

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Tue 21 Apr 2026 16:46:42

Project Information			
Assessed By	Derek White	Building Type	House, Detached
OCDEA Registration	EES/004958	Assessment Date	2026-04-21

Dwelling Details			
Assessment Type	As designed	Total Floor Area	140 m ²
Site Reference	3 Be Green	Plot Reference	001
Address			

Client Details	
Name	Dan & Carolyn Schuster-Woldan
Company	Own Build
Address	land adjacent to, 2 Coleridge Road, London, N8 8EJ

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	12.53 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	2.18 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	66.69 kWh _{PE} /m ²		
Dwelling primary energy	26.71 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	59.8 kWh/m ²		
Dwelling fabric energy efficiency	53.0 kWh/m ²		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.15	Walls (1) (0.15)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.1	FT1 - Ground (0.1)	OK
Roofs	0.16	0.1	Roof (1) (0.1)	OK
Windows, doors, and roof windows	1.6	1.21	H-RL1 (1.7)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))			
Name	Net area [m ²]	U-Value [W/m ² K]	
Exposed wall: Walls (1)	174.31	0.15	
Ground floor: FT1 - Ground, FT1 - Ground	97.62000274658203	0.1 (!)	
Exposed roof: Roof (1)	53.668201831055	0.1 (!)	
Exposed roof: Roof (2)	41.290000915527	0.1 (!)	

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
NE-GD1, NE-GD1	3.12	North East	N/A	1 (!)
NE-GW1, NE-GW1	5.018	North East	0.8	1.2
NW-GW3, NE-GW1	7.02	North West	0.8	1.2
SW-GW4, NE-GW1	13	South West	0.8	1.2
SW-GW5, NE-GW1	6.188	South West	0.8	1.2
SE-GW2, NE-GW1	4.914	South East	0.8	1.2
SE-GW6, NE-GW1	1.8	South East	0.8	1.2
NE-FW1, NE-GW1	0.96	North East	0.8	1.2
SE-FW2, NE-GW1	1.92	South East	0.8	1.2
SE-FW3, NE-GW1	2.56	South East	0.8	1.2
NW-FW4, NE-GW1	2.56	South East	0.8	1.2
H-RL1, H-RL1	1.1218	Horizontal	0.8	1.7

Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
H-RL2, H-RL1	0.54	Horizontal	0.8	1.7
H-RL3, H-RL1	1	Horizontal	0.8	1.7

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part 1: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.02500000037252903 (!)	
External wall	E3: Sill	Calculated by person with suitable expertise	0.02199999988079071 (!)	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.0179999999225139618 (!)	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.04800000041723251	
External wall	E15: Flat roof with parapet	SAP table default	0.3	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.03500000014901161 (!)	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.06599999964237213	
Roof	R1: Head of roof window	SAP table default	0.24	
Roof	R2: Sill of roof window	SAP table default	0.24	
Roof	R3: Jamb of roof window	SAP table default	0.24	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa	4 m ³ /hm ² , Design value	OK
Air permeability test certificate reference		

4 Space heating

Main heating system 1: Heat pump with radiators or underfloor heating - Electricity

Efficiency	347.4%
Emitter type	Both radiators and underfloor
Flow temperature	35°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM plus 5kW + AI
Commissioning	

Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water

Cylinder/store - type: Cylinder

Capacity	250 litres
Declared heat loss	1.61 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	

Waste water heat recovery system 1 - type: N/A

Efficiency	
Manufacturer	
Model	

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services

Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed

Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	120 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.93 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	86%	OK
Manufacturer/Model	ComfoAir 350	
Commissioning		
9 Local generation		
Technology type: Photovoltaic system (1)		
Peak power	2.25 kWp	
Orientation	Horizontal	
Pitch	Horizontal	
Overshading	None or very little	
Manufacturer		
MCS certificate		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Summary for Input Data



Plot Reference	3 Be Green	Issued on Date	21/04/2026
Assessment Reference	001	Plot Type Ref	Lat_2 Coleridge Road N8 8EJ
Plot Address		SAP Version	10.2

SAP Rating	89 B	DER	2.18	TER	12.53
Environmental	98 A	% DER < TER			82.60
CO ₂ Emissions (t/year)	0.22	DFEE	52.98	TFEE	59.79
Compliance Check	See BREL	% DFEE < TFEE			11.40
% DPER < TPER	59.95	DPER	26.71	TPER	66.69

Assessor Details	Mr. Derek White	Assessor ID	B381-0001
Client			

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

Orientation	Northeast	
Property Tenture	1	
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	0	
5.0 Sunlight/Shade	Very little	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	176.47	kJ/m²K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	1.00 m	97.62 m ²	2.60 m
		1.00 m	42.49 m ²	3.06 m

8.0 Living Area	34.00	m ²
-----------------	-------	----------------

9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT1 - Brick faced	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.15	60.00	223.37	174.31	0.00	None	49.06	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	IW1	Plasterboard on timber frame	9.00	170.21

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	RT1 - GF Flat	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	55.33	53.67	None	0.00	Enter Gross Area	1.66
	RT2 - FF Flat	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	42.29	41.29	None	0.00	Enter Gross Area	1.00

10.2 Internal Ceilings	Description	Storey	Construction	Kappa	Area (m ²)
	IC1	Lowest occupied	Other	9.00	42.29

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	FT1 - Ground	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.10	None	0.00	110.00	97.62

11.2 Internal Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
IF1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	18.00	42.29

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
NE-GD1	Manufacturer	Solid Door				0.00			1.00
NE-GW1	Manufacturer	Window	Double Low-E Soft 0.05			0.40		0.80	1.20
H-RL1	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.40		0.80	1.70

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
NE-GD1	NE-GD1	WT1 - Brick faced	North East	3.12	
NE-GW1	NE-GW1	WT1 - Brick faced	North East	5.02	
NW-GW3	NE-GW1	WT1 - Brick faced	North West	7.02	
SW-GW4	NE-GW1	WT1 - Brick faced	South West	13.00	
SW-GW5	NE-GW1	WT1 - Brick faced	South West	6.19	
SE-GW2	NE-GW1	WT1 - Brick faced	South East	4.91	
SE-GW6	NE-GW1	WT1 - Brick faced	South East	1.80	
NE-FW1	NE-GW1	WT1 - Brick faced	North East	0.96	
SE-FW2	NE-GW1	WT1 - Brick faced	South East	1.92	
SE-FW3	NE-GW1	WT1 - Brick faced	South East	2.56	
NW-FW4	NE-GW1	WT1 - Brick faced	South East	2.56	
H-RL1	H-RL1	RT1 - GF Flat	Horizontal	1.12	0
H-RL2	H-RL1	RT1 - GF Flat	Horizontal	0.54	0
H-RL3	H-RL1	RT2 - FF Flat	Horizontal	1.00	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	21.91	0.03	0.03	No
E3 Sill	Independently assessed	8.70	0.02	0.02	No
E4 Jamb	Independently assessed	46.04	0.02	0.02	No
E5 Ground floor (normal)	Independently assessed	55.23	0.05	0.05	No
E15 Flat roof with parapet	Table K1 - Default	55.70	0.30	0.30	No
E16 Corner (normal)	Independently assessed	43.44	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.20	-0.07	-0.07	No
R1 Head of roof window	Table K1 - Default	8.12	0.24	0.24	No
R2 Sill of roof window	Table K1 - Default	8.12	0.24	0.24	No
R3 Jamb of roof window	Table K1 - Default	5.42	0.24	0.24	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	4
Manufacturer SFP	0.93
Duct Type	Rigid
MVHR Efficiency	86.00
Wet Rooms	4
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

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

Summary for Input Data

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	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP ₅₀	4.00	m ³ /(h.m ²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting	No				
	Name	Efficacy	Power	Capacity	Count
	Low energy Lighting	120.00	6.00	720.00	40

24.0 Main Heating 1

Percentage of Heat	100.00	%
Database Ref. No.	104417	
Fuel Type	Electricity	
In Winter	347.43	
In Summer	262.58	
Model Name	aroTHERM plus 5kW + AI	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2207	
Controls description	Time and temperature zone control by arrangement	
PCDF Controls	0	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	35.00	

