168.0000	(1b) - (3b)
First floor	27.5000	(1c)	x	2.5500	(2c) =	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000						(4)
Dwelling volume					(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

2. Ventilation rate

			m3 per hour	
Number of open chimneys		0 * 80 =	0.0000	(6a)
Number of open flues		0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000	(6d)
Number of flues attached to other heater		0 * 35 =	0.0000	(6e)
Number of blocked chimneys		0 * 20 =	0.0000	(6f)
Number of intermittent extract fans		3 * 10 =	30.0000	(7a)
Number of passive vents		0 * 10 =	0.0000	(7b)
Number of flueless gas fires		0 * 40 =	0.0000	(7c)
			Air changes per hour	
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test			Yes	
Pressure Test Method			Blower Door	
Measured/design AP50			5.0000	(17)
Infiltration rate			0.3760	(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) =	0.3196	(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													
	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(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	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750
E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 28.2530 (36)

Point Thermal bridges (36a) = 0.0000

Total fabric heat loss (33) + (36) + (36a) = 93.9220 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)

Average = Sum(39)m / 12 = 138.0673

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (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													
	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses													
	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												66.0135	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	72.0207	70.0449	67.8879	65.2032	62.8082	60.3192	59.8022	61.9548	64.1627	66.7187	69.4271	71.9196	(44)
Energy conte	114.0632	99.7430	104.3411	89.2599	84.5519	74.1695	72.3255	76.7130	79.1190	90.5366	98.9116	112.6088	(45)
Energy content (annual)										Total = Sum(45)m =		1096.3430	
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):													
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													
	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(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													
	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(64)
								Total per year (kWh/year) = Sum(64)m =				931.8916	(64)
12Total per year (kWh/year)												932	(64)
Electric shower(s)													
	55.4450	49.4020	53.9451	51.4791	52.4451	50.0275	51.6951	52.4451	51.4791	53.9451	52.9307	55.4450	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							630.6841	(64a)
Heat gains from water heating, kWh/month													
	38.0997	33.5459	35.6588	31.8375	31.0786	28.2679	28.2930	29.4128	29.6826	32.7253	34.2514	37.7906	(65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	51.2093	49.9195	47.9284	44.2188	41.7722	39.2610	38.0282	39.5333	41.2258	43.9856	47.5714	50.7938	(72)
Total internal gains	486.7617	501.4130	479.5777	466.2526	442.2557	427.5610	411.2489	410.1861	422.5102	434.8855	460.0216	475.4275	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	637.7280	771.6441	881.4468	1013.7665	1097.6785	1095.9641	1048.3474	964.6168	874.7636	742.4633	643.2898	603.0066	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area	0.9940	0.9874	0.9734	0.9327	0.8453	0.6936	0.5415	0.5995	0.8194	0.9568	0.9887	0.9951	(86)
MIT	18.9718	19.2285	19.6133	20.1318	20.5758	20.8613	20.9587	20.9396	20.7241	20.1337	19.4607	18.9303	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house	0.9922	0.9835	0.9648	0.9099	0.7917	0.5913	0.3999	0.4566	0.7375	0.9376	0.9845	0.9936	(89)
MIT 2	17.8921	18.1480	18.5288	19.0351	19.4374	19.6645	19.7184	19.7129	19.5737	19.0487	18.3871	17.8564	(90)
Living area fraction										fLA = Living area / (4) =		0.2270	(91)
MIT	18.1372	18.3933	18.7750	19.2841	19.6959	19.9362	20.0000	19.9914	19.8349	19.2950	18.6309	18.1002	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1372	18.3933	18.7750	19.2841	19.6959	19.9362	20.0000	19.9914	19.8349	19.2950	18.6309	18.1002	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9889	0.9779	0.9565	0.9003	0.7904	0.6097	0.4319	0.4882	0.7458	0.9290	0.9795	0.9908	(94)
Useful gains	630.6214	754.6255	843.1089	912.6631	867.6541	668.1569	452.7290	470.9564	652.3682	689.7846	630.0795	597.4828	(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	1933.5576	1882.0906	1709.1023	1433.7183	1102.2313	730.1765	465.2336	490.7544	786.9764	1198.6108	1594.6206	1928.6952	(97)
Space heating kWh	969.3845	757.6565	644.2991	375.1598	174.5255	0.0000	0.0000	0.0000	0.0000	378.5667	694.4696	990.4220	(98a)
Space heating requirement - total per year (kWh/year)												4984.4837	
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	969.3845	757.6565	644.2991	375.1598	174.5255	0.0000	0.0000	0.0000	0.0000	378.5667	694.4696	990.4220	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4984.4837	
Space heating per m2											(98c) / (4) =	52.6345	(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	1286.2430	1012.5743	1038.5115	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7722	0.8450	0.8061	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	993.2656	855.6539	837.1241	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1231.5341	1178.2944	1082.8803	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	171.5533	240.0445	182.8427	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	42.8883	60.0111	45.7107	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												148.6101	(107)
Energy for space heating												52.6345	(99)
Energy for space cooling												1.5693	(108)
Total												54.2037	(109)
Fabric Energy Efficiency (TFEE)												54.2	(109)

Full SAP Calculation Printout

Plot Reference	Plot 1	Issued on Date	02/09/2026
Assessment Reference	P1 - BL	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	15.69	TER	13.33
Environmental	86 B	% DER < TER			-17.70
CO_2 Emissions (t/year)	1.32	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	-29.50	DPER	91.09	TPER	70.34

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		238.1250	(5)

---

2. Ventilation rate

---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(22b)
Effective ac	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)							8.5636	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)
Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)

Average = Sum(39)m / 12 = 122.0849

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

---

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	77.8885	76.7179	75.0123	71.7488	69.3404	66.6546	65.1280	66.8208	68.6764	71.5601	74.8937	77.5900	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 137.8240 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.9092	146.7628	142.9001	136.9520	132.1486	126.9738	124.9302	128.7756	132.8390	138.2788	144.3207	149.5097	(44)
Energy conte	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(45)
Energy content (annual)										Total = Sum(45)m =		2289.2444	
Distribution loss (46)m = 0.15 x (45)m	35.6129	31.3482	32.9448	28.1221	26.6846	23.4194	22.6638	23.9177	24.5706	28.1464	30.8417	35.1144	(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	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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(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	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(64)
								Total per year (kWh/year) = Sum(64)m =				2889.2444	(64)
12Total per year (kWh/year)												2889	(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	91.6817	80.9955	85.7674	74.6660	71.8906	64.2417	62.9779	65.7572	66.7935	75.1310	80.6945	90.5766	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	123.2281	120.5290	115.2788	103.7028	96.6272	89.2246	84.6477	88.3834	92.7688	100.9825	112.0757	121.7428	(72)
Total internal gains	561.7805	575.0225	549.9281	528.7366	500.1106	477.5246	457.8684	459.0362	474.0532	494.8824	527.5260	549.3764	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	754.0737	919.2180	1061.7615	1226.0172	1334.7721	1328.6965	1269.1837	1165.1084	1050.0411	886.6387	760.9616	711.8814	(84)

---

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9892	0.9759	0.9472	0.8705	0.7331	0.5542	0.4121	0.4644	0.7040	0.9170	0.9789	0.9913	(86)
MIT	19.3711	19.6534	20.0352	20.4925	20.8083	20.9540	20.9892	20.9827	20.8794	20.4374	19.8184	19.3232	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9861	0.9693	0.9326	0.8366	0.6712	0.4661	0.3086	0.3551	0.6172	0.8869	0.9719	0.9889	(89)
MIT 2	17.9697	18.3273	18.8036	19.3553	19.6963	19.8337	19.8561	19.8549	19.7770	19.3092	18.5466	17.9143	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)

MIT	18.2879	18.6284	19.0832	19.6135	19.9488	20.0880	20.1134	20.1110	20.0273	19.5654	18.8353	18.2342	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.1379	18.4784	18.9332	19.4635	19.7988	19.9380	19.9634	19.9610	19.8773	19.4154	18.6853	18.0842	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9794	0.9585	0.9179	0.8233	0.6681	0.4725	0.3182	0.3650	0.6189	0.8724	0.9618	0.9831	(94)
Useful gains	738.5571	881.0676	974.6059	1009.3262	891.7887	627.7550	403.9139	425.2103	649.8933	773.5247	731.8955	699.8862	(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	1712.5499	1676.9893	1532.4623	1289.6542	986.9733	645.0936	406.4564	429.6658	700.4451	1074.3017	1416.9999	1704.5981	(97)
Space heating kWh	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98a)
Space heating requirement - total per year (kWh/year)												3411.7676	
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	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3411.7676	
Space heating per m2											(98c) / (4) =	36.0271	(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 %)	89.5000	(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	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98)
Space heating efficiency (main heating system 1)	89.5000	89.5000	89.5000	89.5000	89.5000	0.0000	0.0000	0.0000	0.0000	89.5000	89.5000	89.5000	(210)
Space heating fuel (main heating system)	809.6655	597.6082	463.7376	225.5152	79.1256	0.0000	0.0000	0.0000	0.0000	250.0314	551.1454	835.2019	(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	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(64)
Efficiency of water heater												81.0000	(216)
(217)m	86.9039	86.5671	85.9408	84.7016	82.8596	81.0000	81.0000	81.0000	81.0000	84.9024	86.4104	86.9802	(217)
Fuel for water heating, kWh/month	273.1976	241.4177	255.5622	221.3423	214.6973	192.7520	186.5336	196.8532	202.2269	221.0101	237.9473	269.1371	(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	54.4411	49.1726	54.4411	52.6849	54.4411	52.6849	54.4411	54.4411	52.6849	54.4411	52.6849	54.4411	(231)
Lighting	22.9307	18.3959	16.5634	12.1351	9.3735	7.6582	8.5508	11.1147	14.4368	18.9419	21.3949	23.5680	(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	3812.0308	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	81.0000	
Water heating fuel used	2712.6775	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	41.0000	(230c)
maintaining electric keep-hot facility for gas combi boiler	600.0000	(230f)
Total electricity for the above, kWh/year	641.0000	(231)
Electricity for lighting (calculated in Appendix L)	185.0639	(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	7350.7722	(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	3812.0308	0.2100	800.5265	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2712.6775	0.2100	569.6623	(264)
Space and water heating			1370.1887	(265)
Pumps, fans and electric keep-hot	641.0000	0.1387	88.9146	(267)
Energy for lighting	185.0639	0.1443	26.7104	(268)
Total CO2, kg/year			1485.8138	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			15.6900	(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	3812.0308	1.1300	4307.5948	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2712.6775	1.1300	3065.3255	(278)
Space and water heating			7372.9203	(279)
Pumps, fans and electric keep-hot	641.0000	1.5128	969.7048	(281)
Energy for lighting	185.0639	1.5338	283.8572	(282)
Total Primary energy kWh/year			8626.4823	(286)
Dwelling Primary energy Rate (DPER)			91.0900	(287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	238.1250	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3760	(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) =	0.3196	(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	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(22b)
Effective ac	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750

E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720	
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600	

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 28.2530 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 93.9220 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)

Average = Sum(39)m / 12 = 138.0673

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	69.2342	68.1937	66.6776	63.7767	61.6359	59.2486	57.8916	59.3963	61.0457	63.6090	66.5721	68.9689	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 129.8451 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	141.2549	138.2386	134.5654	128.9799	124.4441	119.5678	117.6937	121.3511	125.2083	130.3276	135.9992	140.8885	(44)
Energy conte	223.7132	196.8500	206.8221	176.5671	167.5257	147.0225	142.3404	150.2580	154.3944	176.8534	193.7558	220.5974	(45)

Energy content (annual) Total = Sum(45)m = 2156.6998

Distribution loss (46)m = 0.15 x (45)m	33.5570	29.5275	31.0233	26.4851	25.1289	22.0534	21.3511	22.5387	23.1592	26.5280	29.0634	33.0896	(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	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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	274.6721	242.8774	257.7810	225.8821	218.4846	196.3376	193.2993	201.2169	203.7094	227.8123	243.0709	271.5563	(62)
WWHRS	-31.6510	-27.9924	-29.3120	-24.2715	-22.6202	-19.3562	-18.1434	-19.2937	-20.0267	-23.6093	-26.7465	-31.0648	(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	243.0211	214.8850	228.4689	201.6106	195.8644	176.9813	175.1559	181.9232	183.6827	204.2030	216.3244	240.4915	(64)

Total per year (kWh/year) = Sum(64)m = 2462.6122 (64)

12Total per year (kWh/year) 2463 (64)

Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month	87.1244	76.9595	81.5081	71.0373	68.4420	61.2137	60.0679	62.7005	63.6649	71.5435	76.7526	86.0884	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	117.1026	114.5230	109.5538	98.6629	91.9920	85.0191	80.7364	84.2749	88.4235	96.1606	106.6008	115.7102	(72)
Total internal gains	555.6550	569.0166	544.2031	523.6967	495.4754	473.3191	453.9571	454.9277	469.7079	490.0605	522.0510	543.3438	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	706.6214	839.2477	946.0722	1071.2107	1150.8982	1141.7222	1091.0556	1009.3583	921.9613	797.6383	705.3192	670.9229	(84)

7. Mean internal temperature (heating season)

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

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

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

tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area													
	0.9916	0.9835	0.9671	0.9221	0.8291	0.6749	0.5236	0.5785	0.7998	0.9471	0.9848	0.9930	(86)
MIT	19.0515	19.3043	19.6813	20.1824	20.6074	20.8738	20.9631	20.9464	20.7487	20.1876	19.5307	19.0095	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house													
	0.9890	0.9785	0.9568	0.8968	0.7727	0.5724	0.3852	0.4382	0.7144	0.9244	0.9793	0.9909	(89)
MIT 2	17.4797	17.8018	18.2782	18.9001	19.3884	19.6547	19.7170	19.7108	19.5514	18.9217	18.0986	17.4312	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)
MIT	17.8365	18.1429	18.5968	19.1912	19.6651	19.9315	19.9999	19.9913	19.8233	19.2091	18.4237	17.7895	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8365	18.1429	18.5968	19.1912	19.6651	19.9315	19.9999	19.9913	19.8233	19.2091	18.4237	17.7895	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9834	0.9699	0.9447	0.8836	0.7699	0.5903	0.4163	0.4690	0.7220	0.9123	0.9712	0.9861	(94)
Useful gains	694.9037	813.9660	893.7603	946.5688	886.0427	673.9384	454.1635	473.4243	665.6629	727.6888	685.0089	661.5743	(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													
	1891.5449	1847.1619	1684.2906	1420.8892	1097.9945	729.5320	465.2205	490.7444	785.3782	1186.7676	1565.9758	1885.5828	(97)
Space heating kWh													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98a)
Space heating requirement - total per year (kWh/year)												4558.4793	
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													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4558.4793	
Space heating per m2											(98c) / (4) =	48.1360	(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 %)	92.4000	(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													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98)
Space heating efficiency (main heating system 1)													
	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000	(210)
Space heating fuel (main heating system)													
	963.5293	751.4152	636.5309	369.6003	170.6625	0.0000	0.0000	0.0000	0.0000	369.6478	686.4677	985.5653	(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													
	243.0211	214.8850	228.4689	201.6106	195.8644	176.9813	175.1559	181.9232	183.6827	204.2030	216.3244	240.4915	(64)
Efficiency of water heater												80.3000	(216)
(217)m	86.9042	86.7053	86.3138	85.5009	83.9209	80.3000	80.3000	80.3000	80.3000	85.4748	86.5429	86.9545	(217)
Fuel for water heating, kWh/month													
	279.6425	247.8338	264.6958	235.7995	233.3917	220.4002	218.1269	226.5545	228.7456	238.9043	249.9622	276.5718	(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	25.9345	20.8057	18.7332	13.7247	10.6014	8.6614	9.6709	12.5706	16.3280	21.4233	24.1975	26.6553	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-56.3832	-76.3966	-105.5928	-114.0140	-119.1075	-109.8007	-108.3737	-104.0900	-96.0968	-84.9968	-60.8468	-49.1123	(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	-42.0108	-86.9697	-170.3566	-252.3624	-330.4165	-330.8520	-327.0076	-278.3976	-206.0737	-123.2342	-55.7020	-33.3340	(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	4933.4191	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	80.3000	
Water heating fuel used	2920.6287	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	209.3066	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3321.5284	(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	4827.8261	(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	4933.4191	0.2100	1036.0180	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2920.6287	0.2100	613.3320	(264)
Space and water heating			1649.3500	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	209.3066	0.1443	30.2094	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	0.1354	-146.9360	
PV Unit electricity exported	-2236.7170	0.1263	-282.5068	
Total			-429.4428	(269)
Total CO2, kg/year			1262.0459	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.3300	(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	4933.4191	1.1300	5574.7636	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2920.6287	1.1300	3300.3104	(278)
Space and water heating			8875.0740	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	209.3066	1.5338	321.0415	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	1.5006	-1627.9134	
PV Unit electricity exported	-2236.7170	0.4636	-1037.0348	
Total			-2664.9483	(283)
Total Primary energy kWh/year			6661.2681	(286)
Target Primary Energy Rate (TPER)			70.3400	(287)

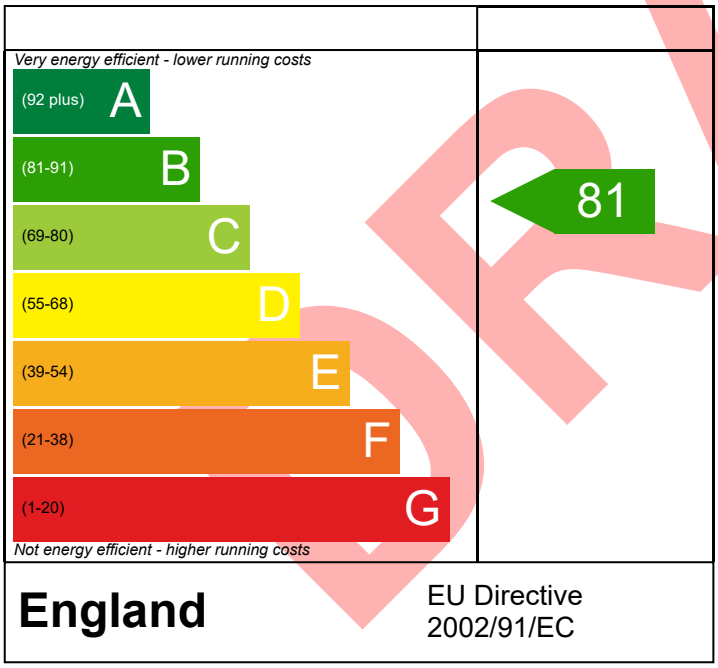
Predicted Energy Assessment

Dwelling type:	House, Detached
Date of assessment:	02/09/2026
SAP Version:	10.2
Produced by:	Samuel Westover
Total floor area:	94.7 m²
DRRN:	

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

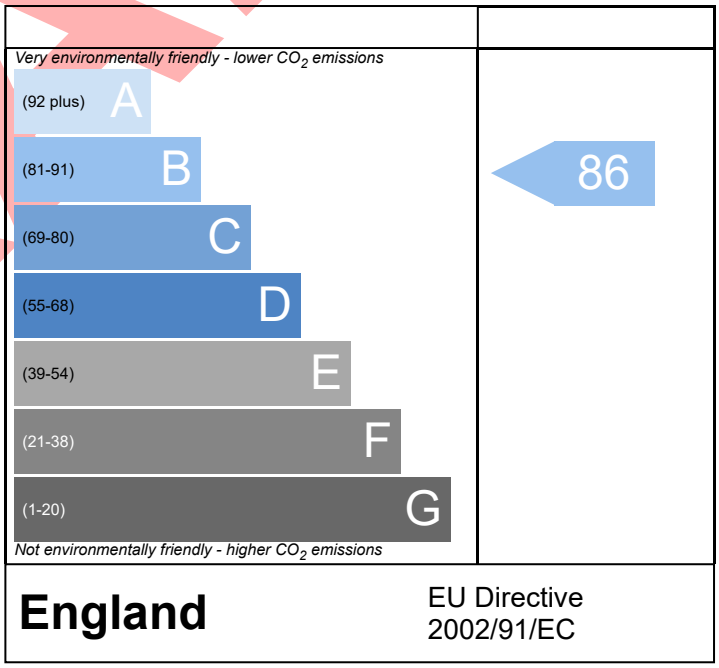
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