25.0 Main Heating 2

26.0 Heat Networks

27.0 Secondary Heating

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

Summary for Input Data

Immersion Only Heating Hot Water

No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Stand alone shower	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Cylinder Volume	250.00
Loss	1.61
Pipes insulation	Fully insulated primary pipework

L

kWh/day

31.0 Thermal Store

None

32.0 Photovoltaic Unit

One Dwelling
Export Capable Meter?
Yes
Connected To Dwelling
Yes
Diverter
No
Battery Capacity [kWh]
0.00

PV Cells kWp

Orientation

Elevation

Overshading

FGHRS

MCS Certificate

Overshading
Factor

MCS
Certificate
Reference

Panel
Manufacturer

2.25

Horizontal

Horizontal

None Or Little

No

1.00

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

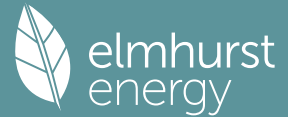
Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			B 90	A 98
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout



Plot Reference	3 Be Green				Issued on Date	21/04/2026	
Assessment Reference	001			Plot Type Ref	Lat_2 Coleridge Road N8 8EJ		
Plot Address					SAP Version	10.2	
SAP Rating	89 B		DER	2.18		TER	12.53
Environmental	98 A		% DER < TER				82.60
CO ₂ Emissions (t/year)	0.22		DFEE	52.98		TFEE	59.79
Compliance Check	See BREL		% DFEE < TFEE				11.40
% DPER < TPER	59.95		DPER	26.71		TPER	66.69
Assessor Details	Mr. Derek White				Assessor ID	B381-0001	
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 (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	97.6200 (1b)	x 2.6000 (2b)	= 253.8120 (1b) - (3b)
First floor	42.4900 (1c)	x 3.0600 (2c)	= 130.0194 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	140.1100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 383.8314 (5)

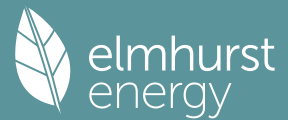
2. Ventilation rate

	m ³ per hour											
Number of open chimneys	0 * 80 = 0.0000 (6a)											
Number of open flues	0 * 20 = 0.0000 (6b)											
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)											
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)											
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)											
Number of blocked chimneys	0 * 20 = 0.0000 (6f)											
Number of intermittent extract fans	0 * 10 = 0.0000 (7a)											
Number of passive vents	0 * 10 = 0.0000 (7b)											
Number of flueless gas fires	0 * 40 = 0.0000 (7c)											
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 0.0000 / (5) = 0.0000 (8)											
Pressure test	Yes											
Pressure Test Method	Blower Door											
Measured/design AP50	4.0000 (17)											
Infiltration rate	0.2000 (18)											
Number of sides sheltered	0 (19)											
Shelter factor	(20) = 1 - [0.075 x (19)] = 1.0000 (20)											
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2000 (21)											
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Balanced mechanical ventilation with heat recovery	0.2550	0.2500	0.2450	0.2200	0.2150	0.1900	0.1900	0.1850	0.2000	0.2150	0.2250	0.2350 (22b)
If mechanical ventilation	0.5000 (23a)											
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)	0.5000 (23b)											
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =	77.4000 (23c)											
Effective ac	0.3680	0.3630	0.3580	0.3330	0.3280	0.3030	0.3030	0.2980	0.3130	0.3280	0.3380	0.3480 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
NE-GD1			3.1200	1.0000	3.1200		(26)
NE-GW1			45.9400	1.1450	52.6031		(27)
H-RL1			2.6600	1.5918	4.2341		(27a)
FT1 - Ground			97.6200	0.1000	9.7620	110.0000	10738.2003 (28a)
WT1 - Brick faced	223.3700	49.0600	174.3100	0.1500	26.1465	60.0000	10458.5997 (29a)
RT1 - GF Flat	55.3300	1.6600	53.6700	0.1000	5.3670	9.0000	483.0300 (30)
RT2 - FF Flat	42.2900	1.0000	41.2900	0.1000	4.1290	9.0000	371.6100 (30)
Total net area of external elements Aum (A, m ²)			418.6100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		105.3616		(33)
Main dwelling							
IW1			170.2100			9.0000	1531.8901 (32c)
IF1			42.2900			18.0000	761.2200 (32d)
IC1			42.2900			9.0000	380.6100 (32e)

Full SAP Calculation Printout



Heat capacity Cm = Sum(A x k)				(28)...(30) + (32) + (32a)...(32e) =	24725.1601	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K					176.4696	(35)
List of Thermal Bridges						
K1 Element	Length	Psi-value	Total			
E2 Other lintels (including other steel lintels)	21.9100	0.0250	0.5478			
E3 Sill	8.7000	0.0220	0.1914			
E4 Jamb	46.0400	0.0180	0.8287			
E5 Ground floor (normal)	55.2300	0.0480	2.6510			
E15 Flat roof with parapet	55.7000	0.3000	16.7100			
E16 Corner (normal)	43.4400	0.0350	1.5204			
E17 Corner (inverted - internal area greater than external area)	5.2000	-0.0660	-0.3432			
R1 Head of roof window	8.1200	0.2400	1.9488			
R2 Sill of roof window	8.1200	0.2400	1.9488			
R3 Jamb of roof window	5.4200	0.2400	1.3008			
Thermal bridges (Sum(L x Psi) calculated using Appendix K)					27.3045	(36)
Point Thermal bridges				(36a) =	0.0000	
Total fabric heat loss				(33) + (36) + (36a) =	132.6661	(37)

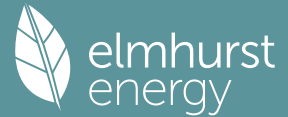
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	46.6125	45.9792	45.3458	42.1792	41.5459	38.3793	38.3793	37.7460	39.6459	41.5459	42.8126	44.0792 (38)
Heat transfer coeff	179.2786	178.6453	178.0120	174.8454	174.2121	171.0454	171.0454	170.4121	172.3121	174.2121	175.4787	176.7453 (39)
Average = Sum(39)m / 12 =												174.6871
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.2796	1.2750	1.2705	1.2479	1.2434	1.2208	1.2208	1.2163	1.2298	1.2434	1.2524	1.2615 (40)
HLP (average)												1.2468
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.9173 (42)
Hot water usage for mixer showers												
	73.1333	72.0342	70.4327	67.3684	65.1071	62.5853	61.1519	62.7413	64.4836	67.1913	70.3213	72.8531 (42a)
Hot water usage for baths												
	31.5729	31.1040	30.4437	29.2262	28.3146	27.3037	26.7577	27.4134	28.1273	29.2090	30.4515	31.4662 (42b)
Hot water usage for other uses												
	44.5060	42.8876	41.2692	39.6508	38.0324	36.4140	36.4140	38.0324	39.6508	41.2692	42.8876	44.5060 (42c)
Average daily hot water use (litres/day)												137.1595 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
	149.2122	146.0258	142.1456	136.2455	131.4541	126.3030	124.3235	128.1871	132.2617	137.6694	143.6604	148.8252 (44)
Energy content												
	236.3156	207.9388	218.4725	186.5132	176.9624	155.3042	150.3586	158.7223	163.0919	186.8161	204.6706	233.0244 (45)
Energy content (annual)												Total = Sum(45)m = 2278.1907
Distribution loss (46)m = 0.15 x (45)m												
	35.4473	31.1908	32.7709	27.9770	26.5444	23.2956	22.5538	23.8084	24.4638	28.0224	30.7006	34.9537 (46)
Water storage loss (or HIU loss):												
Store volume												250.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6100 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8694 (55)
Total storage loss												
	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514 (56)
If cylinder contains dedicated solar storage												
	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514 (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												
	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382 (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												
	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382 (64)
Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 2869.4177 (64)
Electric shower(s)												2869 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
	118.7460	105.4232	112.8131	100.8908	99.0111	90.5139	90.1653	92.9462	93.1032	102.2874	106.9282	117.6516 (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	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	156.1259	172.8537	156.1259	161.3301	156.1259	161.3301	156.1259	156.1259	161.3301	156.1259	161.3301	156.1259 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	309.5371	312.7491	304.6549	287.4233	265.6715	245.2279	231.5703	228.3583	236.4525	253.6841	275.4359	295.8795 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865 (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)	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918 (71)
Water heating gains (Table 5)	159.6048	156.8797	151.6306	140.1262	133.0794	125.7137	121.1899	124.9277	129.3101	137.4831	148.5114	158.1339 (72)
Total internal gains	692.0272	709.2419	679.1708	655.6390	621.6362	599.0311	575.6455	576.1713	593.8520	614.0524	652.0367	676.8987 (73)

6. Solar gains											
[Jan]	Area	Solar flux	g	FF	Access	Gains					
	m2	Table 6a	W/m2	Specific data or Table 6b	Specific data or Table 6c	factor Table 6d	W				
Northeast	5.9800	11.2829	0.4000	0.8000	0.7700	14.9626	(75)				

Full SAP Calculation Printout



Southeast			13.7500	36.7938	0.4000	0.8000	0.7700	112.1918 (77)
Southwest			19.1900	36.7938	0.4000	0.8000	0.7700	156.5789 (79)
Northwest			7.0200	11.2829	0.4000	0.8000	0.7700	17.5648 (81)
Horizontal			2.6600	26.0000	0.4000	0.8000	1.0000	19.9181 (82)

Solar gains	321.2161	565.3946	819.2374	1086.9650	1279.7734	1297.0237	1239.5047	1092.1982	911.7187	637.4597	388.1338	272.6628 (83)
Total gains	1013.2433	1274.6365	1498.4082	1742.6040	1901.4096	1896.0548	1815.1502	1668.3695	1505.5707	1251.5121	1040.1705	949.5616 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	38.3096	38.4455	38.5822	39.2810	39.4238	40.1537	40.1537	40.3029	39.8585	39.4238	39.1392	38.8587
alpha	3.5540	3.5630	3.5721	3.6187	3.6283	3.6769	3.6769	3.6869	3.6572	3.6283	3.6093	3.5906
util living area	0.9858	0.9686	0.9344	0.8523	0.7173	0.5423	0.4049	0.4540	0.6847	0.9014	0.9730	0.9886 (86)
Living	19.4662	19.7215	20.0553	20.4542	20.7276	20.8673	20.9032	20.8969	20.7997	20.4150	19.8730	19.4351
Non living	18.0762	18.4009	18.8192	19.3117	19.6163	19.7652	19.7908	19.7914	19.7052	19.2820	18.6091	18.0471
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	9	0	0	0	0	0	0	0	0	0	0	0
16 / 9	22	26	0	0	0	0	0	0	0	0	0	31
MIT	20.3835	20.2363	20.0553	20.4542	20.7276	20.8673	20.9032	20.8969	20.7997	20.4150	19.8730	20.1137 (87)
Th 2	19.8569	19.8604	19.8640	19.8819	19.8854	19.9034	19.9034	19.9070	19.8962	19.8854	19.8783	19.8711 (88)
util rest of house	0.9824	0.9613	0.9192	0.8198	0.6603	0.4613	0.3083	0.3530	0.6050	0.8717	0.9655	0.9858 (89)
MIT 2	19.2991	19.1580	18.8192	19.3117	19.6163	19.7652	19.7908	19.7914	19.7052	19.2820	18.6091	19.0661 (90)
Living area fraction									fLA = Living area / (4) =			0.2427 (91)
MIT	19.5623	19.4197	19.1191	19.5889	19.8860	20.0326	20.0607	20.0597	19.9708	19.5570	18.9158	19.3203 (92)
Temperature adjustment												0.0000
adjusted MIT	19.5623	19.4197	19.1191	19.5889	19.8860	20.0326	20.0607	20.0597	19.9708	19.5570	18.9158	19.3203 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9814	0.9579	0.9070	0.8100	0.6603	0.4713	0.3225	0.3675	0.6108	0.8610	0.9569	0.9842 (94)
Useful gains	994.3516	1220.9755	1359.0744	1411.5573	1255.4991	893.5349	585.4258	613.1719	919.6557	1077.5736	995.3171	934.5270 (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	2736.1955	2593.8724	2246.3557	1868.9112	1426.1029	929.2216	591.9399	623.6530	1011.6152	1560.4117	2073.4253	2672.4387 (97)
Space heating kWh	1295.9319	922.5867	660.1373	329.2949	126.9292	0.0000	0.0000	0.0000	0.0000	359.2316	776.2379	1293.0063 (98a)
Space heating requirement - total per year (kWh/year)												5763.3557
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	1295.9319	922.5867	660.1373	329.2949	126.9292	0.0000	0.0000	0.0000	0.0000	359.2316	776.2379	1293.0063 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5763.3557
Space heating per m2										(98c) / (4) =		41.1345 (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 %)													347.4270 (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	1295.9319	922.5867	660.1373	329.2949	126.9292	0.0000	0.0000	0.0000	0.0000	359.2316	776.2379	1293.0063 (98)	
Space heating efficiency (main heating system 1)	347.4270	347.4270	347.4270	347.4270	347.4270	0.0000	0.0000	0.0000	0.0000	347.4270	347.4270	347.4270 (210)	
Space heating fuel (main heating system)	373.0084	265.5483	190.0075	94.7810	36.5341	0.0000	0.0000	0.0000	0.0000	103.3977	223.4247	372.1663 (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	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382 (64)	
Efficiency of water heater (217)m	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800 (216)	
Fuel for water heating, kWh/month	109.1208	96.4633	102.3255	89.5374	86.5170	77.6519	76.3852	79.5705	80.6177	90.2696	96.4524	107.8674 (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	46.2341	41.7598	46.2341	44.7426	46.2341	44.7426	46.2341	46.2341	44.7426	46.2341	44.7426	46.2341 (231)	
Lighting	28.6826	23.0102	20.7182	15.1790	11.7247	9.5792	10.6957	13.9026	18.0581	23.6933	26.7615	29.4797 (232)	
Electricity generated by PVs (Appendix M) (negative quantity)	-28.7129	-48.6976	-83.8793	-107.5248	-123.2632	-115.4189	-113.3114	-101.4826	-81.1234	-59.3400	-33.4667	-23.6202 (233a)	
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)	
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)	
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)	
Electricity generated by PVs (Appendix M) (negative quantity)	-6.1063	-16.6208	-44.6839	-86.8752	-133.8632	-143.7811	-139.7974	-108.7718	-67.9166	-29.0472	-9.3013	-4.5030 (233b)	
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)	
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)	
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)	

Full SAP Calculation Printout



Annual totals kWh/year	
Space heating fuel - main system 1	1658.8679 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	262.5800
Water heating fuel used	1092.7785 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 1.1625)	
mechanical ventilation fans (SFP = 1.1625)	544.3689 (230a)
Total electricity for the above, kWh/year	544.3689 (231)
Electricity for lighting (calculated in Appendix L)	231.4848 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-1711.1088 (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	1816.3913 (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	1658.8679	0.1562	259.1977 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1092.7785	0.1410	154.0683 (264)
Space and water heating			413.2660 (265)
Pumps, fans and electric keep-hot	544.3689	0.1387	75.5107 (267)
Energy for lighting	231.4848	0.1443	33.4104 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-919.8410	0.1322	-121.6169
PV Unit electricity exported	-791.2678	0.1199	-94.8910
Total			-216.5079 (269)
Total CO2, kg/year			305.6792 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			2.1800 (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	1658.8679	1.5784	2618.4113 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1092.7785	1.5213	1662.4719 (278)
Space and water heating			4280.8832 (279)
Pumps, fans and electric keep-hot	544.3689	1.5128	823.5212 (281)
Energy for lighting	231.4848	1.5338	355.0591 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-919.8410	1.4885	-1369.2072
PV Unit electricity exported	-791.2678	0.4399	-348.0633
Total			-1717.2704 (283)
Total Primary energy kWh/year			3742.1931 (286)
Dwelling Primary energy Rate (DPER)			26.7100 (287)

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

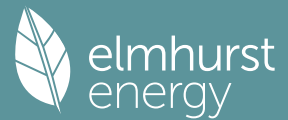
1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	97.6200 (1b)	x 2.6000 (2b)	= 253.8120 (1b) - (3b)
First floor	42.4900 (1c)	x 3.0600 (2c)	= 130.0194 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	140.1100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	383.8314 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1042 (8)
Pressure test	Yes
Pressure Test Method	Blower Door