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

Environmental Impact (CO_2) Rating



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

DRAFT

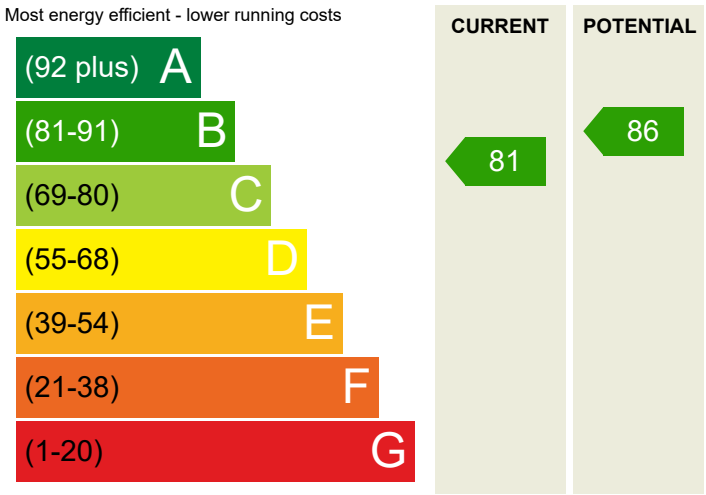
Energy Report

Dwelling Address	
Reference	Plot 1-P1 - BL
SAP Version	10.2
Assessment Date	30/07/2026
Submission Date	
Property Type	House, Detached
Total Floor Area	95

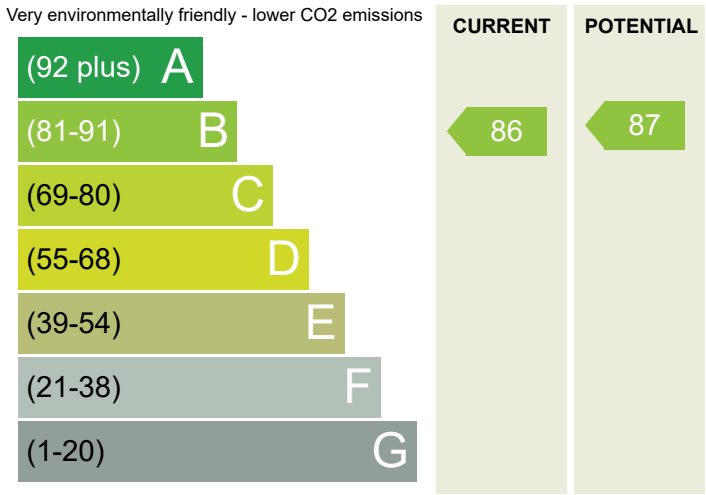
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

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

Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report

	Primary Energy	Energy	Carbon	Cost	HTC
CURRENT	81.72 kWh	6566 kWh	1321 kg	756.71 £	122 W/K
POTENTIAL	68.38 kWh	5720 kWh	1208 kg	522.71 £	122 W/K

Energy Report

elmhurst energy

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m²K	Very Good
Roof	Average thermal transmittance 0.11 W/m²K	Very Good
Floor	Average thermal transmittance 0.1 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, mains gas	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 5.0 m³/h.m² (assumed)	Good

Recommendations

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

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating
Solar water heating	£40	B 81			B 88
Photovoltaic	£274	B 86	£8,000 - £10,000	£234	B 87

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

Estimated energy costs of the dwelling

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

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£51	£51	You could save £234
Heating	£506	£506	
Hot Water	£200	£200	
New Technologies e.g. Impact of PV	£0	-(£234)	
TOTAL	£757	£523	

Estimated energy use and potential savings

Space Heating
3014
kWh per year

Water Heating
2725
kWh per year

Energy Report

elmhurst energy

About this document

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

Disclaimer

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

Glossary terms for additional metrics

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

Summary for Input Data

Plot Reference	Plot 2	Issued on Date	02/09/2026
Assessment Reference	P2 - BL	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	15.69	TER	13.33
Environmental	86 B	% DER < TER			-17.70
CO_2 Emissions (t/year)	1.32	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	-29.50	DPER	91.09	TPER	70.34

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	215.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	37.70 m	67.20 m²	2.50 m
1st Storey:	21.10 m	27.50 m²	2.55 m

8.0 Living Area 21.50 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		148.06	118.46	0.00	None	29.60	Calculate Wall Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
FR	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	39.70	39.70	None	0.00	Enter Gross Area	0.00
Sloping Roof	External Slope Roof	Plasterboard, insulated slope	0.11	9.00	30.40	30.40	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.10	None	0.00	75.00	67.30

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Triple Low-E Soft 0.05			0.63		0.70	1.20
Front Door	Manufacturer	Solid Door				0.00			1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W	Windows	External Wall 1	West	7.16	
N	Windows	External Wall 1	North	10.42	
S	Windows	External Wall 1	South	6.69	

E	Windows	External Wall 1	East	3.31
Front Door	Front Door	External Wall 1	West	2.02

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	User Input	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate		14.46			Yes
E3 Sill		13.52			Yes
E4 Jamb		40.20			Yes
E5 Ground floor (normal)		37.70			Yes
E6 Intermediate floor within a dwelling		21.10			Yes
E16 Corner (normal)		27.50			No
E15 Flat roof with parapet		28.00			No
E17 Corner (inverted – internal area greater than external area)		7.50			No
E11 Eaves (insulation at rafter level)		9.30			No
E13 Gable (insulation at rafter level)		12.00			No

Y-value	0.03	W/m²K
Description	ROI	

19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	3	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	5.01	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting: No

Name	Efficacy	Power	Capacity	Count
Lighting 1	120.00	6.00	720.00	25

24.0 Main Heating 1	Manufacturer	
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	104	
In Winter	89.50	
In Summer	81.00	
Model Name	Gb	
Manufacturer	GB	
Controls SAP Code	2110	
Controls description	Time and temperature zone control by arrangement	
Delayed Start Stat	Yes	

Summary for Input Data

Burner Control	On/Off
Flue Type	None or Unknown
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	Yes
Combi boiler type	Standard Combi
Combi keep hot type	Electric, time clock

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	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
S1	Vented hot water system	9.00		No	
s2	Vented hot water system	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating			B 81	B 88
Photovoltaic	£8,000 - £10,000	£234	B 86	B 87
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Plot 2	Issued on Date	02/09/2026
Assessment Reference	P2 - BL	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	15.69	TER	13.33
Environmental	86 B	% DER < TER			-17.70
CO_2 Emissions (t/year)	1.32	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	-29.50	DPER	91.09	TPER	70.34

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		238.1250	(5)

---

2. Ventilation rate

---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(22b)
Effective ac	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)							8.5636	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)
Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)

Average = Sum(39)m / 12 = 122.0849

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

---

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	77.8885	76.7179	75.0123	71.7488	69.3404	66.6546	65.1280	66.8208	68.6764	71.5601	74.8937	77.5900	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 137.8240 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.9092	146.7628	142.9001	136.9520	132.1486	126.9738	124.9302	128.7756	132.8390	138.2788	144.3207	149.5097	(44)
Energy conte	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(45)
Energy content (annual)										Total = Sum(45)m =		2289.2444	
Distribution loss (46)m = 0.15 x (45)m	35.6129	31.3482	32.9448	28.1221	26.6846	23.4194	22.6638	23.9177	24.5706	28.1464	30.8417	35.1144	(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	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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(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	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(64)
								Total per year (kWh/year) = Sum(64)m =				2889.2444	(64)
12Total per year (kWh/year)												2889	(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	91.6817	80.9955	85.7674	74.6660	71.8906	64.2417	62.9779	65.7572	66.7935	75.1310	80.6945	90.5766	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	123.2281	120.5290	115.2788	103.7028	96.6272	89.2246	84.6477	88.3834	92.7688	100.9825	112.0757	121.7428	(72)
Total internal gains	561.7805	575.0225	549.9281	528.7366	500.1106	477.5246	457.8684	459.0362	474.0532	494.8824	527.5260	549.3764	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	754.0737	919.2180	1061.7615	1226.0172	1334.7721	1328.6965	1269.1837	1165.1084	1050.0411	886.6387	760.9616	711.8814	(84)

---

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9892	0.9759	0.9472	0.8705	0.7331	0.5542	0.4121	0.4644	0.7040	0.9170	0.9789	0.9913	(86)
MIT	19.3711	19.6534	20.0352	20.4925	20.8083	20.9540	20.9892	20.9827	20.8794	20.4374	19.8184	19.3232	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9861	0.9693	0.9326	0.8366	0.6712	0.4661	0.3086	0.3551	0.6172	0.8869	0.9719	0.9889	(89)
MIT 2	17.9697	18.3273	18.8036	19.3553	19.6963	19.8337	19.8561	19.8549	19.7770	19.3092	18.5466	17.9143	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)

MIT	18.2879	18.6284	19.0832	19.6135	19.9488	20.0880	20.1134	20.1110	20.0273	19.5654	18.8353	18.2342	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.1379	18.4784	18.9332	19.4635	19.7988	19.9380	19.9634	19.9610	19.8773	19.4154	18.6853	18.0842	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9794	0.9585	0.9179	0.8233	0.6681	0.4725	0.3182	0.3650	0.6189	0.8724	0.9618	0.9831	(94)
Useful gains	738.5571	881.0676	974.6059	1009.3262	891.7887	627.7550	403.9139	425.2103	649.8933	773.5247	731.8955	699.8862	(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	1712.5499	1676.9893	1532.4623	1289.6542	986.9733	645.0936	406.4564	429.6658	700.4451	1074.3017	1416.9999	1704.5981	(97)
Space heating kWh	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98a)
Space heating requirement - total per year (kWh/year)												3411.7676	
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	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3411.7676	
Space heating per m2											(98c) / (4) =	36.0271	(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 %)	89.5000	(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	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98)
Space heating efficiency (main heating system 1)	89.5000	89.5000	89.5000	89.5000	89.5000	0.0000	0.0000	0.0000	0.0000	89.5000	89.5000	89.5000	(210)
Space heating fuel (main heating system)	809.6655	597.6082	463.7376	225.5152	79.1256	0.0000	0.0000	0.0000	0.0000	250.0314	551.1454	835.2019	(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	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(64)
Efficiency of water heater												81.0000	(216)
(217)m	86.9039	86.5671	85.9408	84.7016	82.8596	81.0000	81.0000	81.0000	81.0000	84.9024	86.4104	86.9802	(217)
Fuel for water heating, kWh/month	273.1976	241.4177	255.5622	221.3423	214.6973	192.7520	186.5336	196.8532	202.2269	221.0101	237.9473	269.1371	(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	54.4411	49.1726	54.4411	52.6849	54.4411	52.6849	54.4411	54.4411	52.6849	54.4411	52.6849	54.4411	(231)
Lighting	22.9307	18.3959	16.5634	12.1351	9.3735	7.6582	8.5508	11.1147	14.4368	18.9419	21.3949	23.5680	(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	3812.0308	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	81.0000	
Water heating fuel used	2712.6775	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	41.0000	(230c)
maintaining electric keep-hot facility for gas combi boiler	600.0000	(230f)
Total electricity for the above, kWh/year	641.0000	(231)
Electricity for lighting (calculated in Appendix L)	185.0639	(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	7350.7722	(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	3812.0308	0.2100	800.5265	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2712.6775	0.2100	569.6623	(264)
Space and water heating			1370.1887	(265)
Pumps, fans and electric keep-hot	641.0000	0.1387	88.9146	(267)
Energy for lighting	185.0639	0.1443	26.7104	(268)
Total CO2, kg/year			1485.8138	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			15.6900	(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	3812.0308	1.1300	4307.5948	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2712.6775	1.1300	3065.3255	(278)
Space and water heating			7372.9203	(279)
Pumps, fans and electric keep-hot	641.0000	1.5128	969.7048	(281)
Energy for lighting	185.0639	1.5338	283.8572	(282)
Total Primary energy kWh/year			8626.4823	(286)
Dwelling Primary energy Rate (DPER)			91.0900	(287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	238.1250	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3760	(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) =	0.3196	(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	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(22b)
Effective ac	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750

E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720	
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600	

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 28.2530 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 93.9220 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)

Average = Sum(39)m / 12 = 138.0673

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	69.2342	68.1937	66.6776	63.7767	61.6359	59.2486	57.8916	59.3963	61.0457	63.6090	66.5721	68.9689	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 129.8451 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	141.2549	138.2386	134.5654	128.9799	124.4441	119.5678	117.6937	121.3511	125.2083	130.3276	135.9992	140.8885	(44)
Energy conte	223.7132	196.8500	206.8221	176.5671	167.5257	147.0225	142.3404	150.2580	154.3944	176.8534	193.7558	220.5974	(45)

Energy content (annual) Total = Sum(45)m = 2156.6998

Distribution loss (46)m = 0.15 x (45)m	33.5570	29.5275	31.0233	26.4851	25.1289	22.0534	21.3511	22.5387	23.1592	26.5280	29.0634	33.0896	(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	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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	274.6721	242.8774	257.7810	225.8821	218.4846	196.3376	193.2993	201.2169	203.7094	227.8123	243.0709	271.5563	(62)
WWHRS	-31.6510	-27.9924	-29.3120	-24.2715	-22.6202	-19.3562	-18.1434	-19.2937	-20.0267	-23.6093	-26.7465	-31.0648	(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	243.0211	214.8850	228.4689	201.6106	195.8644	176.9813	175.1559	181.9232	183.6827	204.2030	216.3244	240.4915	(64)

Total per year (kWh/year) = Sum(64)m = 2462.6122 (64)

12Total per year (kWh/year) 2463 (64)

Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month	87.1244	76.9595	81.5081	71.0373	68.4420	61.2137	60.0679	62.7005	63.6649	71.5435	76.7526	86.0884	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	117.1026	114.5230	109.5538	98.6629	91.9920	85.0191	80.7364	84.2749	88.4235	96.1606	106.6008	115.7102	(72)
Total internal gains	555.6550	569.0166	544.2031	523.6967	495.4754	473.3191	453.9571	454.9277	469.7079	490.0605	522.0510	543.3438	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	706.6214	839.2477	946.0722	1071.2107	1150.8982	1141.7222	1091.0556	1009.3583	921.9613	797.6383	705.3192	670.9229	(84)

7. Mean internal temperature (heating season)

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

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

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

tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area													
	0.9916	0.9835	0.9671	0.9221	0.8291	0.6749	0.5236	0.5785	0.7998	0.9471	0.9848	0.9930	(86)
MIT	19.0515	19.3043	19.6813	20.1824	20.6074	20.8738	20.9631	20.9464	20.7487	20.1876	19.5307	19.0095	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house													
	0.9890	0.9785	0.9568	0.8968	0.7727	0.5724	0.3852	0.4382	0.7144	0.9244	0.9793	0.9909	(89)
MIT 2	17.4797	17.8018	18.2782	18.9001	19.3884	19.6547	19.7170	19.7108	19.5514	18.9217	18.0986	17.4312	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)
MIT	17.8365	18.1429	18.5968	19.1912	19.6651	19.9315	19.9999	19.9913	19.8233	19.2091	18.4237	17.7895	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8365	18.1429	18.5968	19.1912	19.6651	19.9315	19.9999	19.9913	19.8233	19.2091	18.4237	17.7895	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9834	0.9699	0.9447	0.8836	0.7699	0.5903	0.4163	0.4690	0.7220	0.9123	0.9712	0.9861	(94)
Useful gains	694.9037	813.9660	893.7603	946.5688	886.0427	673.9384	454.1635	473.4243	665.6629	727.6888	685.0089	661.5743	(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													
	1891.5449	1847.1619	1684.2906	1420.8892	1097.9945	729.5320	465.2205	490.7444	785.3782	1186.7676	1565.9758	1885.5828	(97)
Space heating kWh													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98a)
Space heating requirement - total per year (kWh/year)												4558.4793	
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													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4558.4793	
Space heating per m2											(98c) / (4) =	48.1360	(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 %)	92.4000	(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													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98)
Space heating efficiency (main heating system 1)													
	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000	(210)
Space heating fuel (main heating system)													
	963.5293	751.4152	636.5309	369.6003	170.6625	0.0000	0.0000	0.0000	0.0000	369.6478	686.4677	985.5653	(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													
	243.0211	214.8850	228.4689	201.6106	195.8644	176.9813	175.1559	181.9232	183.6827	204.2030	216.3244	240.4915	(64)
Efficiency of water heater												80.3000	(216)
(217)m	86.9042	86.7053	86.3138	85.5009	83.9209	80.3000	80.3000	80.3000	80.3000	85.4748	86.5429	86.9545	(217)
Fuel for water heating, kWh/month													
	279.6425	247.8338	264.6958	235.7995	233.3917	220.4002	218.1269	226.5545	228.7456	238.9043	249.9622	276.5718	(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	25.9345	20.8057	18.7332	13.7247	10.6014	8.6614	9.6709	12.5706	16.3280	21.4233	24.1975	26.6553	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-56.3832	-76.3966	-105.5928	-114.0140	-119.1075	-109.8007	-108.3737	-104.0900	-96.0968	-84.9968	-60.8468	-49.1123	(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	-42.0108	-86.9697	-170.3566	-252.3624	-330.4165	-330.8520	-327.0076	-278.3976	-206.0737	-123.2342	-55.7020	-33.3340	(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	4933.4191	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	80.3000	
Water heating fuel used	2920.6287	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	209.3066	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3321.5284	(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	4827.8261	(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	4933.4191	0.2100	1036.0180	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2920.6287	0.2100	613.3320	(264)
Space and water heating			1649.3500	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	209.3066	0.1443	30.2094	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	0.1354	-146.9360	
PV Unit electricity exported	-2236.7170	0.1263	-282.5068	
Total			-429.4428	(269)
Total CO2, kg/year			1262.0459	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.3300	(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	4933.4191	1.1300	5574.7636	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2920.6287	1.1300	3300.3104	(278)
Space and water heating			8875.0740	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	209.3066	1.5338	321.0415	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	1.5006	-1627.9134	
PV Unit electricity exported	-2236.7170	0.4636	-1037.0348	
Total			-2664.9483	(283)
Total Primary energy kWh/year			6661.2681	(286)
Target Primary Energy Rate (TPER)			70.3400	(287)

Full SAP Calculation Printout

Plot Reference	Plot 2	Issued on Date	02/09/2026
Assessment Reference	P2 - BL	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	15.69	TER	13.33
Environmental	86 B	% DER < TER			-17.70
CO_2 Emissions (t/year)	1.32	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	-29.50	DPER	91.09	TPER	70.34

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

---

2. Ventilation rate

---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(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	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)	8.5636	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)

Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)
Average = Sum(39)m / 12 =												122.0849	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6847	(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	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												66.0135	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	72.0207	70.0449	67.8879	65.2032	62.8082	60.3192	59.8022	61.9548	64.1627	66.7187	69.4271	71.9196	(44)
Energy conte	114.0632	99.7430	104.3411	89.2599	84.5519	74.1695	72.3255	76.7130	79.1190	90.5366	98.9116	112.6088	(45)
Energy content (annual)										Total = Sum(45)m =		1096.3430	
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):													
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	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(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	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(64)
								Total per year (kWh/year) = Sum(64)m =				931.8916	(64)
12Total per year (kWh/year)												932	(64)
Electric shower(s)	55.4450	49.4020	53.9451	51.4791	52.4451	50.0275	51.6951	52.4451	51.4791	53.9451	52.9307	55.4450	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							630.6841	(64a)
Heat gains from water heating, kWh/month	38.0997	33.5459	35.6588	31.8375	31.0786	28.2679	28.2930	29.4128	29.6826	32.7253	34.2514	37.7906	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	51.2093	49.9195	47.9284	44.2188	41.7722	39.2610	38.0282	39.5333	41.2258	43.9856	47.5714	50.7938	(72)
Total internal gains	486.7617	501.4130	479.5777	466.2526	442.2557	427.5610	411.2489	410.1861	422.5102	434.8855	460.0216	475.4275	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	679.0548	845.6085	991.4112	1163.5332	1276.9172	1278.7329	1222.5642	1116.2583	998.4981	826.6418	693.4572	637.9325	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9925	0.9818	0.9571	0.8862	0.7531	0.5722	0.4269	0.4828	0.7275	0.9318	0.9846	0.9942	(86)
MIT	19.2824	19.5709	19.9651	20.4479	20.7874	20.9483	20.9878	20.9800	20.8634	20.3845	19.7416	19.2349	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9904	0.9766	0.9448	0.8549	0.6923	0.4826	0.3201	0.3700	0.6414	0.9057	0.9793	0.9925	(89)

MIT 2	18.2938	18.5802	18.9662	19.4260	19.7158	19.8367	19.8565	19.8555	19.7851	19.3822	18.7589	18.2526	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)
MIT	18.5182	18.8051	19.1930	19.6580	19.9590	20.0891	20.1133	20.1108	20.0299	19.6098	18.9820	18.4756	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5182	18.8051	19.1930	19.6580	19.9590	20.0891	20.1133	20.1108	20.0299	19.6098	18.9820	18.4756	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9869	0.9704	0.9361	0.8489	0.6985	0.5014	0.3444	0.3955	0.6558	0.8989	0.9739	0.9895	(94)
Useful gains	670.1349	820.6080	928.1072	987.7230	891.9623	641.2088	421.0112	441.4948	654.7905	743.0487	675.3562	631.2652	(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	1759.6239	1717.3439	1564.4769	1313.4059	1006.5068	663.3444	424.5777	447.7458	718.9526	1097.9945	1453.2867	1752.6500	(97)
Space heating kWh	810.5799	602.6065	473.4590	234.4917	85.2211	0.0000	0.0000	0.0000	0.0000	264.0797	560.1100	834.3102	(98a)
Space heating requirement - total per year (kWh/year)												3864.8581	
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	810.5799	602.6065	473.4590	234.4917	85.2211	0.0000	0.0000	0.0000	0.0000	264.0797	560.1100	834.3102	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3864.8581	
Space heating per m2											(98c) / (4) =	40.8116	(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	1135.9775	894.2802	917.0165	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8880	0.9342	0.9087	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1008.7341	835.4140	833.2948	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1445.1599	1381.9244	1260.1237	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	314.2266	406.6038	317.5607	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	78.5566	101.6509	79.3902	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												259.5978	(107)
Energy for space heating												40.8116	(99)
Energy for space cooling												2.7413	(108)
Total												43.5529	(109)
Fabric Energy Efficiency (DFEE)												43.6	(109)

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)			Volume (m3)	
Main dwelling							
Ground floor	67.2000	(1b)	x	2.5000	(2b) =	168.0000	(1b) - (3b)
First floor	27.5000	(1c)	x	2.5500	(2c) =	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000						(4)
Dwelling volume					(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

2. Ventilation rate

			m3 per hour	
Number of open chimneys		0 * 80 =	0.0000	(6a)
Number of open flues		0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000	(6d)
Number of flues attached to other heater		0 * 35 =	0.0000	(6e)
Number of blocked chimneys		0 * 20 =	0.0000	(6f)
Number of intermittent extract fans		3 * 10 =	30.0000	(7a)
Number of passive vents		0 * 10 =	0.0000	(7b)
Number of flueless gas fires		0 * 40 =	0.0000	(7c)
			Air changes per hour	
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test			Yes	
Pressure Test Method			Blower Door	
Measured/design AP50			5.0000	(17)
Infiltration rate			0.3760	(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) =	0.3196	(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													
	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(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	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750
E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 28.2530 (36)

Point Thermal bridges (36a) = 0.0000

Total fabric heat loss (33) + (36) + (36a) = 93.9220 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)

Average = Sum(39)m / 12 = 138.0673

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (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													
	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses													
	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												66.0135	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	72.0207	70.0449	67.8879	65.2032	62.8082	60.3192	59.8022	61.9548	64.1627	66.7187	69.4271	71.9196	(44)
Energy conte	114.0632	99.7430	104.3411	89.2599	84.5519	74.1695	72.3255	76.7130	79.1190	90.5366	98.9116	112.6088	(45)
Energy content (annual)										Total = Sum(45)m =		1096.3430	
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):													
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													
	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(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													
	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(64)
								Total per year (kWh/year) = Sum(64)m =				931.8916	(64)
12Total per year (kWh/year)												932	(64)
Electric shower(s)													
	55.4450	49.4020	53.9451	51.4791	52.4451	50.0275	51.6951	52.4451	51.4791	53.9451	52.9307	55.4450	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							630.6841	(64a)
Heat gains from water heating, kWh/month													
	38.0997	33.5459	35.6588	31.8375	31.0786	28.2679	28.2930	29.4128	29.6826	32.7253	34.2514	37.7906	(65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	51.2093	49.9195	47.9284	44.2188	41.7722	39.2610	38.0282	39.5333	41.2258	43.9856	47.5714	50.7938	(72)
Total internal gains	486.7617	501.4130	479.5777	466.2526	442.2557	427.5610	411.2489	410.1861	422.5102	434.8855	460.0216	475.4275	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	637.7280	771.6441	881.4468	1013.7665	1097.6785	1095.9641	1048.3474	964.6168	874.7636	742.4633	643.2898	603.0066	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area	0.9940	0.9874	0.9734	0.9327	0.8453	0.6936	0.5415	0.5995	0.8194	0.9568	0.9887	0.9951	(86)
MIT	18.9718	19.2285	19.6133	20.1318	20.5758	20.8613	20.9587	20.9396	20.7241	20.1337	19.4607	18.9303	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house	0.9922	0.9835	0.9648	0.9099	0.7917	0.5913	0.3999	0.4566	0.7375	0.9376	0.9845	0.9936	(89)
MIT 2	17.8921	18.1480	18.5288	19.0351	19.4374	19.6645	19.7184	19.7129	19.5737	19.0487	18.3871	17.8564	(90)
Living area fraction										fLA = Living area / (4) =		0.2270	(91)
MIT	18.1372	18.3933	18.7750	19.2841	19.6959	19.9362	20.0000	19.9914	19.8349	19.2950	18.6309	18.1002	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1372	18.3933	18.7750	19.2841	19.6959	19.9362	20.0000	19.9914	19.8349	19.2950	18.6309	18.1002	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9889	0.9779	0.9565	0.9003	0.7904	0.6097	0.4319	0.4882	0.7458	0.9290	0.9795	0.9908	(94)
Useful gains	630.6214	754.6255	843.1089	912.6631	867.6541	668.1569	452.7290	470.9564	652.3682	689.7846	630.0795	597.4828	(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	1933.5576	1882.0906	1709.1023	1433.7183	1102.2313	730.1765	465.2336	490.7544	786.9764	1198.6108	1594.6206	1928.6952	(97)
Space heating kWh	969.3845	757.6565	644.2991	375.1598	174.5255	0.0000	0.0000	0.0000	0.0000	378.5667	694.4696	990.4220	(98a)
Space heating requirement - total per year (kWh/year)												4984.4837	
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	969.3845	757.6565	644.2991	375.1598	174.5255	0.0000	0.0000	0.0000	0.0000	378.5667	694.4696	990.4220	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4984.4837	
Space heating per m2											(98c) / (4) =	52.6345	(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	1286.2430	1012.5743	1038.5115	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7722	0.8450	0.8061	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	993.2656	855.6539	837.1241	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1231.5341	1178.2944	1082.8803	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	171.5533	240.0445	182.8427	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	42.8883	60.0111	45.7107	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												148.6101	(107)
Energy for space heating												52.6345	(99)
Energy for space cooling												1.5693	(108)
Total												54.2037	(109)
Fabric Energy Efficiency (TFEE)												54.2	(109)

Full SAP Calculation Printout

Plot Reference	Plot 2	Issued on Date	02/09/2026
Assessment Reference	P2 - BL	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	15.69	TER	13.33
Environmental	86 B	% DER < TER			-17.70
CO_2 Emissions (t/year)	1.32	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	-29.50	DPER	91.09	TPER	70.34

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		238.1250	(5)

---

2. Ventilation rate

---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(22b)
Effective ac	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)							8.5636	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)
Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)

Average = Sum(39)m / 12 = 122.0849

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

---

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	77.8885	76.7179	75.0123	71.7488	69.3404	66.6546	65.1280	66.8208	68.6764	71.5601	74.8937	77.5900	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 137.8240 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.9092	146.7628	142.9001	136.9520	132.1486	126.9738	124.9302	128.7756	132.8390	138.2788	144.3207	149.5097	(44)
Energy conte	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(45)
Energy content (annual)										Total = Sum(45)m =		2289.2444	
Distribution loss (46)m = 0.15 x (45)m	35.6129	31.3482	32.9448	28.1221	26.6846	23.4194	22.6638	23.9177	24.5706	28.1464	30.8417	35.1144	(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	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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(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	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(64)
								Total per year (kWh/year) = Sum(64)m =				2889.2444	(64)
12Total per year (kWh/year)												2889	(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	91.6817	80.9955	85.7674	74.6660	71.8906	64.2417	62.9779	65.7572	66.7935	75.1310	80.6945	90.5766	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	123.2281	120.5290	115.2788	103.7028	96.6272	89.2246	84.6477	88.3834	92.7688	100.9825	112.0757	121.7428	(72)
Total internal gains	561.7805	575.0225	549.9281	528.7366	500.1106	477.5246	457.8684	459.0362	474.0532	494.8824	527.5260	549.3764	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	754.0737	919.2180	1061.7615	1226.0172	1334.7721	1328.6965	1269.1837	1165.1084	1050.0411	886.6387	760.9616	711.8814	(84)

---

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9892	0.9759	0.9472	0.8705	0.7331	0.5542	0.4121	0.4644	0.7040	0.9170	0.9789	0.9913	(86)
MIT	19.3711	19.6534	20.0352	20.4925	20.8083	20.9540	20.9892	20.9827	20.8794	20.4374	19.8184	19.3232	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9861	0.9693	0.9326	0.8366	0.6712	0.4661	0.3086	0.3551	0.6172	0.8869	0.9719	0.9889	(89)
MIT 2	17.9697	18.3273	18.8036	19.3553	19.6963	19.8337	19.8561	19.8549	19.7770	19.3092	18.5466	17.9143	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)

MIT	18.2879	18.6284	19.0832	19.6135	19.9488	20.0880	20.1134	20.1110	20.0273	19.5654	18.8353	18.2342	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.1379	18.4784	18.9332	19.4635	19.7988	19.9380	19.9634	19.9610	19.8773	19.4154	18.6853	18.0842	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9794	0.9585	0.9179	0.8233	0.6681	0.4725	0.3182	0.3650	0.6189	0.8724	0.9618	0.9831	(94)
Useful gains	738.5571	881.0676	974.6059	1009.3262	891.7887	627.7550	403.9139	425.2103	649.8933	773.5247	731.8955	699.8862	(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	1712.5499	1676.9893	1532.4623	1289.6542	986.9733	645.0936	406.4564	429.6658	700.4451	1074.3017	1416.9999	1704.5981	(97)
Space heating kWh	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98a)
Space heating requirement - total per year (kWh/year)												3411.7676	
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	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3411.7676	
Space heating per m2											(98c) / (4) =	36.0271	(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 %)	89.5000	(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	724.6506	534.8594	415.0451	201.8361	70.8174	0.0000	0.0000	0.0000	0.0000	223.7781	493.2752	747.5057	(98)
Space heating efficiency (main heating system 1)	89.5000	89.5000	89.5000	89.5000	89.5000	0.0000	0.0000	0.0000	0.0000	89.5000	89.5000	89.5000	(210)
Space heating fuel (main heating system)	809.6655	597.6082	463.7376	225.5152	79.1256	0.0000	0.0000	0.0000	0.0000	250.0314	551.1454	835.2019	(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	288.3784	255.0157	270.5911	236.7955	228.8563	205.4442	202.0511	210.4100	213.1189	238.6019	254.9264	285.0549	(64)
Efficiency of water heater												81.0000	(216)
(217)m	86.9039	86.5671	85.9408	84.7016	82.8596	81.0000	81.0000	81.0000	81.0000	84.9024	86.4104	86.9802	(217)
Fuel for water heating, kWh/month	273.1976	241.4177	255.5622	221.3423	214.6973	192.7520	186.5336	196.8532	202.2269	221.0101	237.9473	269.1371	(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	54.4411	49.1726	54.4411	52.6849	54.4411	52.6849	54.4411	54.4411	52.6849	54.4411	52.6849	54.4411	(231)
Lighting	22.9307	18.3959	16.5634	12.1351	9.3735	7.6582	8.5508	11.1147	14.4368	18.9419	21.3949	23.5680	(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	3812.0308	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	81.0000	
Water heating fuel used	2712.6775	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	41.0000	(230c)
maintaining electric keep-hot facility for gas combi boiler	600.0000	(230f)
Total electricity for the above, kWh/year	641.0000	(231)
Electricity for lighting (calculated in Appendix L)	185.0639	(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	7350.7722	(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	3812.0308	0.2100	800.5265	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2712.6775	0.2100	569.6623	(264)
Space and water heating			1370.1887	(265)
Pumps, fans and electric keep-hot	641.0000	0.1387	88.9146	(267)
Energy for lighting	185.0639	0.1443	26.7104	(268)
Total CO2, kg/year			1485.8138	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			15.6900	(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	3812.0308	1.1300	4307.5948	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2712.6775	1.1300	3065.3255	(278)
Space and water heating			7372.9203	(279)
Pumps, fans and electric keep-hot	641.0000	1.5128	969.7048	(281)
Energy for lighting	185.0639	1.5338	283.8572	(282)
Total Primary energy kWh/year			8626.4823	(286)
Dwelling Primary energy Rate (DPER)			91.0900	(287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	238.1250	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3760	(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) =	0.3196	(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	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(22b)
Effective ac	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750

E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720	
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600	

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 28.2530 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 93.9220 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)

Average = Sum(39)m / 12 = 138.0673

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	69.2342	68.1937	66.6776	63.7767	61.6359	59.2486	57.8916	59.3963	61.0457	63.6090	66.5721	68.9689	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 129.8451 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	141.2549	138.2386	134.5654	128.9799	124.4441	119.5678	117.6937	121.3511	125.2083	130.3276	135.9992	140.8885	(44)
Energy conte	223.7132	196.8500	206.8221	176.5671	167.5257	147.0225	142.3404	150.2580	154.3944	176.8534	193.7558	220.5974	(45)

Energy content (annual) Total = Sum(45)m = 2156.6998

Distribution loss (46)m = 0.15 x (45)m	33.5570	29.5275	31.0233	26.4851	25.1289	22.0534	21.3511	22.5387	23.1592	26.5280	29.0634	33.0896	(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	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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	274.6721	242.8774	257.7810	225.8821	218.4846	196.3376	193.2993	201.2169	203.7094	227.8123	243.0709	271.5563	(62)
WWHRS	-31.6510	-27.9924	-29.3120	-24.2715	-22.6202	-19.3562	-18.1434	-19.2937	-20.0267	-23.6093	-26.7465	-31.0648	(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	243.0211	214.8850	228.4689	201.6106	195.8644	176.9813	175.1559	181.9232	183.6827	204.2030	216.3244	240.4915	(64)

Total per year (kWh/year) = Sum(64)m = 2462.6122 (64)

12Total per year (kWh/year) 2463 (64)

Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month	87.1244	76.9595	81.5081	71.0373	68.4420	61.2137	60.0679	62.7005	63.6649	71.5435	76.7526	86.0884	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	117.1026	114.5230	109.5538	98.6629	91.9920	85.0191	80.7364	84.2749	88.4235	96.1606	106.6008	115.7102	(72)
Total internal gains	555.6550	569.0166	544.2031	523.6967	495.4754	473.3191	453.9571	454.9277	469.7079	490.0605	522.0510	543.3438	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	706.6214	839.2477	946.0722	1071.2107	1150.8982	1141.7222	1091.0556	1009.3583	921.9613	797.6383	705.3192	670.9229	(84)

7. Mean internal temperature (heating season)

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

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

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

tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area													
	0.9916	0.9835	0.9671	0.9221	0.8291	0.6749	0.5236	0.5785	0.7998	0.9471	0.9848	0.9930	(86)
MIT	19.0515	19.3043	19.6813	20.1824	20.6074	20.8738	20.9631	20.9464	20.7487	20.1876	19.5307	19.0095	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house													
	0.9890	0.9785	0.9568	0.8968	0.7727	0.5724	0.3852	0.4382	0.7144	0.9244	0.9793	0.9909	(89)
MIT 2	17.4797	17.8018	18.2782	18.9001	19.3884	19.6547	19.7170	19.7108	19.5514	18.9217	18.0986	17.4312	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)
MIT	17.8365	18.1429	18.5968	19.1912	19.6651	19.9315	19.9999	19.9913	19.8233	19.2091	18.4237	17.7895	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8365	18.1429	18.5968	19.1912	19.6651	19.9315	19.9999	19.9913	19.8233	19.2091	18.4237	17.7895	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9834	0.9699	0.9447	0.8836	0.7699	0.5903	0.4163	0.4690	0.7220	0.9123	0.9712	0.9861	(94)
Useful gains	694.9037	813.9660	893.7603	946.5688	886.0427	673.9384	454.1635	473.4243	665.6629	727.6888	685.0089	661.5743	(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													
	1891.5449	1847.1619	1684.2906	1420.8892	1097.9945	729.5320	465.2205	490.7444	785.3782	1186.7676	1565.9758	1885.5828	(97)
Space heating kWh													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98a)
Space heating requirement - total per year (kWh/year)												4558.4793	
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													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4558.4793	
Space heating per m2											(98c) / (4) =	48.1360	(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 %)	92.4000	(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													
	890.3011	694.3077	588.1545	341.5107	157.6922	0.0000	0.0000	0.0000	0.0000	341.5546	634.2962	910.6623	(98)
Space heating efficiency (main heating system 1)													
	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000	(210)
Space heating fuel (main heating system)													
	963.5293	751.4152	636.5309	369.6003	170.6625	0.0000	0.0000	0.0000	0.0000	369.6478	686.4677	985.5653	(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													
	243.0211	214.8850	228.4689	201.6106	195.8644	176.9813	175.1559	181.9232	183.6827	204.2030	216.3244	240.4915	(64)
Efficiency of water heater												80.3000	(216)
(217)m	86.9042	86.7053	86.3138	85.5009	83.9209	80.3000	80.3000	80.3000	80.3000	85.4748	86.5429	86.9545	(217)
Fuel for water heating, kWh/month													
	279.6425	247.8338	264.6958	235.7995	233.3917	220.4002	218.1269	226.5545	228.7456	238.9043	249.9622	276.5718	(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	25.9345	20.8057	18.7332	13.7247	10.6014	8.6614	9.6709	12.5706	16.3280	21.4233	24.1975	26.6553	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-56.3832	-76.3966	-105.5928	-114.0140	-119.1075	-109.8007	-108.3737	-104.0900	-96.0968	-84.9968	-60.8468	-49.1123	(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	-42.0108	-86.9697	-170.3566	-252.3624	-330.4165	-330.8520	-327.0076	-278.3976	-206.0737	-123.2342	-55.7020	-33.3340	(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	4933.4191	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	80.3000	
Water heating fuel used	2920.6287	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	209.3066	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3321.5284	(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	4827.8261	(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	4933.4191	0.2100	1036.0180	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2920.6287	0.2100	613.3320	(264)
Space and water heating			1649.3500	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	209.3066	0.1443	30.2094	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	0.1354	-146.9360	
PV Unit electricity exported	-2236.7170	0.1263	-282.5068	
Total			-429.4428	(269)
Total CO2, kg/year			1262.0459	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.3300	(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	4933.4191	1.1300	5574.7636	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2920.6287	1.1300	3300.3104	(278)
Space and water heating			8875.0740	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	209.3066	1.5338	321.0415	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	1.5006	-1627.9134	
PV Unit electricity exported	-2236.7170	0.4636	-1037.0348	
Total			-2664.9483	(283)
Total Primary energy kWh/year			6661.2681	(286)
Target Primary Energy Rate (TPER)			70.3400	(287)