Full SAP Calculation Printout



Measured/design AP50 5.0000 (17)
 Infiltration rate 0.3542 (18)
 Number of sides sheltered 0 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 1.0000 (20)
 Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3542 (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	0.4516	0.4428	0.4339	0.3896	0.3808	0.3365	0.3365	0.3276	0.3542	0.3808	0.3985	0.4162 (22b)
Effective ac	0.6020	0.5980	0.5941	0.5759	0.5725	0.5566	0.5566	0.5537	0.5627	0.5725	0.5794	0.5866 (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			3.1200	1.0000	3.1200		(26)
TER Opening Type			30.1500	1.1450	34.5229		(27)
TER Roof Window			1.7500	1.1450	2.7856		(27a)
FT1 - Ground			97.6200	0.1300	12.6906		(28a)
WT1 - Brick faced	223.3700	33.2700	190.1000	0.1800	34.2180		(29a)
RT1 - GF Flat	55.3300	1.0900	54.2400	0.1100	5.9664		(30)
RT2 - FF Flat	42.2900	0.6600	41.6300	0.1100	4.5793		(30)
Total net area of external elements Aum(A, m2)			418.6100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	97.8828	(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 176.4696 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	21.9100	0.0500	1.0955
E3 Sill	8.7000	0.0500	0.4350
E4 Jamb	46.0400	0.0500	2.3020
E5 Ground floor (normal)	55.2300	0.1600	8.8368
E15 Flat roof with parapet	55.7000	0.5600	31.1920
E16 Corner (normal)	43.4400	0.0900	3.9096
E17 Corner (inverted - internal area greater than external area)	5.2000	-0.0900	-0.4680
R1 Head of roof window	8.1200	0.0800	0.6496
R2 Sill of roof window	8.1200	0.0600	0.4872
R3 Jamb of roof window	5.4200	0.0800	0.4336

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 48.8733 (36)

Point Thermal Bridges

Total fabric heat loss (33) + (36) + (36a) = 146.7561 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
76.2495	75.7479	75.2562	72.9469	72.5149	70.5035	70.5035	70.1310	71.2782	72.5149	73.3889	74.3027	(38)
Heat transfer coeff	223.0056	222.5040	222.0123	219.7030	219.2709	217.2596	217.2596	216.8871	218.0343	219.2709	220.1450	221.0588 (39)
Average = Sum(39)m / 12 =												219.7009

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.5916	1.5881	1.5846	1.5681	1.5650	1.5506	1.5506	1.5480	1.5562	1.5650	1.5712	1.5778 (40)
HLP (average)												1.5681
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9173 (42)
Hot water usage for mixer showers												
73.1333	72.0342	70.4327	67.3684	65.1071	62.5853	61.1519	62.7413	64.4836	67.1913	70.3213	72.8531	(42a)
Hot water usage for baths												
31.5729	31.1040	30.4437	29.2262	28.3146	27.3037	26.7577	27.4134	28.1273	29.2090	30.4515	31.4662	(42b)
Hot water usage for other uses												
44.5060	42.8876	41.2692	39.6508	38.0324	36.4140	36.4140	38.0324	39.6508	41.2692	42.8876	44.5060	(42c)
Average daily hot water use (litres/day)												137.1595 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	149.2122	146.0258	142.1456	136.2455	131.4541	126.3030	124.3235	128.1871	132.2617	137.6694	143.6604	148.8252 (44)
Energy conte	236.3156	207.9388	218.4725	186.5132	176.9624	155.3042	150.3586	158.7223	163.0919	186.8161	204.6706	233.0244 (45)
Energy content (annual)										Total = Sum(45)m =		2278.1907

Distribution loss (46)m = 0.15 x (45)m 35.4473 31.1908 32.7709 27.9770 26.5444 23.2956 22.5538 23.8084 24.4638 28.0224 30.7006 34.9537 (46)

Water storage loss (or HIU loss):

Store volume 250.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.8903 (48)

Temperature factor from Table 2b 0.5400 (49)

Enter (49) or (54) in (55) 1.0208 (55)

Total storage loss 31.6444 28.5820 31.6444 30.6236 31.6444 30.6236 31.6444 31.6444 30.6236 31.6444 30.6236 31.6444 (56)

If cylinder contains dedicated solar storage 31.6444 28.5820 31.6444 30.6236 31.6444 30.6236 31.6444 31.6444 30.6236 31.6444 30.6236 31.6444 (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 291.2224 257.5321 273.3793 239.6488 231.8692 208.4398 205.2653 213.6291 216.2275 241.7229 257.8062 287.9312 (62)

WWHRS -33.4335 -29.5688 -30.9628 -25.6384 -23.8941 -20.4463 -19.1652 -20.3802 -21.1546 -24.9389 -28.2527 -32.8143 (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 257.7889 227.9632 242.4165 214.0104 207.9752 187.9935 186.1002 193.2489 195.0729 216.7840 229.5535 255.1168 (64)

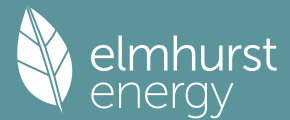
12Total per year (kWh/year) Total per year (kWh/year) = Sum(64)m = 2614.0240 (64)

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 122.5004 108.8142 116.5675 104.5241 102.7654 94.1471 93.9197 96.7006 96.7365 106.0418 110.5615 121.4060 (65)

Full SAP Calculation Printout



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	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	156.1259	172.8537	156.1259	161.3301	156.1259	161.3301	156.1259	156.1259	161.3301	156.1259	161.3301	156.1259	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	309.5371	312.7491	304.6549	287.4233	265.6715	245.2279	231.5703	228.3583	236.4525	253.6841	275.4359	295.8795	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	(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)	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	(71)
Water heating gains (Table 5)	164.6510	161.9260	156.6768	145.1724	138.1256	130.7599	126.2361	129.9739	134.3563	142.5293	153.5576	163.1802	(72)
Total internal gains	700.0734	717.2882	687.2170	663.6852	629.6824	604.0773	580.6917	581.2175	598.8983	622.0987	660.0830	684.9450	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d		Gains W	
Northeast					3.9300	11.2829	0.6300	0.7000	0.7700		13.5515 (75)	
Southeast					9.0200	36.7938	0.6300	0.7000	0.7700		101.4270 (77)	
Southwest					12.5900	36.7938	0.6300	0.7000	0.7700		141.5704 (79)	
Northwest					4.6100	11.2829	0.6300	0.7000	0.7700		15.8963 (81)	
Horizontal					1.7500	26.0000	0.6300	0.7000	1.0000		18.0590 (82)	
Solar gains	290.5041	511.3633	741.0110	983.2641	1157.7476	1173.3805	1121.3337	988.0255	824.6928	576.5592	351.0287	246.5897 (83)
Total gains	990.5775	1228.6514	1428.2280	1646.9494	1787.4301	1777.4579	1702.0254	1569.2431	1423.5911	1198.6578	1011.1117	931.5347 (84)