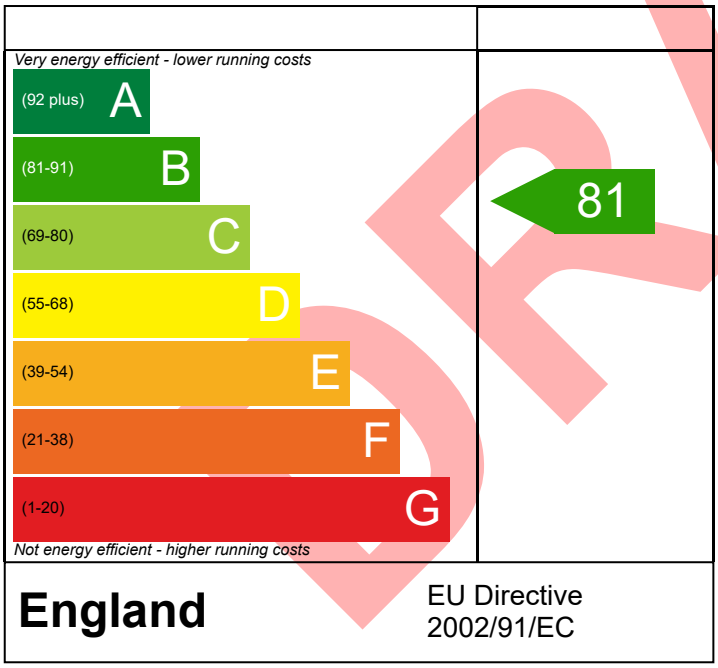
Predicted Energy Assessment

Dwelling type:	House, Detached
Date of assessment:	02/09/2026
SAP Version:	10.2
Produced by:	Samuel Westover
Total floor area:	94.7 m²
DRRN:	

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

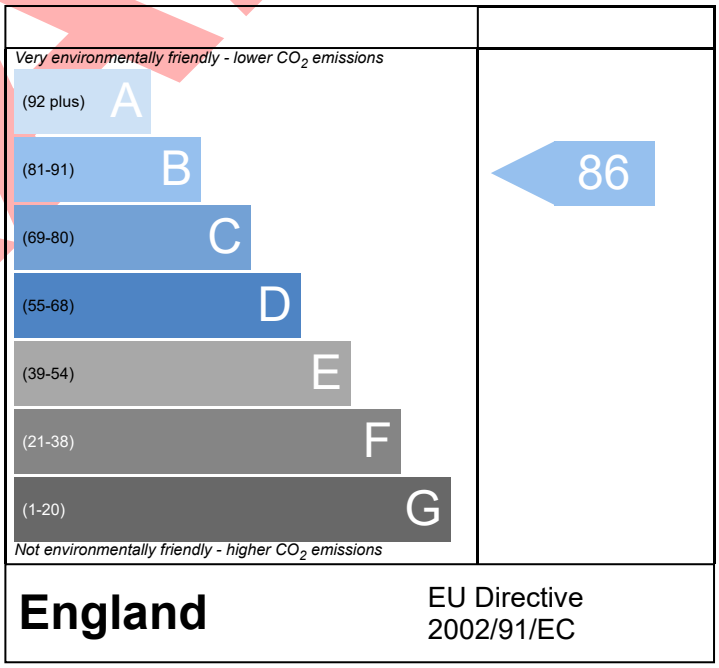
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



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

Environmental Impact (CO_2) Rating



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

DRAFT

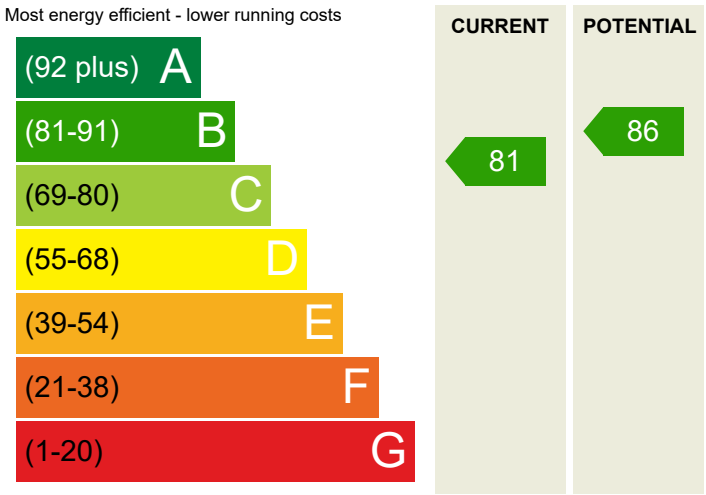
Energy Report

Dwelling Address	
Reference	Plot 2-P2 - BL
SAP Version	10.2
Assessment Date	30/07/2026
Submission Date	
Property Type	House, Detached
Total Floor Area	95

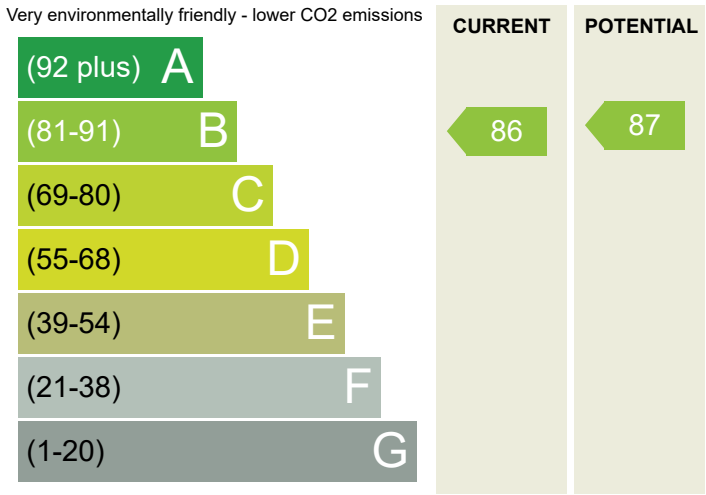
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

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

Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report

	Primary Energy	Energy	Carbon	Cost	HTC
CURRENT	81.72 kWh	6566 kWh	1321 kg	756.71 £	122 W/K
POTENTIAL	68.38 kWh	5720 kWh	1208 kg	522.71 £	122 W/K

Energy Report

elmhurst energy

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m²K	Very Good
Roof	Average thermal transmittance 0.11 W/m²K	Very Good
Floor	Average thermal transmittance 0.1 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, mains gas	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 5.0 m³/h.m² (assumed)	Good

Recommendations

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

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating
Solar water heating	£40	B 81			B 88
Photovoltaic	£274	B 86	£8,000 - £10,000	£234	B 87

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

Estimated energy costs of the dwelling

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

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£51	£51	You could save £234
Heating	£506	£506	
Hot Water	£200	£200	
New Technologies e.g. Impact of PV	£0	-(£234)	
TOTAL	£757	£523	

Estimated energy use and potential savings

Space Heating
3014
kWh per year

Water Heating
2725
kWh per year

Energy Report

elmhurst energy

About this document

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

Disclaimer

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

Glossary terms for additional metrics

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

Summary for Input Data

Plot Reference	Plot 1	Issued on Date	02/09/2026
Assessment Reference	P1 - BG	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.58	TER	12.95
Environmental	96 A	% DER < TER			64.63
CO_2 Emissions (t/year)	0.39	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	30.14	DPER	47.72	TPER	68.30

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	215.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	37.70 m	67.20 m²	2.50 m
1st Storey:	21.10 m	27.50 m²	2.55 m

8.0 Living Area 21.50 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		148.06	118.46	0.00	None	29.60	Calculate Wall Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
FR	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	39.70	39.70	None	0.00	Enter Gross Area	0.00
Sloping Roof	External Slope Roof	Plasterboard, insulated slope	0.11	9.00	30.40	30.40	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.10	None	0.00	75.00	67.30

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Triple Low-E Soft 0.05			0.63		0.70	1.20
Front Door	Manufacturer	Solid Door				0.00			1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W	Windows	External Wall 1	West	7.16	
N	Windows	External Wall 1	North	10.42	
S	Windows	External Wall 1	South	6.69	

E	Windows	External Wall 1	East	3.31
Front Door	Front Door	External Wall 1	West	2.02

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	User Input	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate		14.46			Yes
E3 Sill		13.52			Yes
E4 Jamb		40.20			Yes
E5 Ground floor (normal)		37.70			Yes
E6 Intermediate floor within a dwelling		21.10			Yes
E16 Corner (normal)		27.50			No
E15 Flat roof with parapet		28.00			No
E17 Corner (inverted – internal area greater than external area)		7.50			No
E11 Eaves (insulation at rafter level)		9.30			No
E13 Gable (insulation at rafter level)		12.00			No

Y-value	0.03	W/m²K
Description	ROI	

19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	3	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	5.01	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting: No

Name	Efficacy	Power	Capacity	Count
Lighting 1	120.00	6.00	720.00	25

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	214	
In Winter	249.90	
In Summer	175.10	
Controls SAP Code	2207	
Controls description	Time and temperature zone control by arrangement	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	

Summary for Input Data

Flow Temperature	Enter value
Flow Temperature Value	35.00

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	1
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
S1	Vented hot water system	9.00		No	
s2	Vented hot water system	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £7,000	£81	B 82	A 96
Photovoltaic	£8,000 - £10,000	£245	B 88	A 97
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Plot 1	Issued on Date	02/09/2026
Assessment Reference	P1 - BG	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.58	TER	12.95
Environmental	96 A	% DER < TER			64.63
CO_2 Emissions (t/year)	0.39	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	30.14	DPER	47.72	TPER	68.30

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---
1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	238.1250	(5)

---
2. Ventilation rate
---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(22b)
Effective ac	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---
3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)							8.5636	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)
Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)

Average = Sum(39)m / 12 = 122.0849

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	77.8885	76.7179	75.0123	71.7488	69.3404	66.6546	65.1280	66.8208	68.6764	71.5601	74.8937	77.5900	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 137.8240 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.9092	146.7628	142.9001	136.9520	132.1486	126.9738	124.9302	128.7756	132.8390	138.2788	144.3207	149.5097	(44)
Energy conte	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(45)
Energy content (annual)										Total = Sum(45)m =		2289.2444	
Distribution loss (46)m = 0.15 x (45)m	35.6129	31.3482	32.9448	28.1221	26.6846	23.4194	22.6638	23.9177	24.5706	28.1464	30.8417	35.1144	(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	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	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(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	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(64)
									Total per year (kWh/year) = Sum(64)m =			2289.2444	(64)
12Total per year (kWh/year)												2289	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							0.0000	(64a)
Heat gains from water heating, kWh/month	78.9420	69.4886	73.0277	62.3372	59.1509	51.9129	50.2382	53.0175	54.4648	62.3913	68.3658	77.8369	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	106.1048	103.4057	98.1555	86.5795	79.5039	72.1013	67.5244	71.2601	75.6455	83.8593	94.9525	104.6195	(72)
Total internal gains	544.6572	557.8993	532.8048	511.6133	482.9873	460.4013	440.7451	441.9129	456.9299	477.7591	510.4027	532.2531	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	736.9504	902.0947	1044.6382	1208.8940	1317.6488	1311.5732	1252.0605	1147.9851	1032.9178	869.5154	743.8383	694.7581	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9900	0.9774	0.9497	0.8748	0.7390	0.5603	0.4174	0.4707	0.7118	0.9213	0.9805	0.9921	(86)
MIT	19.3510	19.6344	20.0184	20.4806	20.8023	20.9521	20.9887	20.9818	20.8743	20.4227	19.7991	19.3029	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9872	0.9711	0.9357	0.8416	0.6774	0.4717	0.3128	0.3602	0.6251	0.8923	0.9739	0.9898	(89)
MIT 2	17.9442	18.3036	18.7834	19.3423	19.6910	19.8326	19.8559	19.8546	19.7732	19.2927	18.5226	17.8885	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)

MIT	18.2636	18.6058	19.0638	19.6007	19.9433	20.0867	20.1131	20.1105	20.0232	19.5492	18.8124	18.2096	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2636	18.6058	19.0638	19.6007	19.9433	20.0867	20.1131	20.1105	20.0232	19.5492	18.8124	18.2096	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9815	0.9620	0.9238	0.8333	0.6827	0.4900	0.3365	0.3851	0.6389	0.8829	0.9657	0.9850	(94)
Useful gains	723.3314	867.7950	964.9877	1007.4133	899.6098	642.7116	421.2820	442.0467	659.9172	767.6786	718.3019	684.3165	(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	1728.1102	1692.7198	1548.5556	1306.4073	1004.5856	663.0635	424.5528	447.7092	718.1368	1090.6162	1432.5386	1719.9943	(97)
Space heating kWh	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98a)
Space heating requirement - total per year (kWh/year)												3554.5173	
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	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3554.5173	
Space heating per m2											(98c) / (4) =	37.5345	(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 %)	249.9000	(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													
	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98)
Space heating efficiency (main heating system 1)													
	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000	(210)
Space heating fuel (main heating system)													
	299.1418	221.8285	173.7393	86.1447	31.2533	0.0000	0.0000	0.0000	0.0000	96.1447	205.7825	308.3410	(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													
	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(64)
Efficiency of water heater												175.1000	(216)
(217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	(217)
Fuel for water heating, kWh/month													
	135.5908	119.3537	125.4324	107.0705	101.5976	89.1657	86.2891	91.0629	93.5487	107.1633	117.4251	133.6927	(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	22.9307	18.3959	16.5634	12.1351	9.3735	7.6582	8.5508	11.1147	14.4368	18.9419	21.3949	23.5680	(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	1422.3759	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	175.1000	
Water heating fuel used	1307.3926	(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)	185.0639	(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	2914.8324	(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	1422.3759	0.1559	221.6873	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1307.3926	0.1416	185.0983	(264)
Space and water heating			406.7856	(265)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	185.0639	0.1443	26.7104	(268)
Total CO2, kg/year			433.4961	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5800	(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	1422.3759	1.5770	2243.0861	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1307.3926	1.5235	1991.8629	(278)
Space and water heating			4234.9490	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	185.0639	1.5338	283.8572	(282)
Total Primary energy kWh/year			4518.8062	(286)
Dwelling Primary energy Rate (DPER)			47.7200	(287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3760	(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) =	0.3196	(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	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(22b)
Effective ac	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750
E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600

Thermal bridges (Sum(L x Psi) calculated using Appendix K)	28.2530	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	93.9220	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)
Average = Sum(39)m / 12 =												138.0673	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.6847	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	69.2342	68.1937	66.6776	63.7767	61.6359	59.2486	57.8916	59.3963	61.0457	63.6090	66.5721	68.9689	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												129.8451	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	141.2549	138.2386	134.5654	128.9799	124.4441	119.5678	117.6937	121.3511	125.2083	130.3276	135.9992	140.8885	(44)
Energy conte	223.7132	196.8500	206.8221	176.5671	167.5257	147.0225	142.3404	150.2580	154.3944	176.8534	193.7558	220.5974	(45)
Energy content (annual)										Total = Sum(45)m =		2156.6998	
Distribution loss (46)m = 0.15 x (45)m	33.5570	29.5275	31.0233	26.4851	25.1289	22.0534	21.3511	22.5387	23.1592	26.5280	29.0634	33.0896	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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	270.3081	238.9357	253.4170	221.6589	214.1206	192.1143	188.9353	196.8529	199.4862	223.4483	238.8476	267.1923	(62)
WWHRS	-31.6510	-27.9924	-29.3120	-24.2715	-22.6202	-19.3562	-18.1434	-19.2937	-20.0267	-23.6093	-26.7465	-31.0648	(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	238.6571	210.9433	224.1049	197.3874	191.5004	172.7581	170.7919	177.5592	179.4595	199.8390	212.1012	236.1275	(64)
									Total per year (kWh/year) = Sum(64)m =			2411.2296	(64)
12Total per year (kWh/year)												2411	(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	111.6606	99.1212	106.0443	94.7820	92.9782	84.9585	84.6041	87.2367	87.4096	96.0797	100.4973	110.6246	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	150.0814	147.5018	142.5326	131.6417	124.9707	117.9979	113.7152	117.2536	121.4022	129.1393	139.5796	148.6889	(72)
Total internal gains	588.6338	601.9953	577.1819	556.6755	528.4541	506.2979	486.9359	487.9064	502.6866	523.0392	555.0298	576.3226	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	739.6001	872.2264	979.0510	1104.1894	1183.8770	1174.7010	1124.0344	1042.3371	954.9401	830.6170	738.2980	703.9017	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area													
	0.9902	0.9814	0.9636	0.9158	0.8190	0.6618	0.5105	0.5637	0.7860	0.9408	0.9824	0.9918	(86)
MIT	19.0893	19.3408	19.7154	20.2105	20.6258	20.8820	20.9661	20.9508	20.7646	20.2187	19.5675	19.0476	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house													
	0.9873	0.9759	0.9524	0.8890	0.7611	0.5594	0.3746	0.4255	0.6986	0.9161	0.9762	0.9894	(89)
MIT 2	17.5277	17.8476	18.3200	18.9322	19.4063	19.6602	19.7181	19.7127	19.5645	18.9579	18.1446	17.4796	(90)
Living area fraction										fLA = Living area / (4) =		0.2270	(91)
MIT	17.8822	18.1866	18.6368	19.2224	19.6832	19.9376	20.0014	19.9938	19.8370	19.2442	18.4677	17.8356	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8822	18.1866	18.6368	19.2224	19.6832	19.9376	20.0014	19.9938	19.8370	19.2442	18.4677	17.8356	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9811	0.9665	0.9398	0.8760	0.7591	0.5777	0.4051	0.4560	0.7074	0.9039	0.9674	0.9839	(94)
Useful gains	725.6001	843.0501	920.1209	967.2694	898.6776	678.5954	455.3311	475.3015	675.5542	750.7993	714.1976	692.5963	(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													
	1897.9268	1853.2600	1689.8573	1425.2006	1100.4838	730.3695	465.4290	491.0776	787.2613	1191.5978	1572.0515	1891.9835	(97)
Space heating kWh													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98a)
Space heating requirement - total per year (kWh/year)												4441.5632	
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													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4441.5632	
Space heating per m2											(98c) / (4) =	46.9014	(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 %)	92.3000	(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													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98)
Space heating efficiency (main heating system 1)													
	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000	(210)
Space heating fuel (main heating system)													
	944.9741	735.4940	620.4593	357.2160	162.6694	0.0000	0.0000	0.0000	0.0000	355.3132	669.1818	966.7867	(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													
	238.6571	210.9433	224.1049	197.3874	191.5004	172.7581	170.7919	177.5592	179.4595	199.8390	212.1012	236.1275	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.6993	86.4876	86.0698	85.2016	83.5201	79.8000	79.8000	79.8000	79.8000	85.1633	86.3117	86.7527	(217)
Fuel for water heating, kWh/month													
	275.2700	243.9001	260.3759	231.6711	229.2866	216.4889	214.0249	222.5053	224.8866	234.6539	245.7386	272.1845	(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	25.9345	20.8057	18.7332	13.7247	10.6014	8.6614	9.6709	12.5706	16.3280	21.4233	24.1975	26.6553	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-56.3832	-76.3966	-105.5928	-114.0140	-119.1075	-109.8007	-108.3737	-104.0900	-96.0968	-84.9968	-60.8468	-49.1123	(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	-42.0108	-86.9697	-170.3566	-252.3624	-330.4165	-330.8520	-327.0076	-278.3976	-206.0737	-123.2342	-55.7020	-33.3340	(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	4812.0945	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	79.8000	
Water heating fuel used	2870.9865	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	209.3066	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3321.5284	(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	4656.8592	(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	4812.0945	0.2100	1010.5398	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2870.9865	0.2100	602.9072	(264)
Space and water heating			1613.4470	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	209.3066	0.1443	30.2094	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	0.1354	-146.9360	
PV Unit electricity exported	-2236.7170	0.1263	-282.5068	
Total			-429.4428	(269)
Total CO2, kg/year			1226.1429	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.9500	(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	4812.0945	1.1300	5437.6668	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2870.9865	1.1300	3244.2147	(278)
Space and water heating			8681.8815	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	209.3066	1.5338	321.0415	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	1.5006	-1627.9134	
PV Unit electricity exported	-2236.7170	0.4636	-1037.0348	
Total			-2664.9483	(283)
Total Primary energy kWh/year			6468.0755	(286)
Target Primary Energy Rate (TPER)			68.3000	(287)