7. Mean internal temperature (heating season)

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

21.0000 (85)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	30.7979	30.8673	30.9357	31.2608	31.3224	31.6124	31.6124	31.6667	31.5001	31.3224	31.1981	31.0691	
alpha	3.0532	3.0578	3.0624	3.0841	3.0882	3.1075	3.1075	3.1111	3.1000	3.0882	3.0799	3.0713	
util living area	0.9871	0.9748	0.9521	0.8988	0.8027	0.6573	0.5164	0.5688	0.7766	0.9298	0.9776	0.9892	(86)
MIT	18.5219	18.8466	19.3197	19.9315	20.4514	20.7977	20.9299	20.9042	20.6373	19.9420	19.1226	18.4730	(87)
Th 2	19.6195	19.6221	19.6247	19.6368	19.6391	19.6497	19.6497	19.6517	19.6456	19.6391	19.6345	19.6297	(88)
util rest of house	0.9837	0.9682	0.9392	0.8705	0.7453	0.5561	0.3763	0.4281	0.6913	0.9041	0.9707	0.9864	(89)
MIT 2	16.7921	17.2049	17.8013	18.5601	19.1633	19.5227	19.6240	19.6126	19.3831	18.5930	17.5670	16.7358	(90)
Living area fraction	17.2119	17.6033	18.1698	18.8929	19.4759	19.8321	19.9409	19.9260	19.6875	18.9204	17.9445	17.1573	(91)
MIT	17.2119	17.6033	18.1698	18.8929	19.4759	19.8321	19.9409	19.9260	19.6875	18.9204	17.9445	17.1573	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.2119	17.6033	18.1698	18.8929	19.4759	19.8321	19.9409	19.9260	19.6875	18.9204	17.9445	17.1573	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9744	0.9542	0.9205	0.8510	0.7373	0.5712	0.4086	0.4592	0.6944	0.8857	0.9578	0.9784	(94)
Useful gains	965.2459	1172.3713	1314.6733	1401.5318	1317.8395	1015.2047	695.4662	720.5499	988.5446	1061.7085	968.4862	911.3683	(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	2879.4248	2826.5340	2590.8296	2195.4620	1705.0234	1136.7277	725.8445	764.7444	1218.2590	1824.4165	2387.3545	2864.3320	(97)
Space heating kWh	1424.1491	1111.5973	949.4603	571.6297	288.0648	0.0000	0.0000	0.0000	0.0000	567.4547	1021.5851	1453.0050	(98a)
Space heating requirement - total per year (kWh/year)												7386.9461	
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	1424.1491	1111.5973	949.4603	571.6297	288.0648	0.0000	0.0000	0.0000	0.0000	567.4547	1021.5851	1453.0050	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												7386.9461	
Space heating per m2										(98c) / (4) =		52.7225	(99)

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

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

0.0000 (201)

Efficiency of main space heating system 1 (in %)

1.0000 (202)

Efficiency of main space heating system 2 (in %)

92.3000 (206)

Efficiency of secondary/supplementary heating system, %

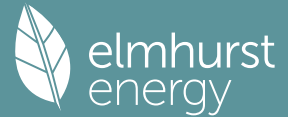
0.0000 (207)

Efficiency of secondary/supplementary heating system, %

0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1424.1491	1111.5973	949.4603	571.6297	288.0648	0.0000	0.0000	0.0000	0.0000	567.4547	1021.5851	1453.0050	(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)	1542.9568	1204.3308	1028.6677	619.3172	312.0962	0.0000	0.0000	0.0000	0.0000	614.7938	1106.8095	1574.2199	(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)

Full SAP Calculation Printout



Water heating												
Water heating requirement												
	257.7889	227.9632	242.4165	214.0104	207.9752	187.9935	186.1002	193.2489	195.0729	216.7840	229.5535	255.1168 (64)
Efficiency of water heater												
(217)m	87.2911	87.1278	86.8087	86.1532	84.7906	79.8000	79.8000	79.8000	79.8000	86.1153	86.9997	79.8000 (216)
Fuel for water heating, kWh/month												
	295.3210	261.6425	279.2536	248.4068	245.2810	235.5808	233.2082	242.1665	244.4523	251.7370	263.8554	87.3290 (217)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (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												
	32.4399	26.0245	23.4322	17.1674	13.2606	10.8340	12.0968	15.7238	20.4237	26.7970	30.2671	33.3415 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-78.0162	-103.8470	-141.0000	-149.4120	-153.7334	-140.7991	-138.8603	-134.4501	-125.9556	-114.0088	-83.4636	-68.1760 (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	-64.9187	-133.4716	-259.8658	-382.8152	-499.2804	-499.3276	-493.6087	-421.1815	-313.0010	-188.4840	-85.8443	-51.5920 (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											8003.1919	(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											3093.0382	(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)											261.8084	(232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation											-4825.1132	(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											6618.9254	(238)

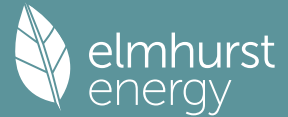
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1			
	8003.1919	0.2100	1680.6703 (261)
Total CO2 associated with community systems			
			0.0000 (373)
Water heating (other fuel)			
	3093.0382	0.2100	649.5380 (264)
Space and water heating			
			2330.2083 (265)
Pumps, fans and electric keep-hot			
	86.0000	0.1387	11.9293 (267)
Energy for lighting			
	261.8084	0.1443	37.7870 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling			
	-1431.7223	0.1359	-194.5192
PV Unit electricity exported			
	-3393.3909	0.1265	-429.1609
Total			
			-623.6801 (269)
Total CO2, kg/year			
			1756.2445 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			
			12.5300 (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			
	8003.1919	1.1300	9043.6069 (275)
Total CO2 associated with community systems			
			0.0000 (473)
Water heating (other fuel)			
	3093.0382	1.1300	3495.1332 (278)
Space and water heating			
			12538.7401 (279)
Pumps, fans and electric keep-hot			
	86.0000	1.5128	130.1008 (281)
Energy for lighting			
	261.8084	1.5338	401.5705 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling			
	-1431.7223	1.5022	-2150.7324
PV Unit electricity exported			
	-3393.3909	0.4643	-1575.4004
Total			
			-3726.1328 (283)
Total Primary energy kWh/year			
			9344.2786 (286)
Target Primary Energy Rate (TPER)			
			66.6900 (287)

Full SAP Calculation Printout



Plot Reference	3 Be Green			Issued on Date	21/04/2026
Assessment Reference	001	Plot Type Ref	Lat_2 Coleridge Road N8 8EJ		
Plot Address				SAP Version	10.2
SAP Rating	89 B	DER	2.18	TER	12.53
Environmental	98 A	% DER < TER			82.60
CO ₂ Emissions (t/year)	0.22	DFEE	52.98	TFEE	59.79
Compliance Check	See BREL	% DFEE < TFEE			11.40
% DPER < TPER	59.95	DPER	26.71	TPER	66.69
Assessor Details	Mr. Derek White			Assessor ID	B381-0001
Client					

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	97.6200 (1b)	x 2.6000 (2b)	= 253.8120 (1b) - (3b)
First floor	42.4900 (1c)	x 3.0600 (2c)	= 130.0194 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	140.1100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 383.8314 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	Air changes per hour 40.0000 / (5) = 0.1042 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	4.0000 (17)
Infiltration rate	0.3042 (18)
Number of sides sheltered	0 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 1.0000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3042 (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	0.3879	0.3803	0.3727	0.3346	0.3270	0.2890	0.2890	0.2814	0.3042	0.3270	0.3422	0.3574 (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	0.5752	0.5723	0.5694	0.5560	0.5535	0.5418	0.5418	0.5396	0.5463	0.5535	0.5586	0.5639 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
NE-GD1			3.1200	1.0000	3.1200		(26)
NE-GW1			45.9400	1.1450	52.6031		(27)
H-RL1			2.6600	1.5918	4.2341		(27a)
FT1 - Ground			97.6200	0.1000	9.7620	110.0000	10738.2003 (28a)
WT1 - Brick faced	223.3700	49.0600	174.3100	0.1500	26.1465	60.0000	10458.5997 (29a)
RT1 - GF Flat	55.3300	1.6600	53.6700	0.1000	5.3670	9.0000	483.0300 (30)
RT2 - FF Flat	42.2900	1.0000	41.2900	0.1000	4.1290	9.0000	371.6100 (30)
Total net area of external elements Aum(A, m ²)			418.6100				(31)
Fabric heat loss, W/K = Sum (A x k)					(26)...(30) + (32) =	105.3616	(33)
Main dwelling							
IW1			170.2100			9.0000	1531.8901 (32c)
IF1			42.2900			18.0000	761.2200 (32d)
IC1			42.2900			9.0000	380.6100 (32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 24725.1601 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K 176.4696 (35)
List of Thermal Bridges