Full SAP Calculation Printout

Plot Reference	Plot 1	Issued on Date	02/09/2026
Assessment Reference	P1 - BG	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.58	TER	12.95
Environmental	96 A	% DER < TER			64.63
CO_2 Emissions (t/year)	0.39	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	30.14	DPER	47.72	TPER	68.30

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---
1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

---
2. Ventilation rate
---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(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	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---
3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)	8.5636	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)

Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)
Average = Sum(39)m / 12 =												122.0849	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6847	(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	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												66.0135	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	72.0207	70.0449	67.8879	65.2032	62.8082	60.3192	59.8022	61.9548	64.1627	66.7187	69.4271	71.9196	(44)
Energy conte	114.0632	99.7430	104.3411	89.2599	84.5519	74.1695	72.3255	76.7130	79.1190	90.5366	98.9116	112.6088	(45)
Energy content (annual)										Total = Sum(45)m =		1096.3430	
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):													
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	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(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	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(64)
								Total per year (kWh/year) = Sum(64)m =				931.8916	(64)
12Total per year (kWh/year)												932	(64)
Electric shower(s)	55.4450	49.4020	53.9451	51.4791	52.4451	50.0275	51.6951	52.4451	51.4791	53.9451	52.9307	55.4450	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							630.6841	(64a)
Heat gains from water heating, kWh/month	38.0997	33.5459	35.6588	31.8375	31.0786	28.2679	28.2930	29.4128	29.6826	32.7253	34.2514	37.7906	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	51.2093	49.9195	47.9284	44.2188	41.7722	39.2610	38.0282	39.5333	41.2258	43.9856	47.5714	50.7938	(72)
Total internal gains	486.7617	501.4130	479.5777	466.2526	442.2557	427.5610	411.2489	410.1861	422.5102	434.8855	460.0216	475.4275	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	679.0548	845.6085	991.4112	1163.5332	1276.9172	1278.7329	1222.5642	1116.2583	998.4981	826.6418	693.4572	637.9325	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9925	0.9818	0.9571	0.8862	0.7531	0.5722	0.4269	0.4828	0.7275	0.9318	0.9846	0.9942	(86)
MIT	19.2824	19.5709	19.9651	20.4479	20.7874	20.9483	20.9878	20.9800	20.8634	20.3845	19.7416	19.2349	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9904	0.9766	0.9448	0.8549	0.6923	0.4826	0.3201	0.3700	0.6414	0.9057	0.9793	0.9925	(89)

MIT 2	18.2938	18.5802	18.9662	19.4260	19.7158	19.8367	19.8565	19.8555	19.7851	19.3822	18.7589	18.2526	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)
MIT	18.5182	18.8051	19.1930	19.6580	19.9590	20.0891	20.1133	20.1108	20.0299	19.6098	18.9820	18.4756	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5182	18.8051	19.1930	19.6580	19.9590	20.0891	20.1133	20.1108	20.0299	19.6098	18.9820	18.4756	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9869	0.9704	0.9361	0.8489	0.6985	0.5014	0.3444	0.3955	0.6558	0.8989	0.9739	0.9895	(94)
Useful gains	670.1349	820.6080	928.1072	987.7230	891.9623	641.2088	421.0112	441.4948	654.7905	743.0487	675.3562	631.2652	(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	1759.6239	1717.3439	1564.4769	1313.4059	1006.5068	663.3444	424.5777	447.7458	718.9526	1097.9945	1453.2867	1752.6500	(97)
Space heating kWh	810.5799	602.6065	473.4590	234.4917	85.2211	0.0000	0.0000	0.0000	0.0000	264.0797	560.1100	834.3102	(98a)
Space heating requirement - total per year (kWh/year)												3864.8581	
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	810.5799	602.6065	473.4590	234.4917	85.2211	0.0000	0.0000	0.0000	0.0000	264.0797	560.1100	834.3102	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3864.8581	
Space heating per m2											(98c) / (4) =	40.8116	(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	1135.9775	894.2802	917.0165	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8880	0.9342	0.9087	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1008.7341	835.4140	833.2948	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1445.1599	1381.9244	1260.1237	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	314.2266	406.6038	317.5607	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	78.5566	101.6509	79.3902	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												259.5978	(107)
Energy for space heating												40.8116	(99)
Energy for space cooling												2.7413	(108)
Total												43.5529	(109)
Fabric Energy Efficiency (DFEE)												43.6	(109)

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)			Volume (m3)	
Main dwelling							
Ground floor	67.2000	(1b)	x	2.5000	(2b) =	168.0000	(1b) - (3b)
First floor	27.5000	(1c)	x	2.5500	(2c) =	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000						(4)
Dwelling volume					(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

2. Ventilation rate

			m3 per hour	
Number of open chimneys		0 * 80 =	0.0000	(6a)
Number of open flues		0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000	(6d)
Number of flues attached to other heater		0 * 35 =	0.0000	(6e)
Number of blocked chimneys		0 * 20 =	0.0000	(6f)
Number of intermittent extract fans		3 * 10 =	30.0000	(7a)
Number of passive vents		0 * 10 =	0.0000	(7b)
Number of flueless gas fires		0 * 40 =	0.0000	(7c)
			Air changes per hour	
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test			Yes	
Pressure Test Method			Blower Door	
Measured/design AP50			5.0000	(17)
Infiltration rate			0.3760	(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) =	0.3196	(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													
	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(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	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750
E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 28.2530 (36)

Point Thermal bridges (36a) = 0.0000

Total fabric heat loss (33) + (36) + (36a) = 93.9220 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)

Average = Sum(39)m / 12 = 138.0673

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (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													
	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses													
	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												66.0135	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	72.0207	70.0449	67.8879	65.2032	62.8082	60.3192	59.8022	61.9548	64.1627	66.7187	69.4271	71.9196	(44)
Energy conte	114.0632	99.7430	104.3411	89.2599	84.5519	74.1695	72.3255	76.7130	79.1190	90.5366	98.9116	112.6088	(45)
Energy content (annual)										Total = Sum(45)m =		1096.3430	
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):													
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													
	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(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													
	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(64)
								Total per year (kWh/year) = Sum(64)m =				931.8916	(64)
12Total per year (kWh/year)												932	(64)
Electric shower(s)													
	55.4450	49.4020	53.9451	51.4791	52.4451	50.0275	51.6951	52.4451	51.4791	53.9451	52.9307	55.4450	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							630.6841	(64a)
Heat gains from water heating, kWh/month													
	38.0997	33.5459	35.6588	31.8375	31.0786	28.2679	28.2930	29.4128	29.6826	32.7253	34.2514	37.7906	(65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	51.2093	49.9195	47.9284	44.2188	41.7722	39.2610	38.0282	39.5333	41.2258	43.9856	47.5714	50.7938	(72)
Total internal gains	486.7617	501.4130	479.5777	466.2526	442.2557	427.5610	411.2489	410.1861	422.5102	434.8855	460.0216	475.4275	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	637.7280	771.6441	881.4468	1013.7665	1097.6785	1095.9641	1048.3474	964.6168	874.7636	742.4633	643.2898	603.0066	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area	0.9940	0.9874	0.9734	0.9327	0.8453	0.6936	0.5415	0.5995	0.8194	0.9568	0.9887	0.9951	(86)
MIT	18.9718	19.2285	19.6133	20.1318	20.5758	20.8613	20.9587	20.9396	20.7241	20.1337	19.4607	18.9303	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house	0.9922	0.9835	0.9648	0.9099	0.7917	0.5913	0.3999	0.4566	0.7375	0.9376	0.9845	0.9936	(89)
MIT 2	17.8921	18.1480	18.5288	19.0351	19.4374	19.6645	19.7184	19.7129	19.5737	19.0487	18.3871	17.8564	(90)
Living area fraction										fLA = Living area / (4) =		0.2270	(91)
MIT	18.1372	18.3933	18.7750	19.2841	19.6959	19.9362	20.0000	19.9914	19.8349	19.2950	18.6309	18.1002	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1372	18.3933	18.7750	19.2841	19.6959	19.9362	20.0000	19.9914	19.8349	19.2950	18.6309	18.1002	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9889	0.9779	0.9565	0.9003	0.7904	0.6097	0.4319	0.4882	0.7458	0.9290	0.9795	0.9908	(94)
Useful gains	630.6214	754.6255	843.1089	912.6631	867.6541	668.1569	452.7290	470.9564	652.3682	689.7846	630.0795	597.4828	(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	1933.5576	1882.0906	1709.1023	1433.7183	1102.2313	730.1765	465.2336	490.7544	786.9764	1198.6108	1594.6206	1928.6952	(97)
Space heating kWh	969.3845	757.6565	644.2991	375.1598	174.5255	0.0000	0.0000	0.0000	0.0000	378.5667	694.4696	990.4220	(98a)
Space heating requirement - total per year (kWh/year)												4984.4837	
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	969.3845	757.6565	644.2991	375.1598	174.5255	0.0000	0.0000	0.0000	0.0000	378.5667	694.4696	990.4220	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4984.4837	
Space heating per m2											(98c) / (4) =	52.6345	(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	1286.2430	1012.5743	1038.5115	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7722	0.8450	0.8061	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	993.2656	855.6539	837.1241	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1231.5341	1178.2944	1082.8803	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	171.5533	240.0445	182.8427	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	42.8883	60.0111	45.7107	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												148.6101	(107)
Energy for space heating												52.6345	(99)
Energy for space cooling												1.5693	(108)
Total												54.2037	(109)
Fabric Energy Efficiency (TFEE)												54.2	(109)

Full SAP Calculation Printout

Plot Reference	Plot 1	Issued on Date	02/09/2026
Assessment Reference	P1 - BG	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.58	TER	12.95
Environmental	96 A	% DER < TER			64.63
CO_2 Emissions (t/year)	0.39	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	30.14	DPER	47.72	TPER	68.30

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---
1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	238.1250	(5)

---
2. Ventilation rate
---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(22b)
Effective ac	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---
3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)							8.5636	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)
Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)

Average = Sum(39)m / 12 = 122.0849

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	77.8885	76.7179	75.0123	71.7488	69.3404	66.6546	65.1280	66.8208	68.6764	71.5601	74.8937	77.5900	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 137.8240 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.9092	146.7628	142.9001	136.9520	132.1486	126.9738	124.9302	128.7756	132.8390	138.2788	144.3207	149.5097	(44)
Energy conte	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(45)
Energy content (annual)										Total = Sum(45)m =		2289.2444	
Distribution loss (46)m = 0.15 x (45)m	35.6129	31.3482	32.9448	28.1221	26.6846	23.4194	22.6638	23.9177	24.5706	28.1464	30.8417	35.1144	(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	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	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(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	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(64)
									Total per year (kWh/year) = Sum(64)m =			2289.2444	(64)
12Total per year (kWh/year)												2289	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							0.0000	(64a)
Heat gains from water heating, kWh/month	78.9420	69.4886	73.0277	62.3372	59.1509	51.9129	50.2382	53.0175	54.4648	62.3913	68.3658	77.8369	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	106.1048	103.4057	98.1555	86.5795	79.5039	72.1013	67.5244	71.2601	75.6455	83.8593	94.9525	104.6195	(72)
Total internal gains	544.6572	557.8993	532.8048	511.6133	482.9873	460.4013	440.7451	441.9129	456.9299	477.7591	510.4027	532.2531	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	736.9504	902.0947	1044.6382	1208.8940	1317.6488	1311.5732	1252.0605	1147.9851	1032.9178	869.5154	743.8383	694.7581	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9900	0.9774	0.9497	0.8748	0.7390	0.5603	0.4174	0.4707	0.7118	0.9213	0.9805	0.9921	(86)
MIT	19.3510	19.6344	20.0184	20.4806	20.8023	20.9521	20.9887	20.9818	20.8743	20.4227	19.7991	19.3029	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9872	0.9711	0.9357	0.8416	0.6774	0.4717	0.3128	0.3602	0.6251	0.8923	0.9739	0.9898	(89)
MIT 2	17.9442	18.3036	18.7834	19.3423	19.6910	19.8326	19.8559	19.8546	19.7732	19.2927	18.5226	17.8885	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)

MIT	18.2636	18.6058	19.0638	19.6007	19.9433	20.0867	20.1131	20.1105	20.0232	19.5492	18.8124	18.2096	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2636	18.6058	19.0638	19.6007	19.9433	20.0867	20.1131	20.1105	20.0232	19.5492	18.8124	18.2096	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9815	0.9620	0.9238	0.8333	0.6827	0.4900	0.3365	0.3851	0.6389	0.8829	0.9657	0.9850	(94)
Useful gains	723.3314	867.7950	964.9877	1007.4133	899.6098	642.7116	421.2820	442.0467	659.9172	767.6786	718.3019	684.3165	(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	1728.1102	1692.7198	1548.5556	1306.4073	1004.5856	663.0635	424.5528	447.7092	718.1368	1090.6162	1432.5386	1719.9943	(97)
Space heating kWh	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98a)
Space heating requirement - total per year (kWh/year)												3554.5173	
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	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3554.5173	
Space heating per m2											(98c) / (4) =	37.5345	(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 %)	249.9000	(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													
	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98)
Space heating efficiency (main heating system 1)													
	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000	(210)
Space heating fuel (main heating system)													
	299.1418	221.8285	173.7393	86.1447	31.2533	0.0000	0.0000	0.0000	0.0000	96.1447	205.7825	308.3410	(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													
	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(64)
Efficiency of water heater												175.1000	(216)
(217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	(217)
Fuel for water heating, kWh/month													
	135.5908	119.3537	125.4324	107.0705	101.5976	89.1657	86.2891	91.0629	93.5487	107.1633	117.4251	133.6927	(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	22.9307	18.3959	16.5634	12.1351	9.3735	7.6582	8.5508	11.1147	14.4368	18.9419	21.3949	23.5680	(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	1422.3759	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	175.1000	
Water heating fuel used	1307.3926	(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)	185.0639	(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	2914.8324	(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	1422.3759	0.1559	221.6873	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1307.3926	0.1416	185.0983	(264)
Space and water heating			406.7856	(265)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	185.0639	0.1443	26.7104	(268)
Total CO2, kg/year			433.4961	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5800	(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	1422.3759	1.5770	2243.0861	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1307.3926	1.5235	1991.8629	(278)
Space and water heating			4234.9490	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	185.0639	1.5338	283.8572	(282)
Total Primary energy kWh/year			4518.8062	(286)
Dwelling Primary energy Rate (DPER)			47.7200	(287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3760	(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) =	0.3196	(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	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(22b)
Effective ac	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750
E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600