elmhurst
energy

SAP 10 Online 3.1.62 Page 2 of 6

Full SAP Calculation Printout



Total gains 907.7327 1170.4885 1397.4060 1649.1876 1812.4556 1811.8137 1734.1307 1585.2021 1419.8089 1160.4926 941.9105 845.0831 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	33.4171	33.4774	33.5367	33.8180	33.8711	34.1208	34.1208	34.1674	34.0242	33.8711	33.7638	33.6523
alpha	3.2278	3.2318	3.2358	3.2545	3.2581	3.2747	3.2747	3.2778	3.2683	3.2581	3.2509	3.2435
util living area	0.9899	0.9771	0.9518	0.8900	0.7801	0.6234	0.4814	0.5372	0.7583	0.9303	0.9811	0.9920 (86)
MIT	18.6509	18.9968	19.4783	20.0790	20.5606	20.8518	20.9525	20.9317	20.7052	20.0416	19.2294	18.5928 (87)
Th 2	19.7124	19.7144	19.7164	19.7256	19.7273	19.7354	19.7354	19.7368	19.7323	19.7273	19.7238	19.7202 (88)
util rest of house	0.9873	0.9713	0.9394	0.8611	0.7225	0.5276	0.3554	0.4082	0.6748	0.9055	0.9754	0.9899 (89)
MIT 2	17.6064	17.9496	18.4225	19.0011	19.4310	19.6628	19.7215	19.7147	19.5655	18.9825	18.1897	17.5541 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	17.8599	18.2038	18.6787	19.2626	19.7051	19.9513	20.0202	20.0101	19.8420	19.2395	18.4420	17.8061 (92)
Temperature adjustment	0.0000											
adjusted MIT	17.8599	18.2038	18.6787	19.2626	19.7051	19.9513	20.0202	20.0101	19.8420	19.2395	18.4420	17.8061 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9818	0.9619	0.9262	0.8484	0.7214	0.5453	0.3851	0.4379	0.6830	0.8933	0.9671	0.9852 (94)
Useful gains	891.2082	1125.9186	1294.2649	1399.2202	1307.4316	987.9331	667.8993	694.1747	969.7927	1036.6548	910.9314	832.5998 (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	2786.9124	2729.3492	2494.1123	2104.5500	1623.2060	1077.1583	688.4482	725.6685	1159.0814	1751.8392	2307.1418	2776.8829 (97)
Space heating kWh	1410.4039	1077.5053	892.6865	507.8374	234.9361	0.0000	0.0000	0.0000	0.0000	532.0972	1005.2715	1446.5467 (98a)
Space heating requirement - total per year (kWh/year)	7107.2847											
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	1410.4039	1077.5053	892.6865	507.8374	234.9361	0.0000	0.0000	0.0000	0.0000	532.0972	1005.2715	1446.5467 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	7107.2847											
Space heating per m2	(98c) / (4) = 50.7265 (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	1892.1068	1489.5309	1527.7005	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7914	0.8554	0.8195	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1497.3645	1274.1161	1252.0005	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	2025.0457	1938.6520	1771.8361	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	379.9305	494.4147	386.7576	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
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 (105)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	94.9826	123.6037	96.6894	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	315.2757 (107)											
Energy for space heating	50.7265 (99)											
Energy for space cooling	2.2502 (108)											
Total	52.9767 (109)											
Fabric Energy Efficiency (DFEE)	53.0 (109)											

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

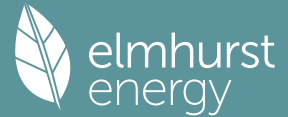
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	97.6200 (1b)	x 2.6000 (2b)	= 253.8120 (1b) - (3b)	
First floor	42.4900 (1c)	x 3.0600 (2c)	= 130.0194 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	140.1100		(4)	
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 383.8314 (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)

Full SAP Calculation Printout



Number of intermittent extract fans	4 * 10 =	40.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.1042 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3542	(18)
Number of sides sheltered	0	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	1.0000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3542 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000	(22)
Wind factor	Jan 1.2750 Feb 1.2500 Mar 1.2250 Apr 1.1000 May 1.0750 Jun 0.9500 Jul 0.9500 Aug 0.9250 Sep 1.0000 Oct 1.0750 Nov 1.1250 Dec 1.1750	(22a)
Adj infilt rate	Jan 0.4516 Feb 0.4428 Mar 0.4339 Apr 0.3896 May 0.3808 Jun 0.3365 Jul 0.3365 Aug 0.3276 Sep 0.3542 Oct 0.3808 Nov 0.3985 Dec 0.4162	(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	Jan 0.6020 Feb 0.5980 Mar 0.5941 Apr 0.5759 May 0.5725 Jun 0.5566 Jul 0.5566 Aug 0.5537 Sep 0.5627 Oct 0.5725 Nov 0.5794 Dec 0.5866	(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			3.1200	1.0000	3.1200		(26)
TER Opening Type			30.1500	1.1450	34.5229		(27)
TER Roof Window			1.7500	1.1450	2.7856		(27a)
FT1 - Ground			97.6200	0.1300	12.6906		(28a)
WT1 - Brick faced	223.3700	33.2700	190.1000	0.1800	34.2180		(29a)
RT1 - GF Flat	55.3300	1.0900	54.2400	0.1100	5.9664		(30)
RT2 - FF Flat	42.2900	0.6600	41.6300	0.1100	4.5793		(30)
Total net area of external elements Aum(A, m2)			418.6100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)... (30) + (32) =		97.8828		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							176.4696 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				21.9100	0.0500	1.0955	
E3 Sill				8.7000	0.0500	0.4350	
E4 Jamb				46.0400	0.0500	2.3020	
E5 Ground floor (normal)				55.2300	0.1600	8.8368	
E15 Flat roof with parapet				55.7000	0.5600	31.1920	
E16 Corner (normal)				43.4400	0.0900	3.9096	
E17 Corner (inverted - internal area greater than external area)				5.2000	-0.0900	-0.4680	
R1 Head of roof window				8.1200	0.0800	0.6496	
R2 Sill of roof window				8.1200	0.0600	0.4872	
R3 Jamb of roof window				5.4200	0.0800	0.4336	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							48.8733 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	146.7561 (37)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9173 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	31.5729	31.1040	30.4437	29.2262	28.3146	27.3037	26.7577	27.4134	28.1273	29.2090	30.4515	31.4662 (42b)
Hot water usage for other uses	44.5060	42.8876	41.2692	39.6508	38.0324	36.4140	36.4140	38.0324	39.6508	41.2692	42.8876	44.5060 (42c)
Average daily hot water use (litres/day)												69.7331 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	76.0789	73.9916	71.7129	68.8770	66.3470	63.7177	63.1717	65.4458	67.7781	70.4782	73.3391	75.9722 (44)
Energy content (annual)	120.4904	105.3631	110.2201	94.2892	89.3158	78.3483	76.4007	81.0355	83.5772	95.6382	104.4850	118.9541 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1158.1175
Water storage loss (or HIU loss):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	102.4169	89.5586	93.6871	80.1458	75.9184	66.5961	64.9406	68.8802	71.0406	81.2925	88.8123	101.1110 (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	102.4169	89.5586	93.6871	80.1458	75.9184	66.5961	64.9406	68.8802	71.0406	81.2925	88.8123	101.1110 (64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				984.3999 (64)
Electric shower(s)												984 (64)

Full SAP Calculation Printout



	58.5676	52.1842	56.9831	54.3783	55.3987	52.8450	54.6065	55.3987	54.3783	56.9831	55.9116	58.5676 (64a)
	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =											666.2025 (64a)
Heat gains from water heating, kWh/month	40.2461	35.4357	37.6675	33.6310	32.8293	29.8603	29.8868	31.0697	31.3547	34.5689	36.1810	39.9196 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	156.1259	172.8537	156.1259	161.3301	156.1259	161.3301	156.1259	156.1259	161.3301	156.1259	161.3301	156.1259 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	309.5371	312.7491	304.6549	287.4233	265.6715	245.2279	231.5703	228.3583	236.4525	253.6841	275.4359	295.8795 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865 (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)	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918 (71)
Water heating gains (Table 5)	54.0942	52.7317	50.6284	46.7098	44.1254	41.4726	40.1704	41.7604	43.5482	46.4636	50.2514	53.6554 (72)
Total internal gains	586.5166	605.0939	578.1686	562.2226	532.6822	514.7900	494.6260	493.0039	508.0902	523.0329	553.7767	572.4202 (73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d	Gains W	
Northeast					3.9300	11.2829		0.6300	0.7000		0.7700	13.5515 (75)	
Southeast					9.0200	36.7938		0.6300	0.7000		0.7700	101.4270 (77)	
Southwest					12.5900	36.7938		0.6300	0.7000		0.7700	141.5704 (79)	
Northwest					4.6100	11.2829		0.6300	0.7000		0.7700	15.8963 (81)	
Horizontal					1.7500	26.0000		0.6300	0.7000		1.0000	18.0590 (82)	
Solar gains	290.5041	511.3633	741.0110	983.2641	1157.7476	1173.3805	1121.3337	988.0255	824.6928	576.5592	351.0287	246.5897	(83)
Total gains	877.0207	1116.4571	1319.1796	1545.4867	1690.4298	1688.1705	1615.9597	1481.0295	1332.7830	1099.5921	904.8055	819.0099	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	30.7979	30.8673	30.9357	31.2608	31.3224	31.6124	31.6124	31.6667	31.5001	31.3224	31.1981	31.0691
alpha	3.0532	3.0578	3.0624	3.0841	3.0882	3.1075	3.1075	3.1111	3.1000	3.0882	3.0799	3.0713
util living area	0.9907	0.9803	0.9605	0.9118	0.8211	0.6789	0.5381	0.5935	0.7998	0.9427	0.9834	0.9925 (86)
MIT	18.4236	18.7535	19.2359	19.8670	20.4090	20.7776	20.9214	20.8919	20.6013	19.8712	19.0331	18.3746 (87)
Th 2	19.6195	19.6221	19.6247	19.6368	19.6391	19.6497	19.6497	19.6517	19.6456	19.6391	19.6345	19.6297 (88)
util rest of house	0.9883	0.9752	0.9497	0.8862	0.7664	0.5780	0.3945	0.4502	0.7181	0.9207	0.9781	0.9905 (89)
MIT 2	17.3189	17.6472	18.1236	18.7396	19.2350	19.5393	19.6269	19.6166	19.4165	18.7592	17.9357	17.2770 (90)
Living area fraction	17.5870	17.9157	18.3935	19.0132	19.5199	19.8398	19.9410	19.9261	19.7040	19.0290	18.2020	17.5433 (91)
MIT	17.5870	17.9157	18.3935	19.0132	19.5199	19.8398	19.9410	19.9261	19.7040	19.0290	18.2020	17.5433 (92)
Temperature adjustment												0.0000
adjusted MIT	17.5870	17.9157	18.3935	19.0132	19.5199	19.8398	19.9410	19.9261	19.7040	19.0290	18.2020	17.5433 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9828	0.9660	0.9365	0.8714	0.7607	0.5938	0.4278	0.4822	0.7223	0.9074	0.9700	0.9858 (94)
Useful gains	861.9058	1078.4639	1235.3513	1346.7995	1285.9802	1002.4912	691.3238	714.0943	962.6921	997.8158	877.6275	807.3879 (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	2963.0767	2896.0422	2640.5080	2221.8965	1714.6681	1138.3958	725.8623	764.7594	1221.8655	1848.2376	2444.0586	2949.6606 (97)
Space heating kWh	1563.2711	1221.4126	1045.4366	630.0698	318.9438	0.0000	0.0000	0.0000	0.0000	632.7138	1127.8303	1593.8509 (98a)
Space heating requirement - total per year (kWh/year)												8133.5289
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	1563.2711	1221.4126	1045.4366	630.0698	318.9438	0.0000	0.0000	0.0000	0.0000	632.7138	1127.8303	1593.8509 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												8133.5289
Space heating per m2												58.0510 (99)

8c. Space cooling requirement

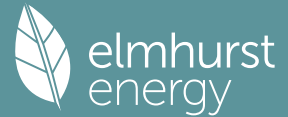
Calculated for June, July and August. See Table 10b												
Ext. temp.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	2042.2401	1607.7209	1648.3421	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.7250	0.7980	0.7576	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1480.6262	1282.9398	1248.7648	0.0000	0.0000	0.0000	0.0000 (102)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	1882.9423	1802.8117	1651.9712	0.0000	0.0000	0.0000	0.0000 (103)
Cooled fraction	0.0000	0.0000	0.0000	0.0000	0.0000	289.6675	386.7847	299.9855	0.0000	0.0000	0.0000	0.0000 (104)
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 (105)
Space cooling kWh												

Full SAP Calculation Printout



0.0000	0.0000	0.0000	0.0000	0.0000	72.4169	96.6962	74.9964	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												244.1094 (107)
Energy for space heating												58.0510 (99)
Energy for space cooling												1.7423 (108)
Total												59.7933 (109)
Fabric Energy Efficiency (TFEE)												59.8 (109)

Full SAP Calculation Printout



Plot Reference	3 Be Green			Issued on Date	21/04/2026
Assessment Reference	001	Plot Type Ref	Lat_2 Coleridge Road N8 8EJ		
Plot Address				SAP Version	10.2
SAP Rating	89 B	DER	2.18	TER	12.53
Environmental	98 A	% DER < TER			82.60
CO ₂ Emissions (t/year)	0.22	DFEE	52.98	TFEE	59.79
Compliance Check	See BREL	% DFEE < TFEE			11.40
% DPER < TPER	59.95	DPER	26.71	TPER	66.69
Assessor Details	Mr. Derek White			Assessor ID	B381-0001
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 (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	97.6200 (1b)	x 2.6000 (2b)	= 253.8120 (1b) - (3b)
First floor	42.4900 (1c)	x 3.0600 (2c)	= 130.0194 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	140.1100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 383.8314 (5)

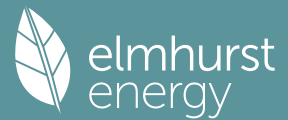
2. Ventilation rate

	m ³ per hour											
Number of open chimneys	0 * 80 = 0.0000 (6a)											
Number of open flues	0 * 20 = 0.0000 (6b)											
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)											
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)											
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)											
Number of blocked chimneys	0 * 20 = 0.0000 (6f)											
Number of intermittent extract fans	0 * 10 = 0.0000 (7a)											
Number of passive vents	0 * 10 = 0.0000 (7b)											
Number of flueless gas fires	0 * 40 = 0.0000 (7c)											
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 0.0000 / (5) = 0.0000 (8)											
Pressure test	Yes											
Pressure Test Method	Blower Door											
Measured/design AP50	4.0000 (17)											
Infiltration rate	0.2000 (18)											
Number of sides sheltered	0 (19)											
Shelter factor	(20) = 1 - [0.075 x (19)] = 1.0000 (20)											
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2000 (21)											
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Balanced mechanical ventilation with heat recovery	0.2550	0.2500	0.2450	0.2200	0.2150	0.1900	0.1900	0.1850	0.2000	0.2150	0.2250	0.2350 (22b)
If mechanical ventilation	0.5000 (23a)											
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)	0.5000 (23b)											
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =	77.4000 (23c)											
Effective ac	0.3680	0.3630	0.3580	0.3330	0.3280	0.3030	0.3030	0.2980	0.3130	0.3280	0.3380	0.3480 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
NE-GD1			3.1200	1.0000	3.1200		(26)
NE-GW1			45.9400	1.1450	52.6031		(27)
H-RL1			2.6600	1.5918	4.2341		(27a)
FT1 - Ground			97.6200	0.1000	9.7620	110.0000	10738.2003 (28a)
WT1 - Brick faced	223.3700	49.0600	174.3100	0.1500	26.1465	60.0000	10458.5997 (29a)
RT1 - GF Flat	55.3300	1.6600	53.6700	0.1000	5.3670	9.0000	483.0300 (30)
RT2 - FF Flat	42.2900	1.0000	41.2900	0.1000	4.1290	9.0000	371.6100 (30)
Total net area of external elements Aum (A, m ²)			418.6100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		105.3616		(33)
Main dwelling							
IW1			170.2100			9.0000	1531.8901 (32c)
IF1			42.2900			18.0000	761.2200 (32d)
IC1			42.2900			9.0000	380.6100 (32e)