Thermal bridges (Sum(L x Psi) calculated using Appendix K)	28.2530	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	93.9220	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)
Average = Sum(39)m / 12 =												138.0673	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.6847	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	69.2342	68.1937	66.6776	63.7767	61.6359	59.2486	57.8916	59.3963	61.0457	63.6090	66.5721	68.9689	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												129.8451	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	141.2549	138.2386	134.5654	128.9799	124.4441	119.5678	117.6937	121.3511	125.2083	130.3276	135.9992	140.8885	(44)
Energy conte	223.7132	196.8500	206.8221	176.5671	167.5257	147.0225	142.3404	150.2580	154.3944	176.8534	193.7558	220.5974	(45)
Energy content (annual)										Total = Sum(45)m =		2156.6998	
Distribution loss (46)m = 0.15 x (45)m	33.5570	29.5275	31.0233	26.4851	25.1289	22.0534	21.3511	22.5387	23.1592	26.5280	29.0634	33.0896	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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	270.3081	238.9357	253.4170	221.6589	214.1206	192.1143	188.9353	196.8529	199.4862	223.4483	238.8476	267.1923	(62)
WWHRS	-31.6510	-27.9924	-29.3120	-24.2715	-22.6202	-19.3562	-18.1434	-19.2937	-20.0267	-23.6093	-26.7465	-31.0648	(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	238.6571	210.9433	224.1049	197.3874	191.5004	172.7581	170.7919	177.5592	179.4595	199.8390	212.1012	236.1275	(64)
									Total per year (kWh/year) = Sum(64)m =			2411.2296	(64)
12Total per year (kWh/year)												2411	(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	111.6606	99.1212	106.0443	94.7820	92.9782	84.9585	84.6041	87.2367	87.4096	96.0797	100.4973	110.6246	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	150.0814	147.5018	142.5326	131.6417	124.9707	117.9979	113.7152	117.2536	121.4022	129.1393	139.5796	148.6889	(72)
Total internal gains	588.6338	601.9953	577.1819	556.6755	528.4541	506.2979	486.9359	487.9064	502.6866	523.0392	555.0298	576.3226	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	739.6001	872.2264	979.0510	1104.1894	1183.8770	1174.7010	1124.0344	1042.3371	954.9401	830.6170	738.2980	703.9017	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area													
	0.9902	0.9814	0.9636	0.9158	0.8190	0.6618	0.5105	0.5637	0.7860	0.9408	0.9824	0.9918	(86)
MIT	19.0893	19.3408	19.7154	20.2105	20.6258	20.8820	20.9661	20.9508	20.7646	20.2187	19.5675	19.0476	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house													
	0.9873	0.9759	0.9524	0.8890	0.7611	0.5594	0.3746	0.4255	0.6986	0.9161	0.9762	0.9894	(89)
MIT 2	17.5277	17.8476	18.3200	18.9322	19.4063	19.6602	19.7181	19.7127	19.5645	18.9579	18.1446	17.4796	(90)
Living area fraction										fLA = Living area / (4) =		0.2270	(91)
MIT	17.8822	18.1866	18.6368	19.2224	19.6832	19.9376	20.0014	19.9938	19.8370	19.2442	18.4677	17.8356	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8822	18.1866	18.6368	19.2224	19.6832	19.9376	20.0014	19.9938	19.8370	19.2442	18.4677	17.8356	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9811	0.9665	0.9398	0.8760	0.7591	0.5777	0.4051	0.4560	0.7074	0.9039	0.9674	0.9839	(94)
Useful gains	725.6001	843.0501	920.1209	967.2694	898.6776	678.5954	455.3311	475.3015	675.5542	750.7993	714.1976	692.5963	(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													
	1897.9268	1853.2600	1689.8573	1425.2006	1100.4838	730.3695	465.4290	491.0776	787.2613	1191.5978	1572.0515	1891.9835	(97)
Space heating kWh													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98a)
Space heating requirement - total per year (kWh/year)												4441.5632	
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													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4441.5632	
Space heating per m2											(98c) / (4) =	46.9014	(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 %)	92.3000	(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													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98)
Space heating efficiency (main heating system 1)													
	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000	(210)
Space heating fuel (main heating system)													
	944.9741	735.4940	620.4593	357.2160	162.6694	0.0000	0.0000	0.0000	0.0000	355.3132	669.1818	966.7867	(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													
	238.6571	210.9433	224.1049	197.3874	191.5004	172.7581	170.7919	177.5592	179.4595	199.8390	212.1012	236.1275	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.6993	86.4876	86.0698	85.2016	83.5201	79.8000	79.8000	79.8000	79.8000	85.1633	86.3117	86.7527	(217)
Fuel for water heating, kWh/month													
	275.2700	243.9001	260.3759	231.6711	229.2866	216.4889	214.0249	222.5053	224.8866	234.6539	245.7386	272.1845	(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	25.9345	20.8057	18.7332	13.7247	10.6014	8.6614	9.6709	12.5706	16.3280	21.4233	24.1975	26.6553	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-56.3832	-76.3966	-105.5928	-114.0140	-119.1075	-109.8007	-108.3737	-104.0900	-96.0968	-84.9968	-60.8468	-49.1123	(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	-42.0108	-86.9697	-170.3566	-252.3624	-330.4165	-330.8520	-327.0076	-278.3976	-206.0737	-123.2342	-55.7020	-33.3340	(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	4812.0945	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	79.8000	
Water heating fuel used	2870.9865	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	209.3066	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3321.5284	(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	4656.8592	(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	4812.0945	0.2100	1010.5398	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2870.9865	0.2100	602.9072	(264)
Space and water heating			1613.4470	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	209.3066	0.1443	30.2094	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	0.1354	-146.9360	
PV Unit electricity exported	-2236.7170	0.1263	-282.5068	
Total			-429.4428	(269)
Total CO2, kg/year			1226.1429	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.9500	(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	4812.0945	1.1300	5437.6668	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2870.9865	1.1300	3244.2147	(278)
Space and water heating			8681.8815	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	209.3066	1.5338	321.0415	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	1.5006	-1627.9134	
PV Unit electricity exported	-2236.7170	0.4636	-1037.0348	
Total			-2664.9483	(283)
Total Primary energy kWh/year			6468.0755	(286)
Target Primary Energy Rate (TPER)			68.3000	(287)

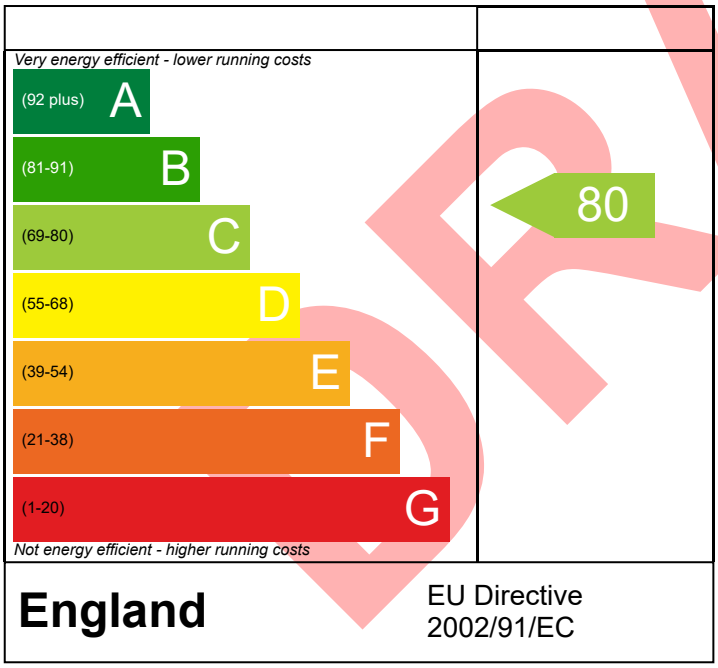
Predicted Energy Assessment

Dwelling type:	House, Detached
Date of assessment:	02/09/2026
SAP Version:	10.2
Produced by:	Samuel Westover
Total floor area:	94.7 m²
DRRN:	

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

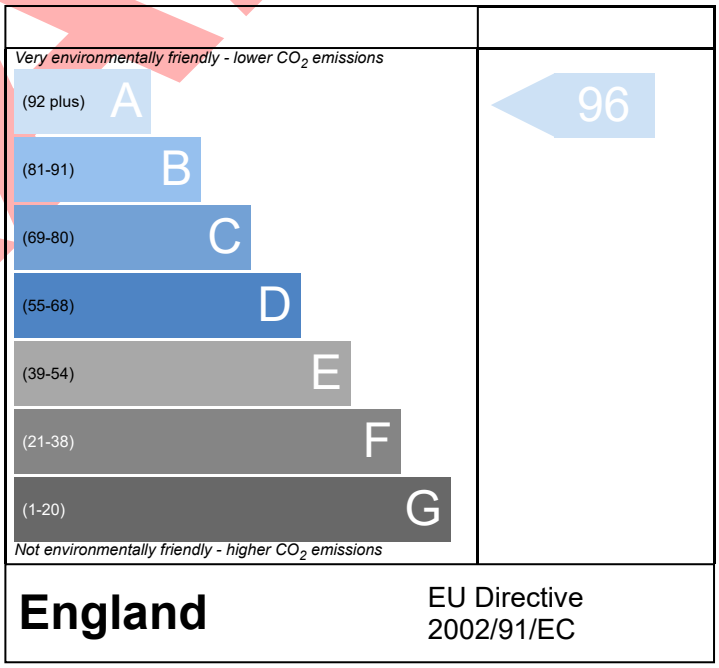
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



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

Environmental Impact (CO_2) Rating



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

DRAFT

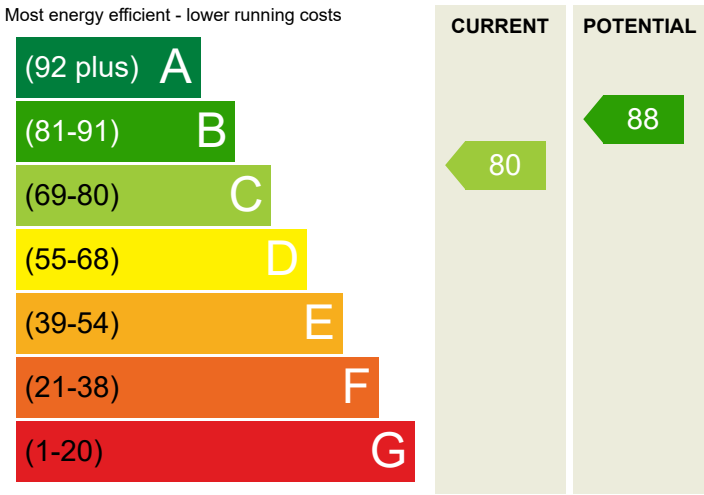
Energy Report

Dwelling Address	
Reference	Plot 1-P1 - BG
SAP Version	10.2
Assessment Date	30/07/2026
Submission Date	
Property Type	House, Detached
Total Floor Area	95

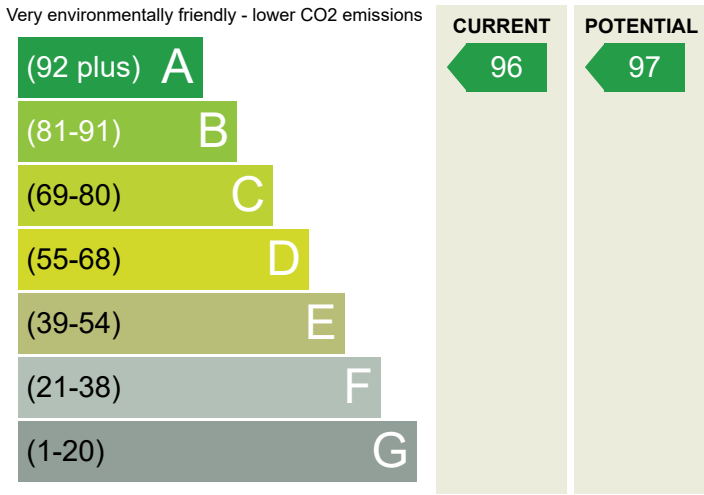
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

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

Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report

	Primary Energy	Energy	Carbon	Cost	HTC
CURRENT	42.89 kWh	2623 kWh	389 kg	725.73 £	122 W/K
POTENTIAL	24.40 kWh	1446 kWh	233 kg	400.24 £	122 W/K

Energy Report

elmhurst energy

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m²K	Very Good
Roof	Average thermal transmittance 0.11 W/m²K	Very Good
Floor	Average thermal transmittance 0.1 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Air source heat pump, radiators, electric	Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 5.0 m³/h.m² (assumed)	Good

Recommendations

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

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating
Solar water heating	£81	B 82	£4,000 - £7,000	£81	A 96
Photovoltaic	£325	B 88	£8,000 - £10,000	£245	A 97

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

Estimated energy costs of the dwelling

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

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£51	£51	You could save £325
Heating	£313	£335	
Hot Water	£362	£259	
New Technologies e.g. Impact of PV	£0	-(£245)	
TOTAL	£726	£400	

Estimated energy use and potential savings

Space Heating
1130
kWh per year

Water Heating
1307
kWh per year

Energy Report

elmhurst energy

About this document

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

Disclaimer

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

Glossary terms for additional metrics

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

Summary for Input Data

Plot Reference	Plot 2	Issued on Date	02/09/2026
Assessment Reference	P2 - BG	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.58	TER	12.95
Environmental	96 A	% DER < TER			64.63
CO_2 Emissions (t/year)	0.39	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	30.14	DPER	47.72	TPER	68.30

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	215.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	37.70 m	67.20 m²	2.50 m
1st Storey:	21.10 m	27.50 m²	2.55 m

8.0 Living Area 21.50 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		148.06	118.46	0.00	None	29.60	Calculate Wall Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
FR	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	39.70	39.70	None	0.00	Enter Gross Area	0.00
Sloping Roof	External Slope Roof	Plasterboard, insulated slope	0.11	9.00	30.40	30.40	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.10	None	0.00	75.00	67.30

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Triple Low-E Soft 0.05			0.63		0.70	1.20
Front Door	Manufacturer	Solid Door				0.00			1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W	Windows	External Wall 1	West	7.16	
N	Windows	External Wall 1	North	10.42	
S	Windows	External Wall 1	South	6.69	

E	Windows	External Wall 1	East	3.31
Front Door	Front Door	External Wall 1	West	2.02

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	User Input	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate		14.46			Yes
E3 Sill		13.52			Yes
E4 Jamb		40.20			Yes
E5 Ground floor (normal)		37.70			Yes
E6 Intermediate floor within a dwelling		21.10			Yes
E16 Corner (normal)		27.50			No
E15 Flat roof with parapet		28.00			No
E17 Corner (inverted – internal area greater than external area)		7.50			No
E11 Eaves (insulation at rafter level)		9.30			No
E13 Gable (insulation at rafter level)		12.00			No

Y-value	0.03	W/m²K
Description	ROI	

19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	3	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	5.01	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting: No

Name	Efficacy	Power	Capacity	Count
Lighting 1	120.00	6.00	720.00	25

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	214	
In Winter	249.90	
In Summer	175.10	
Controls SAP Code	2207	
Controls description	Time and temperature zone control by arrangement	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	

Summary for Input Data

Flow Temperature	Enter value
Flow Temperature Value	35.00

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	1
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
S1	Vented hot water system	9.00		No	
s2	Vented hot water system	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £7,000	£81	B 82	A 96
Photovoltaic	£8,000 - £10,000	£245	B 88	A 97
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Plot 2	Issued on Date	02/09/2026
Assessment Reference	P2 - BG	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.58	TER	12.95
Environmental	96 A	% DER < TER			64.63
CO_2 Emissions (t/year)	0.39	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	30.14	DPER	47.72	TPER	68.30

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---
1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	238.1250	(5)

---
2. Ventilation rate
---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(22b)
Effective ac	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---
3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)							8.5636	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)
Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)

Average = Sum(39)m / 12 = 122.0849

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	77.8885	76.7179	75.0123	71.7488	69.3404	66.6546	65.1280	66.8208	68.6764	71.5601	74.8937	77.5900	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 137.8240 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.9092	146.7628	142.9001	136.9520	132.1486	126.9738	124.9302	128.7756	132.8390	138.2788	144.3207	149.5097	(44)
Energy conte	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(45)
Energy content (annual)										Total = Sum(45)m =		2289.2444	
Distribution loss (46)m = 0.15 x (45)m	35.6129	31.3482	32.9448	28.1221	26.6846	23.4194	22.6638	23.9177	24.5706	28.1464	30.8417	35.1144	(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	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	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(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	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(64)
									Total per year (kWh/year) = Sum(64)m =			2289.2444	(64)
12Total per year (kWh/year)												2289	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							0.0000	(64a)
Heat gains from water heating, kWh/month	78.9420	69.4886	73.0277	62.3372	59.1509	51.9129	50.2382	53.0175	54.4648	62.3913	68.3658	77.8369	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	106.1048	103.4057	98.1555	86.5795	79.5039	72.1013	67.5244	71.2601	75.6455	83.8593	94.9525	104.6195	(72)
Total internal gains	544.6572	557.8993	532.8048	511.6133	482.9873	460.4013	440.7451	441.9129	456.9299	477.7591	510.4027	532.2531	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	736.9504	902.0947	1044.6382	1208.8940	1317.6488	1311.5732	1252.0605	1147.9851	1032.9178	869.5154	743.8383	694.7581	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9900	0.9774	0.9497	0.8748	0.7390	0.5603	0.4174	0.4707	0.7118	0.9213	0.9805	0.9921	(86)
MIT	19.3510	19.6344	20.0184	20.4806	20.8023	20.9521	20.9887	20.9818	20.8743	20.4227	19.7991	19.3029	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9872	0.9711	0.9357	0.8416	0.6774	0.4717	0.3128	0.3602	0.6251	0.8923	0.9739	0.9898	(89)
MIT 2	17.9442	18.3036	18.7834	19.3423	19.6910	19.8326	19.8559	19.8546	19.7732	19.2927	18.5226	17.8885	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)

MIT	18.2636	18.6058	19.0638	19.6007	19.9433	20.0867	20.1131	20.1105	20.0232	19.5492	18.8124	18.2096	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2636	18.6058	19.0638	19.6007	19.9433	20.0867	20.1131	20.1105	20.0232	19.5492	18.8124	18.2096	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9815	0.9620	0.9238	0.8333	0.6827	0.4900	0.3365	0.3851	0.6389	0.8829	0.9657	0.9850	(94)
Useful gains	723.3314	867.7950	964.9877	1007.4133	899.6098	642.7116	421.2820	442.0467	659.9172	767.6786	718.3019	684.3165	(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	1728.1102	1692.7198	1548.5556	1306.4073	1004.5856	663.0635	424.5528	447.7092	718.1368	1090.6162	1432.5386	1719.9943	(97)
Space heating kWh	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98a)
Space heating requirement - total per year (kWh/year)												3554.5173	
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	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3554.5173	
Space heating per m2											(98c) / (4) =	37.5345	(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 %)	249.9000	(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													
	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98)
Space heating efficiency (main heating system 1)													
	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000	(210)
Space heating fuel (main heating system)													
	299.1418	221.8285	173.7393	86.1447	31.2533	0.0000	0.0000	0.0000	0.0000	96.1447	205.7825	308.3410	(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													
	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(64)
Efficiency of water heater												175.1000	(216)
(217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	(217)
Fuel for water heating, kWh/month													
	135.5908	119.3537	125.4324	107.0705	101.5976	89.1657	86.2891	91.0629	93.5487	107.1633	117.4251	133.6927	(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	22.9307	18.3959	16.5634	12.1351	9.3735	7.6582	8.5508	11.1147	14.4368	18.9419	21.3949	23.5680	(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	1422.3759	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	175.1000	
Water heating fuel used	1307.3926	(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)	185.0639	(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	2914.8324	(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	1422.3759	0.1559	221.6873	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1307.3926	0.1416	185.0983	(264)
Space and water heating			406.7856	(265)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	185.0639	0.1443	26.7104	(268)
Total CO2, kg/year			433.4961	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5800	(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	1422.3759	1.5770	2243.0861	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1307.3926	1.5235	1991.8629	(278)
Space and water heating			4234.9490	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	185.0639	1.5338	283.8572	(282)
Total Primary energy kWh/year			4518.8062	(286)
Dwelling Primary energy Rate (DPER)			47.7200	(287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3760	(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) =	0.3196	(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	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(22b)
Effective ac	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750
E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600

Thermal bridges (Sum(L x Psi) calculated using Appendix K)	28.2530	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	93.9220	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)
Average = Sum(39)m / 12 =												138.0673	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.6847	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	69.2342	68.1937	66.6776	63.7767	61.6359	59.2486	57.8916	59.3963	61.0457	63.6090	66.5721	68.9689	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												129.8451	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	141.2549	138.2386	134.5654	128.9799	124.4441	119.5678	117.6937	121.3511	125.2083	130.3276	135.9992	140.8885	(44)
Energy conte	223.7132	196.8500	206.8221	176.5671	167.5257	147.0225	142.3404	150.2580	154.3944	176.8534	193.7558	220.5974	(45)
Energy content (annual)										Total = Sum(45)m =		2156.6998	
Distribution loss (46)m = 0.15 x (45)m	33.5570	29.5275	31.0233	26.4851	25.1289	22.0534	21.3511	22.5387	23.1592	26.5280	29.0634	33.0896	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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	270.3081	238.9357	253.4170	221.6589	214.1206	192.1143	188.9353	196.8529	199.4862	223.4483	238.8476	267.1923	(62)
WWHRS	-31.6510	-27.9924	-29.3120	-24.2715	-22.6202	-19.3562	-18.1434	-19.2937	-20.0267	-23.6093	-26.7465	-31.0648	(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	238.6571	210.9433	224.1049	197.3874	191.5004	172.7581	170.7919	177.5592	179.4595	199.8390	212.1012	236.1275	(64)
									Total per year (kWh/year) = Sum(64)m =			2411.2296	(64)
12Total per year (kWh/year)												2411	(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	111.6606	99.1212	106.0443	94.7820	92.9782	84.9585	84.6041	87.2367	87.4096	96.0797	100.4973	110.6246	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	150.0814	147.5018	142.5326	131.6417	124.9707	117.9979	113.7152	117.2536	121.4022	129.1393	139.5796	148.6889	(72)
Total internal gains	588.6338	601.9953	577.1819	556.6755	528.4541	506.2979	486.9359	487.9064	502.6866	523.0392	555.0298	576.3226	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	739.6001	872.2264	979.0510	1104.1894	1183.8770	1174.7010	1124.0344	1042.3371	954.9401	830.6170	738.2980	703.9017	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area													
	0.9902	0.9814	0.9636	0.9158	0.8190	0.6618	0.5105	0.5637	0.7860	0.9408	0.9824	0.9918	(86)
MIT	19.0893	19.3408	19.7154	20.2105	20.6258	20.8820	20.9661	20.9508	20.7646	20.2187	19.5675	19.0476	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house													
	0.9873	0.9759	0.9524	0.8890	0.7611	0.5594	0.3746	0.4255	0.6986	0.9161	0.9762	0.9894	(89)
MIT 2	17.5277	17.8476	18.3200	18.9322	19.4063	19.6602	19.7181	19.7127	19.5645	18.9579	18.1446	17.4796	(90)
Living area fraction										fLA = Living area / (4) =		0.2270	(91)
MIT	17.8822	18.1866	18.6368	19.2224	19.6832	19.9376	20.0014	19.9938	19.8370	19.2442	18.4677	17.8356	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8822	18.1866	18.6368	19.2224	19.6832	19.9376	20.0014	19.9938	19.8370	19.2442	18.4677	17.8356	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9811	0.9665	0.9398	0.8760	0.7591	0.5777	0.4051	0.4560	0.7074	0.9039	0.9674	0.9839	(94)
Useful gains	725.6001	843.0501	920.1209	967.2694	898.6776	678.5954	455.3311	475.3015	675.5542	750.7993	714.1976	692.5963	(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													
	1897.9268	1853.2600	1689.8573	1425.2006	1100.4838	730.3695	465.4290	491.0776	787.2613	1191.5978	1572.0515	1891.9835	(97)
Space heating kWh													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98a)
Space heating requirement - total per year (kWh/year)												4441.5632	
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													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4441.5632	
Space heating per m2											(98c) / (4) =	46.9014	(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 %)	92.3000	(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													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98)
Space heating efficiency (main heating system 1)													
	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000	(210)
Space heating fuel (main heating system)													
	944.9741	735.4940	620.4593	357.2160	162.6694	0.0000	0.0000	0.0000	0.0000	355.3132	669.1818	966.7867	(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													
	238.6571	210.9433	224.1049	197.3874	191.5004	172.7581	170.7919	177.5592	179.4595	199.8390	212.1012	236.1275	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.6993	86.4876	86.0698	85.2016	83.5201	79.8000	79.8000	79.8000	79.8000	85.1633	86.3117	86.7527	(217)
Fuel for water heating, kWh/month													
	275.2700	243.9001	260.3759	231.6711	229.2866	216.4889	214.0249	222.5053	224.8866	234.6539	245.7386	272.1845	(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	25.9345	20.8057	18.7332	13.7247	10.6014	8.6614	9.6709	12.5706	16.3280	21.4233	24.1975	26.6553	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-56.3832	-76.3966	-105.5928	-114.0140	-119.1075	-109.8007	-108.3737	-104.0900	-96.0968	-84.9968	-60.8468	-49.1123	(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	-42.0108	-86.9697	-170.3566	-252.3624	-330.4165	-330.8520	-327.0076	-278.3976	-206.0737	-123.2342	-55.7020	-33.3340	(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	4812.0945	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	79.8000	
Water heating fuel used	2870.9865	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	209.3066	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3321.5284	(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	4656.8592	(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	4812.0945	0.2100	1010.5398	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2870.9865	0.2100	602.9072	(264)
Space and water heating			1613.4470	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	209.3066	0.1443	30.2094	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	0.1354	-146.9360	
PV Unit electricity exported	-2236.7170	0.1263	-282.5068	
Total			-429.4428	(269)
Total CO2, kg/year			1226.1429	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.9500	(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	4812.0945	1.1300	5437.6668	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2870.9865	1.1300	3244.2147	(278)
Space and water heating			8681.8815	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	209.3066	1.5338	321.0415	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	1.5006	-1627.9134	
PV Unit electricity exported	-2236.7170	0.4636	-1037.0348	
Total			-2664.9483	(283)
Total Primary energy kWh/year			6468.0755	(286)
Target Primary Energy Rate (TPER)			68.3000	(287)

Full SAP Calculation Printout

Plot Reference	Plot 2	Issued on Date	02/09/2026
Assessment Reference	P2 - BG	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.58	TER	12.95
Environmental	96 A	% DER < TER			64.63
CO_2 Emissions (t/year)	0.39	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	30.14	DPER	47.72	TPER	68.30

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---
1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

---
2. Ventilation rate
---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(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	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---
3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)	8.5636	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)

Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)
Average = Sum(39)m / 12 =												122.0849	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6847	(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	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												66.0135	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	72.0207	70.0449	67.8879	65.2032	62.8082	60.3192	59.8022	61.9548	64.1627	66.7187	69.4271	71.9196	(44)
Energy conte	114.0632	99.7430	104.3411	89.2599	84.5519	74.1695	72.3255	76.7130	79.1190	90.5366	98.9116	112.6088	(45)
Energy content (annual)										Total = Sum(45)m =		1096.3430	
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):													
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	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(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	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(64)
								Total per year (kWh/year) = Sum(64)m =				931.8916	(64)
12Total per year (kWh/year)												932	(64)
Electric shower(s)	55.4450	49.4020	53.9451	51.4791	52.4451	50.0275	51.6951	52.4451	51.4791	53.9451	52.9307	55.4450	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							630.6841	(64a)
Heat gains from water heating, kWh/month	38.0997	33.5459	35.6588	31.8375	31.0786	28.2679	28.2930	29.4128	29.6826	32.7253	34.2514	37.7906	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	51.2093	49.9195	47.9284	44.2188	41.7722	39.2610	38.0282	39.5333	41.2258	43.9856	47.5714	50.7938	(72)
Total internal gains	486.7617	501.4130	479.5777	466.2526	442.2557	427.5610	411.2489	410.1861	422.5102	434.8855	460.0216	475.4275	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	679.0548	845.6085	991.4112	1163.5332	1276.9172	1278.7329	1222.5642	1116.2583	998.4981	826.6418	693.4572	637.9325	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9925	0.9818	0.9571	0.8862	0.7531	0.5722	0.4269	0.4828	0.7275	0.9318	0.9846	0.9942	(86)
MIT	19.2824	19.5709	19.9651	20.4479	20.7874	20.9483	20.9878	20.9800	20.8634	20.3845	19.7416	19.2349	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9904	0.9766	0.9448	0.8549	0.6923	0.4826	0.3201	0.3700	0.6414	0.9057	0.9793	0.9925	(89)

MIT 2	18.2938	18.5802	18.9662	19.4260	19.7158	19.8367	19.8565	19.8555	19.7851	19.3822	18.7589	18.2526	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)
MIT	18.5182	18.8051	19.1930	19.6580	19.9590	20.0891	20.1133	20.1108	20.0299	19.6098	18.9820	18.4756	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5182	18.8051	19.1930	19.6580	19.9590	20.0891	20.1133	20.1108	20.0299	19.6098	18.9820	18.4756	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9869	0.9704	0.9361	0.8489	0.6985	0.5014	0.3444	0.3955	0.6558	0.8989	0.9739	0.9895	(94)
Useful gains	670.1349	820.6080	928.1072	987.7230	891.9623	641.2088	421.0112	441.4948	654.7905	743.0487	675.3562	631.2652	(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	1759.6239	1717.3439	1564.4769	1313.4059	1006.5068	663.3444	424.5777	447.7458	718.9526	1097.9945	1453.2867	1752.6500	(97)
Space heating kWh	810.5799	602.6065	473.4590	234.4917	85.2211	0.0000	0.0000	0.0000	0.0000	264.0797	560.1100	834.3102	(98a)
Space heating requirement - total per year (kWh/year)												3864.8581	
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	810.5799	602.6065	473.4590	234.4917	85.2211	0.0000	0.0000	0.0000	0.0000	264.0797	560.1100	834.3102	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3864.8581	
Space heating per m2											(98c) / (4) =	40.8116	(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	1135.9775	894.2802	917.0165	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8880	0.9342	0.9087	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1008.7341	835.4140	833.2948	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1445.1599	1381.9244	1260.1237	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	314.2266	406.6038	317.5607	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	78.5566	101.6509	79.3902	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												259.5978	(107)
Energy for space heating												40.8116	(99)
Energy for space cooling												2.7413	(108)
Total												43.5529	(109)
Fabric Energy Efficiency (DFEE)												43.6	(109)

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)			Volume (m3)	
Main dwelling							
Ground floor	67.2000	(1b)	x	2.5000	(2b) =	168.0000	(1b) - (3b)
First floor	27.5000	(1c)	x	2.5500	(2c) =	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000						(4)
Dwelling volume					(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

2. Ventilation rate

			m3 per hour	
Number of open chimneys		0 * 80 =	0.0000	(6a)
Number of open flues		0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000	(6d)
Number of flues attached to other heater		0 * 35 =	0.0000	(6e)
Number of blocked chimneys		0 * 20 =	0.0000	(6f)
Number of intermittent extract fans		3 * 10 =	30.0000	(7a)
Number of passive vents		0 * 10 =	0.0000	(7b)
Number of flueless gas fires		0 * 40 =	0.0000	(7c)
			Air changes per hour	
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test			Yes	
Pressure Test Method			Blower Door	
Measured/design AP50			5.0000	(17)
Infiltration rate			0.3760	(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) =	0.3196	(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													
	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(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	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750
E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 28.2530 (36)

Point Thermal bridges (36a) = 0.0000

Total fabric heat loss (33) + (36) + (36a) = 93.9220 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)

Average = Sum(39)m / 12 = 138.0673

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (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													
	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses													
	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												66.0135	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	72.0207	70.0449	67.8879	65.2032	62.8082	60.3192	59.8022	61.9548	64.1627	66.7187	69.4271	71.9196	(44)
Energy conte	114.0632	99.7430	104.3411	89.2599	84.5519	74.1695	72.3255	76.7130	79.1190	90.5366	98.9116	112.6088	(45)
Energy content (annual)										Total = Sum(45)m =		1096.3430	
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):													
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													
	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(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													
	96.9537	84.7815	88.6899	75.8709	71.8691	63.0441	61.4767	65.2061	67.2511	76.9561	84.0748	95.7174	(64)
								Total per year (kWh/year) = Sum(64)m =				931.8916	(64)
12Total per year (kWh/year)												932	(64)
Electric shower(s)													
	55.4450	49.4020	53.9451	51.4791	52.4451	50.0275	51.6951	52.4451	51.4791	53.9451	52.9307	55.4450	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							630.6841	(64a)
Heat gains from water heating, kWh/month													
	38.0997	33.5459	35.6588	31.8375	31.0786	28.2679	28.2930	29.4128	29.6826	32.7253	34.2514	37.7906	(65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	51.2093	49.9195	47.9284	44.2188	41.7722	39.2610	38.0282	39.5333	41.2258	43.9856	47.5714	50.7938	(72)
Total internal gains	486.7617	501.4130	479.5777	466.2526	442.2557	427.5610	411.2489	410.1861	422.5102	434.8855	460.0216	475.4275	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	637.7280	771.6441	881.4468	1013.7665	1097.6785	1095.9641	1048.3474	964.6168	874.7636	742.4633	643.2898	603.0066	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area	0.9940	0.9874	0.9734	0.9327	0.8453	0.6936	0.5415	0.5995	0.8194	0.9568	0.9887	0.9951	(86)
MIT	18.9718	19.2285	19.6133	20.1318	20.5758	20.8613	20.9587	20.9396	20.7241	20.1337	19.4607	18.9303	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house	0.9922	0.9835	0.9648	0.9099	0.7917	0.5913	0.3999	0.4566	0.7375	0.9376	0.9845	0.9936	(89)
MIT 2	17.8921	18.1480	18.5288	19.0351	19.4374	19.6645	19.7184	19.7129	19.5737	19.0487	18.3871	17.8564	(90)
Living area fraction										fLA = Living area / (4) =		0.2270	(91)
MIT	18.1372	18.3933	18.7750	19.2841	19.6959	19.9362	20.0000	19.9914	19.8349	19.2950	18.6309	18.1002	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1372	18.3933	18.7750	19.2841	19.6959	19.9362	20.0000	19.9914	19.8349	19.2950	18.6309	18.1002	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9889	0.9779	0.9565	0.9003	0.7904	0.6097	0.4319	0.4882	0.7458	0.9290	0.9795	0.9908	(94)
Useful gains	630.6214	754.6255	843.1089	912.6631	867.6541	668.1569	452.7290	470.9564	652.3682	689.7846	630.0795	597.4828	(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	1933.5576	1882.0906	1709.1023	1433.7183	1102.2313	730.1765	465.2336	490.7544	786.9764	1198.6108	1594.6206	1928.6952	(97)
Space heating kWh	969.3845	757.6565	644.2991	375.1598	174.5255	0.0000	0.0000	0.0000	0.0000	378.5667	694.4696	990.4220	(98a)
Space heating requirement - total per year (kWh/year)												4984.4837	
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	969.3845	757.6565	644.2991	375.1598	174.5255	0.0000	0.0000	0.0000	0.0000	378.5667	694.4696	990.4220	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4984.4837	
Space heating per m2											(98c) / (4) =	52.6345	(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	1286.2430	1012.5743	1038.5115	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7722	0.8450	0.8061	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	993.2656	855.6539	837.1241	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1231.5341	1178.2944	1082.8803	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	171.5533	240.0445	182.8427	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	42.8883	60.0111	45.7107	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												148.6101	(107)
Energy for space heating												52.6345	(99)
Energy for space cooling												1.5693	(108)
Total												54.2037	(109)
Fabric Energy Efficiency (TFEE)												54.2	(109)

Full SAP Calculation Printout

Plot Reference	Plot 2	Issued on Date	02/09/2026
Assessment Reference	P2 - BG	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.58	TER	12.95
Environmental	96 A	% DER < TER			64.63
CO_2 Emissions (t/year)	0.39	DFEE	43.55	TFEE	54.20
Compliance Check	See BREL	% DFEE < TFEE			19.65
% DPER < TPER	30.14	DPER	47.72	TPER	68.30

Assessor Details	Mr. Samuel Westover	Assessor ID	AX13-0001
Client			

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

---
1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	238.1250	(5)

---
2. Ventilation rate
---

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0100	(17)
Infiltration rate		0.3765	(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) =	0.3200	(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	0.4080	0.4000	0.3920	0.3520	0.3440	0.3040	0.3040	0.2960	0.3200	0.3440	0.3600	0.3760	(22b)
Effective ac	0.5832	0.5800	0.5768	0.5620	0.5592	0.5462	0.5462	0.5438	0.5512	0.5592	0.5648	0.5707	(25)

---
3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Windows			27.5800	1.1450	31.5802			(27)
Front Door			2.0200	1.0000	2.0200			(26)
Heatloss Floor 1			67.3000	0.1000	6.7300			(28a)
External Wall 1	148.0550	29.6000	118.4550	0.1800	21.3219			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.3631			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							215.0000	(35)
Thermal bridges (User defined value 0.030 * total exposed area)							8.5636	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		77.9267	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8316	45.5776	45.3286	44.1592	43.9405	42.9220	42.9220	42.7334	43.3143	43.9405	44.3831	44.8458	(38)
Heat transfer coeff	123.7583	123.5043	123.2553	122.0859	121.8672	120.8487	120.8487	120.6601	121.2410	121.8672	122.3098	122.7725	(39)

Average = Sum(39)m / 12 = 122.0849

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3068	1.3042	1.3015	1.2892	1.2869	1.2761	1.2761	1.2741	1.2803	1.2869	1.2915	1.2964	(40)
HLP (average)												1.2892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6847 (42)

Hot water usage for mixer showers	77.8885	76.7179	75.0123	71.7488	69.3404	66.6546	65.1280	66.8208	68.6764	71.5601	74.8937	77.5900	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)

Average daily hot water use (litres/day) 137.8240 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.9092	146.7628	142.9001	136.9520	132.1486	126.9738	124.9302	128.7756	132.8390	138.2788	144.3207	149.5097	(44)
Energy conte	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(45)
Energy content (annual)										Total = Sum(45)m =		2289.2444	
Distribution loss (46)m = 0.15 x (45)m	35.6129	31.3482	32.9448	28.1221	26.6846	23.4194	22.6638	23.9177	24.5706	28.1464	30.8417	35.1144	(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	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	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(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	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(64)
									Total per year (kWh/year) = Sum(64)m =			2289.2444	(64)
12Total per year (kWh/year)												2289	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							0.0000	(64a)
Heat gains from water heating, kWh/month	78.9420	69.4886	73.0277	62.3372	59.1509	51.9129	50.2382	53.0175	54.4648	62.3913	68.3658	77.8369	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	106.1048	103.4057	98.1555	86.5795	79.5039	72.1013	67.5244	71.2601	75.6455	83.8593	94.9525	104.6195	(72)
Total internal gains	544.6572	557.8993	532.8048	511.6133	482.9873	460.4013	440.7451	441.9129	456.9299	477.7591	510.4027	532.2531	(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	10.4200	10.6334	0.6300	0.7000	0.7700	33.8619	(74)
East	3.3100	19.6403	0.6300	0.7000	0.7700	19.8677	(76)
South	6.6900	46.7521	0.6300	0.7000	0.7700	95.5870	(78)
West	7.1600	19.6403	0.6300	0.7000	0.7700	42.9766	(80)

Solar gains	192.2932	344.1954	511.8335	697.2807	834.6615	851.1718	811.3153	706.0722	575.9879	391.7563	233.4356	162.5050	(83)
Total gains	736.9504	902.0947	1044.6382	1208.8940	1317.6488	1311.5732	1252.0605	1147.9851	1032.9178	869.5154	743.8383	694.7581	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.6995	45.7935	45.8860	46.3255	46.4087	46.7998	46.7998	46.8730	46.6484	46.4087	46.2407	46.0665	
alpha	4.0466	4.0529	4.0591	4.0884	4.0939	4.1200	4.1200	4.1249	4.1099	4.0939	4.0827	4.0711	
util living area	0.9900	0.9774	0.9497	0.8748	0.7390	0.5603	0.4174	0.4707	0.7118	0.9213	0.9805	0.9921	(86)
MIT	19.3510	19.6344	20.0184	20.4806	20.8023	20.9521	20.9887	20.9818	20.8743	20.4227	19.7991	19.3029	(87)
Th 2	19.8355	19.8376	19.8396	19.8493	19.8511	19.8596	19.8596	19.8612	19.8563	19.8511	19.8475	19.8436	(88)
util rest of house	0.9872	0.9711	0.9357	0.8416	0.6774	0.4717	0.3128	0.3602	0.6251	0.8923	0.9739	0.9898	(89)
MIT 2	17.9442	18.3036	18.7834	19.3423	19.6910	19.8326	19.8559	19.8546	19.7732	19.2927	18.5226	17.8885	(90)
Living area fraction									fLA = Living area / (4) =			0.2270	(91)

MIT	18.2636	18.6058	19.0638	19.6007	19.9433	20.0867	20.1131	20.1105	20.0232	19.5492	18.8124	18.2096	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2636	18.6058	19.0638	19.6007	19.9433	20.0867	20.1131	20.1105	20.0232	19.5492	18.8124	18.2096	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9815	0.9620	0.9238	0.8333	0.6827	0.4900	0.3365	0.3851	0.6389	0.8829	0.9657	0.9850	(94)
Useful gains	723.3314	867.7950	964.9877	1007.4133	899.6098	642.7116	421.2820	442.0467	659.9172	767.6786	718.3019	684.3165	(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	1728.1102	1692.7198	1548.5556	1306.4073	1004.5856	663.0635	424.5528	447.7092	718.1368	1090.6162	1432.5386	1719.9943	(97)
Space heating kWh	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98a)
Space heating requirement - total per year (kWh/year)												3554.5173	
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	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3554.5173	
Space heating per m2											(98c) / (4) =	37.5345	(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 %)	249.9000	(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													
	747.5554	554.3495	434.1745	215.2757	78.1020	0.0000	0.0000	0.0000	0.0000	240.2656	514.2504	770.5442	(98)
Space heating efficiency (main heating system 1)													
	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000	(210)
Space heating fuel (main heating system)													
	299.1418	221.8285	173.7393	86.1447	31.2533	0.0000	0.0000	0.0000	0.0000	96.1447	205.7825	308.3410	(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													
	237.4195	208.9883	219.6322	187.4804	177.8974	156.1291	151.0922	159.4511	163.8038	187.6430	205.6113	234.0960	(64)
Efficiency of water heater												175.1000	(216)
(217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	(217)
Fuel for water heating, kWh/month													
	135.5908	119.3537	125.4324	107.0705	101.5976	89.1657	86.2891	91.0629	93.5487	107.1633	117.4251	133.6927	(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	22.9307	18.3959	16.5634	12.1351	9.3735	7.6582	8.5508	11.1147	14.4368	18.9419	21.3949	23.5680	(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	1422.3759	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	175.1000	
Water heating fuel used	1307.3926	(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)	185.0639	(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	2914.8324	(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	1422.3759	0.1559	221.6873	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1307.3926	0.1416	185.0983	(264)
Space and water heating			406.7856	(265)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	185.0639	0.1443	26.7104	(268)
Total CO2, kg/year			433.4961	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5800	(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	1422.3759	1.5770	2243.0861	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1307.3926	1.5235	1991.8629	(278)
Space and water heating			4234.9490	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	185.0639	1.5338	283.8572	(282)
Total Primary energy kWh/year			4518.8062	(286)
Dwelling Primary energy Rate (DPER)			47.7200	(287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	67.2000 (1b)	x	2.5000 (2b)	=	168.0000	(1b) - (3b)
First floor	27.5000 (1c)	x	2.5500 (2c)	=	70.1250	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.7000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.1250	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1260	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3760	(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) =	0.3196	(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	0.4075	0.3995	0.3915	0.3515	0.3436	0.3036	0.3036	0.2956	0.3196	0.3436	0.3595	0.3755	(22b)
Effective ac	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5511	0.5590	0.5646	0.5705	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.0200	1.0000	2.0200			(26)
TER Opening Type			21.6600	1.1450	24.8015			(27)
Heatloss Floor 1			67.3000	0.1300	8.7490			(28a)
External Wall 1	148.0550	23.6800	124.3750	0.1800	22.3875			(29a)
FR	39.7000		39.7000	0.1100	4.3670			(30)
Sloping Roof	30.4000		30.4000	0.1100	3.3440			(30)
Total net area of external elements Aum(A, m2)			285.4550					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	65.6690			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 215.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	14.4600	0.0500	0.7230
E3 Sill	13.5200	0.0500	0.6760
E4 Jamb	40.2000	0.0500	2.0100
E5 Ground floor (normal)	37.7000	0.1600	6.0320
E6 Intermediate floor within a dwelling	21.1000	0.0000	0.0000
E16 Corner (normal)	27.5000	0.0900	2.4750
E15 Flat roof with parapet	28.0000	0.5600	15.6800
E17 Corner (inverted - internal area greater than external area)	7.5000	-0.0900	-0.6750
E11 Eaves (insulation at rafter level)	9.3000	0.0400	0.3720
E13 Gable (insulation at rafter level)	12.0000	0.0800	0.9600

Thermal bridges (Sum(L x Psi) calculated using Appendix K)	28.2530	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	93.9220	(37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.8142	45.5609	45.3126	44.1463	43.9281	42.9123	42.9123	42.7242	43.3036	43.9281	44.3695	44.8310	(38)
Heat transfer coeff	139.7362	139.4829	139.2346	138.0683	137.8501	136.8344	136.8344	136.6463	137.2256	137.8501	138.2916	138.7531	(39)
Average = Sum(39)m / 12 =												138.0673	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4756	1.4729	1.4703	1.4580	1.4557	1.4449	1.4449	1.4429	1.4491	1.4557	1.4603	1.4652	(40)
HLP (average)												1.4579	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.6847	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	69.2342	68.1937	66.6776	63.7767	61.6359	59.2486	57.8916	59.3963	61.0457	63.6090	66.5721	68.9689	(42a)
Hot water usage for baths	29.8962	29.4522	28.8269	27.6741	26.8109	25.8537	25.3367	25.9575	26.6335	27.6578	28.8343	29.7951	(42b)
Hot water usage for other uses	42.1245	40.5927	39.0609	37.5291	35.9973	34.4655	34.4655	35.9973	37.5291	39.0609	40.5927	42.1245	(42c)
Average daily hot water use (litres/day)												129.8451	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	141.2549	138.2386	134.5654	128.9799	124.4441	119.5678	117.6937	121.3511	125.2083	130.3276	135.9992	140.8885	(44)
Energy conte	223.7132	196.8500	206.8221	176.5671	167.5257	147.0225	142.3404	150.2580	154.3944	176.8534	193.7558	220.5974	(45)
Energy content (annual)										Total = Sum(45)m =		2156.6998	
Distribution loss (46)m = 0.15 x (45)m	33.5570	29.5275	31.0233	26.4851	25.1289	22.0534	21.3511	22.5387	23.1592	26.5280	29.0634	33.0896	(46)
Water storage loss (or HIU loss):													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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	270.3081	238.9357	253.4170	221.6589	214.1206	192.1143	188.9353	196.8529	199.4862	223.4483	238.8476	267.1923	(62)
WWHRS	-31.6510	-27.9924	-29.3120	-24.2715	-22.6202	-19.3562	-18.1434	-19.2937	-20.0267	-23.6093	-26.7465	-31.0648	(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	238.6571	210.9433	224.1049	197.3874	191.5004	172.7581	170.7919	177.5592	179.4595	199.8390	212.1012	236.1275	(64)
									Total per year (kWh/year) = Sum(64)m =			2411.2296	(64)
12Total per year (kWh/year)												2411	(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	111.6606	99.1212	106.0443	94.7820	92.9782	84.9585	84.6041	87.2367	87.4096	96.0797	100.4973	110.6246	(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	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	134.2374	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.8172	138.1904	124.8172	128.9777	124.8172	128.9777	124.8172	124.8172	128.9777	124.8172	128.9777	124.8172	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	247.4640	250.0319	243.5609	229.7848	212.3950	196.0511	185.1323	182.5644	189.0354	202.8115	220.2013	236.5452	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	36.4237	(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)	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	-107.3899	(71)
Water heating gains (Table 5)	150.0814	147.5018	142.5326	131.6417	124.9707	117.9979	113.7152	117.2536	121.4022	129.1393	139.5796	148.6889	(72)
Total internal gains	588.6338	601.9953	577.1819	556.6755	528.4541	506.2979	486.9359	487.9064	502.6866	523.0392	555.0298	576.3226	(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	8.1900	10.6334	0.6300	0.7000	0.7700	26.6151	(74)
East	2.6000	19.6403	0.6300	0.7000	0.7700	15.6060	(76)
South	5.2500	46.7521	0.6300	0.7000	0.7700	75.0122	(78)
West	5.6200	19.6403	0.6300	0.7000	0.7700	33.7330	(80)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	150.9663	270.2311	401.8691	547.5139	655.4228	668.4031	637.0985	554.4307	452.2534	307.5778	183.2682	127.5791	(83)
Total gains	739.6001	872.2264	979.0510	1104.1894	1183.8770	1174.7010	1124.0344	1042.3371	954.9401	830.6170	738.2980	703.9017	(84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	40.4741	40.5476	40.6199	40.9630	41.0278	41.3324	41.3324	41.3893	41.2146	41.0278	40.8969	40.7609	
alpha	3.6983	3.7032	3.7080	3.7309	3.7352	3.7555	3.7555	3.7593	3.7476	3.7352	3.7265	3.7174	
util living area													
	0.9902	0.9814	0.9636	0.9158	0.8190	0.6618	0.5105	0.5637	0.7860	0.9408	0.9824	0.9918	(86)
MIT	19.0893	19.3408	19.7154	20.2105	20.6258	20.8820	20.9661	20.9508	20.7646	20.2187	19.5675	19.0476	(87)
Th 2	19.7059	19.7079	19.7099	19.7192	19.7209	19.7291	19.7291	19.7306	19.7259	19.7209	19.7174	19.7137	(88)
util rest of house													
	0.9873	0.9759	0.9524	0.8890	0.7611	0.5594	0.3746	0.4255	0.6986	0.9161	0.9762	0.9894	(89)
MIT 2	17.5277	17.8476	18.3200	18.9322	19.4063	19.6602	19.7181	19.7127	19.5645	18.9579	18.1446	17.4796	(90)
Living area fraction										fLA = Living area / (4) =		0.2270	(91)
MIT	17.8822	18.1866	18.6368	19.2224	19.6832	19.9376	20.0014	19.9938	19.8370	19.2442	18.4677	17.8356	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8822	18.1866	18.6368	19.2224	19.6832	19.9376	20.0014	19.9938	19.8370	19.2442	18.4677	17.8356	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9811	0.9665	0.9398	0.8760	0.7591	0.5777	0.4051	0.4560	0.7074	0.9039	0.9674	0.9839	(94)
Useful gains	725.6001	843.0501	920.1209	967.2694	898.6776	678.5954	455.3311	475.3015	675.5542	750.7993	714.1976	692.5963	(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													
	1897.9268	1853.2600	1689.8573	1425.2006	1100.4838	730.3695	465.4290	491.0776	787.2613	1191.5978	1572.0515	1891.9835	(97)
Space heating kWh													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98a)
Space heating requirement - total per year (kWh/year)												4441.5632	
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													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4441.5632	
Space heating per m2											(98c) / (4) =	46.9014	(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 %)	92.3000	(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													
	872.2111	678.8610	572.6839	329.7104	150.1438	0.0000	0.0000	0.0000	0.0000	327.9541	617.6548	892.3441	(98)
Space heating efficiency (main heating system 1)													
	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000	(210)
Space heating fuel (main heating system)													
	944.9741	735.4940	620.4593	357.2160	162.6694	0.0000	0.0000	0.0000	0.0000	355.3132	669.1818	966.7867	(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													
	238.6571	210.9433	224.1049	197.3874	191.5004	172.7581	170.7919	177.5592	179.4595	199.8390	212.1012	236.1275	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.6993	86.4876	86.0698	85.2016	83.5201	79.8000	79.8000	79.8000	79.8000	85.1633	86.3117	86.7527	(217)
Fuel for water heating, kWh/month													
	275.2700	243.9001	260.3759	231.6711	229.2866	216.4889	214.0249	222.5053	224.8866	234.6539	245.7386	272.1845	(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	25.9345	20.8057	18.7332	13.7247	10.6014	8.6614	9.6709	12.5706	16.3280	21.4233	24.1975	26.6553	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-56.3832	-76.3966	-105.5928	-114.0140	-119.1075	-109.8007	-108.3737	-104.0900	-96.0968	-84.9968	-60.8468	-49.1123	(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	-42.0108	-86.9697	-170.3566	-252.3624	-330.4165	-330.8520	-327.0076	-278.3976	-206.0737	-123.2342	-55.7020	-33.3340	(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	4812.0945	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	79.8000	
Water heating fuel used	2870.9865	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	209.3066	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-3321.5284	(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	4656.8592	(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	4812.0945	0.2100	1010.5398	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2870.9865	0.2100	602.9072	(264)
Space and water heating			1613.4470	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	209.3066	0.1443	30.2094	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	0.1354	-146.9360	
PV Unit electricity exported	-2236.7170	0.1263	-282.5068	
Total			-429.4428	(269)
Total CO2, kg/year			1226.1429	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.9500	(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	4812.0945	1.1300	5437.6668	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2870.9865	1.1300	3244.2147	(278)
Space and water heating			8681.8815	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	209.3066	1.5338	321.0415	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.8113	1.5006	-1627.9134	
PV Unit electricity exported	-2236.7170	0.4636	-1037.0348	
Total			-2664.9483	(283)
Total Primary energy kWh/year			6468.0755	(286)
Target Primary Energy Rate (TPER)			68.3000	(287)

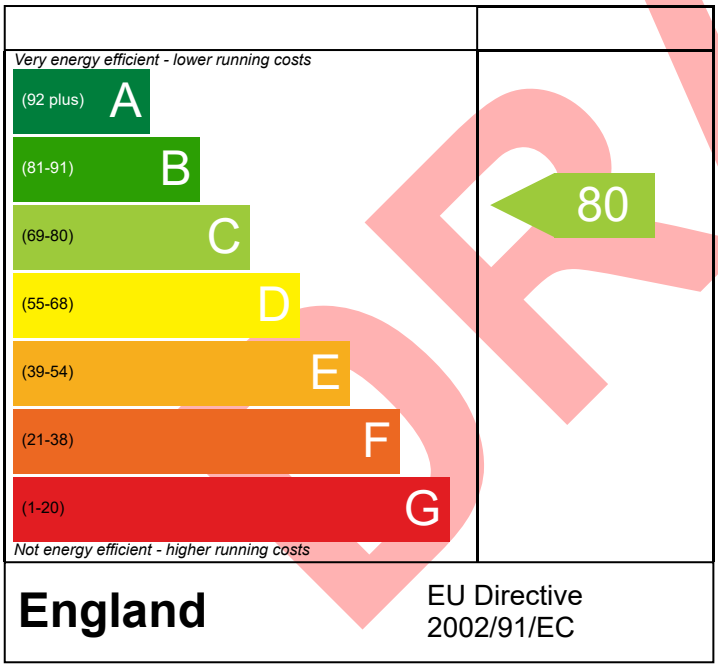
Predicted Energy Assessment

Dwelling type:	House, Detached
Date of assessment:	02/09/2026
SAP Version:	10.2
Produced by:	Samuel Westover
Total floor area:	94.7 m²
DRRN:	

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

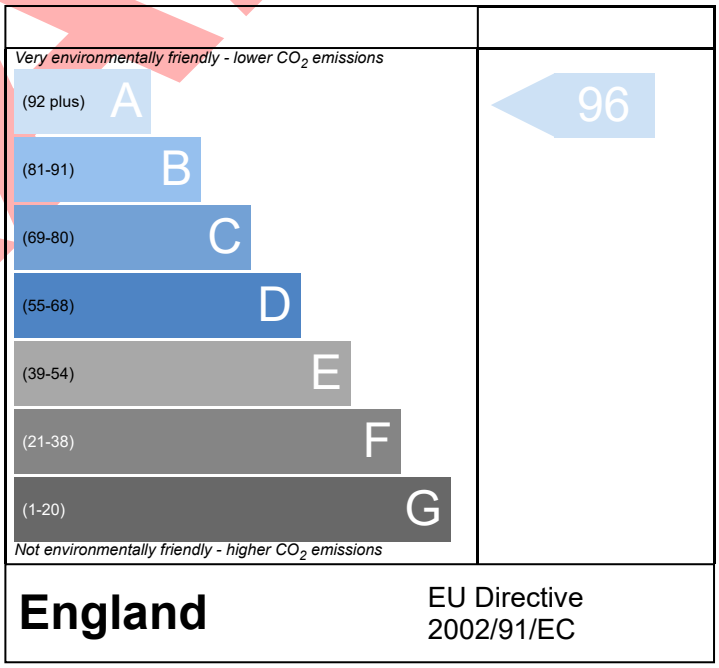
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



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

Environmental Impact (CO_2) Rating



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

DRAFT

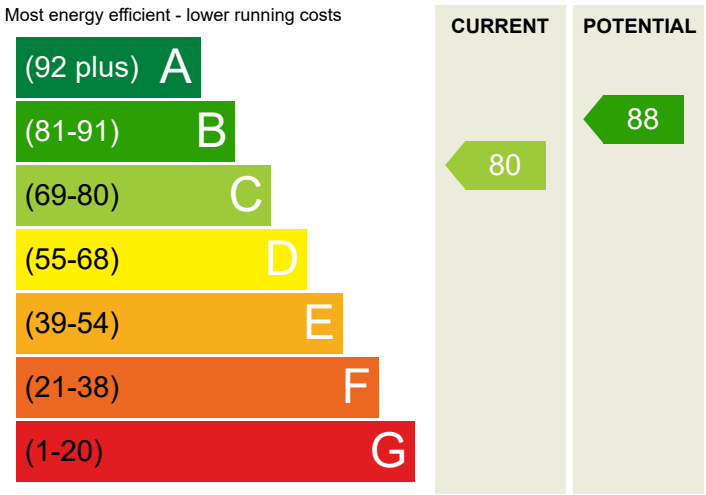
Energy Report

Dwelling Address	
Reference	Plot 2-P2 - BG
SAP Version	10.2
Assessment Date	30/07/2026
Submission Date	
Property Type	House, Detached
Total Floor Area	95

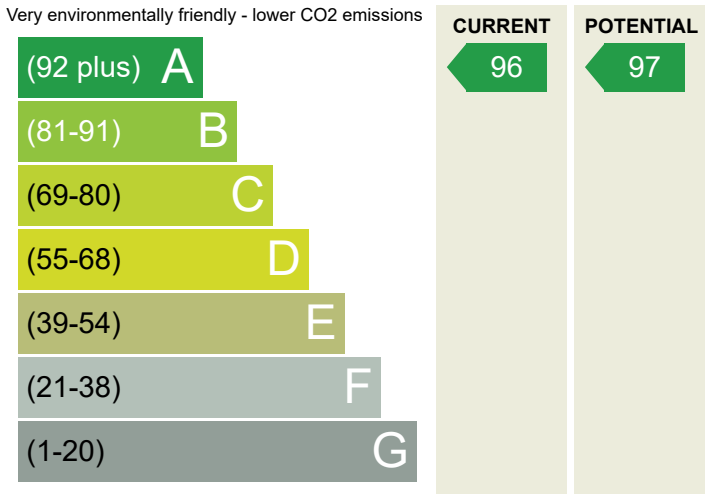
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

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

Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report

	Primary Energy	Energy	Carbon	Cost	HTC
CURRENT	42.89 kWh	2623 kWh	389 kg	725.73 £	122 W/K
POTENTIAL	24.40 kWh	1446 kWh	233 kg	400.24 £	122 W/K

Energy Report

elmhurst energy

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m²K	Very Good
Roof	Average thermal transmittance 0.11 W/m²K	Very Good
Floor	Average thermal transmittance 0.1 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Air source heat pump, radiators, electric	Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 5.0 m³/h.m² (assumed)	Good

Recommendations

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

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating
Solar water heating	£81	B 82	£4,000 - £7,000	£81	A 96
Photovoltaic	£325	B 88	£8,000 - £10,000	£245	A 97

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

Estimated energy costs of the dwelling

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

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£51	£51	You could save £325
Heating	£313	£335	
Hot Water	£362	£259	
New Technologies e.g. Impact of PV	£0	-(£245)	
TOTAL	£726	£400	

Estimated energy use and potential savings

Space Heating
1130
kWh per year

Water Heating
1307
kWh per year

Energy Report

elmhurst energy

About this document

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

Disclaimer

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

Glossary terms for additional metrics

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