Full SAP Calculation Printout



Heat capacity $C_m = \text{Sum}(A \times k)$
Thermal mass parameter (TMP = C_m / TFA) in $\text{kJ/m}^2\text{K}$
List of Thermal Bridges

(28)...(30) + (32) + (32a)...(32e) = 24725.1601 (34)
176.4696 (35)

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	21.9100	0.0250	0.5478
E3 Sill	8.7000	0.0220	0.1914
E4 Jamb	46.0400	0.0180	0.8287
E5 Ground floor (normal)	55.2300	0.0480	2.6510
E15 Flat roof with parapet	55.7000	0.3000	16.7100
E16 Corner (normal)	43.4400	0.0350	1.5204
E17 Corner (inverted - internal area greater than external area)	5.2000	-0.0660	-0.3432
R1 Head of roof window	8.1200	0.2400	1.9488
R2 Sill of roof window	8.1200	0.2400	1.9488
R3 Jamb of roof window	5.4200	0.2400	1.3008

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

Point Thermal bridges
Total fabric heat loss

27.3045 (36)
(36a) = 0.0000
(33) + (36) + (36a) = 132.6661 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$

(38)m	Jan 46.6125	Feb 45.9792	Mar 45.3458	Apr 42.1792	May 41.5459	Jun 38.3793	Jul 38.3793	Aug 37.7460	Sep 39.6459	Oct 41.5459	Nov 42.8126	Dec 44.0792	(38)
Heat transfer coeff	179.2786	178.6453	178.0120	174.8454	174.2121	171.0454	171.0454	170.4121	172.3121	174.2121	175.4787	176.7453	(39)
Average = Sum(39)m / 12 =												174.6871	

HLP	Jan 1.2796	Feb 1.2750	Mar 1.2705	Apr 1.2479	May 1.2434	Jun 1.2208	Jul 1.2208	Aug 1.2163	Sep 1.2298	Oct 1.2434	Nov 1.2524	Dec 1.2615	(40)
HLP (average)												1.2468	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9173 (42)
Hot water usage for mixer showers													
73.1333	72.0342	70.4327	67.3684	65.1071	62.5853	61.1519	62.7413	64.4836	67.1913	70.3213	72.8531	72.8531	(42a)
Hot water usage for baths													
31.5729	31.1040	30.4437	29.2262	28.3146	27.3037	26.7577	27.4134	28.1273	29.2090	30.4515	31.4662	31.4662	(42b)
Hot water usage for other uses													
44.5060	42.8876	41.2692	39.6508	38.0324	36.4140	36.4140	38.0324	39.6508	41.2692	42.8876	44.5060	44.5060	(42c)
Average daily hot water use (litres/day)												137.1595	(43)
Daily hot water use	Jan 149.2122	Feb 146.0258	Mar 142.1456	Apr 136.2455	May 131.4541	Jun 126.3030	Jul 124.3235	Aug 128.1871	Sep 132.2617	Oct 137.6694	Nov 143.6604	Dec 148.8252	(44)
Energy conte	236.3156	207.9388	218.4725	186.5132	176.9624	155.3042	150.3586	158.7223	163.0919	186.8161	204.6706	233.0244	(45)
Energy content (annual)										Total = Sum(45)m =		2278.1907	
Distribution loss (46)m = $0.15 \times (45)\text{m}$	35.4473	31.1908	32.7709	27.9770	26.5444	23.2956	22.5538	23.8084	24.4638	28.0224	30.7006	34.9537	(46)
Water storage loss (or HIU loss):													
Store volume												250.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6100	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8694	(55)
Total storage loss	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	(56)
If cylinder contains dedicated solar storage	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	(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	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382	(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	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2869.4177	(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)
												0.0000	(64a)
Heat gains from water heating, kWh/month	118.7460	105.4232	112.8131	100.8908	99.0111	90.5139	90.1653	92.9462	93.1032	102.2874	106.9282	117.6516	(65)

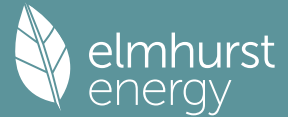
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
(66)m	Jan 145.8647	Feb 145.8647	Mar 145.8647	Apr 145.8647	May 145.8647	Jun 145.8647	Jul 145.8647	Aug 145.8647	Sep 145.8647	Oct 145.8647	Nov 145.8647	Dec 145.8647	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	156.1259	172.8537	156.1259	161.3301	156.1259	161.3301	156.1259	156.1259	161.3301	156.1259	161.3301	156.1259	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	309.5371	312.7491	304.6549	287.4233	265.6715	245.2279	231.5703	228.3583	236.4525	253.6841	275.4359	295.8795	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	(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)	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	(71)
Water heating gains (Table 5)	159.6048	156.8797	151.6306	140.1262	133.0794	125.7137	121.1899	124.9277	129.3101	137.4831	148.5114	158.1339	(72)
Total internal gains	692.0272	709.2419	679.1708	655.6390	621.6362	599.0311	575.6455	576.1713	593.8520	614.0524	652.0367	676.8987	(73)

6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Northeast	5.9800	11.2829	0.4000	0.8000	0.7700	14.9626 (75)

Full SAP Calculation Printout



Southeast			13.7500	36.7938	0.4000	0.8000	0.7700	112.1918 (77)
Southwest			19.1900	36.7938	0.4000	0.8000	0.7700	156.5789 (79)
Northwest			7.0200	11.2829	0.4000	0.8000	0.7700	17.5648 (81)
Horizontal			2.6600	26.0000	0.4000	0.8000	1.0000	19.9181 (82)

Solar gains	321.2161	565.3946	819.2374	1086.9650	1279.7734	1297.0237	1239.5047	1092.1982	911.7187	637.4597	388.1338	272.6628 (83)
Total gains	1013.2433	1274.6365	1498.4082	1742.6040	1901.4096	1896.0548	1815.1502	1668.3695	1505.5707	1251.5121	1040.1705	949.5616 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	38.3096	38.4455	38.5822	39.2810	39.4238	40.1537	40.1537	40.3029	39.8585	39.4238	39.1392	38.8587
alpha	3.5540	3.5630	3.5721	3.6187	3.6283	3.6769	3.6769	3.6869	3.6572	3.6283	3.6093	3.5906
util living area	0.9858	0.9686	0.9344	0.8523	0.7173	0.5423	0.4049	0.4540	0.6847	0.9014	0.9730	0.9886 (86)
Living	19.4662	19.7215	20.0553	20.4542	20.7276	20.8673	20.9032	20.8969	20.7997	20.4150	19.8730	19.4351
Non living	18.0762	18.4009	18.8192	19.3117	19.6163	19.7652	19.7908	19.7914	19.7052	19.2820	18.6091	18.0471
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	9	0	0	0	0	0	0	0	0	0	0	0
16 / 9	22	26	0	0	0	0	0	0	0	0	0	31
MIT	20.3835	20.2363	20.0553	20.4542	20.7276	20.8673	20.9032	20.8969	20.7997	20.4150	19.8730	20.1137 (87)
Th 2	19.8569	19.8604	19.8640	19.8819	19.8854	19.9034	19.9034	19.9070	19.8962	19.8854	19.8783	19.8711 (88)
util rest of house	0.9824	0.9613	0.9192	0.8198	0.6603	0.4613	0.3083	0.3530	0.6050	0.8717	0.9655	0.9858 (89)
MIT 2	19.2991	19.1580	18.8192	19.3117	19.6163	19.7652	19.7908	19.7914	19.7052	19.2820	18.6091	19.0661 (90)
Living area fraction									fLA = Living area / (4) =			0.2427 (91)
MIT	19.5623	19.4197	19.1191	19.5889	19.8860	20.0326	20.0607	20.0597	19.9708	19.5570	18.9158	19.3203 (92)
Temperature adjustment												0.0000
adjusted MIT	19.5623	19.4197	19.1191	19.5889	19.8860	20.0326	20.0607	20.0597	19.9708	19.5570	18.9158	19.3203 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9814	0.9579	0.9070	0.8100	0.6603	0.4713	0.3225	0.3675	0.6108	0.8610	0.9569	0.9842 (94)
Useful gains	994.3516	1220.9755	1359.0744	1411.5573	1255.4991	893.5349	585.4258	613.1719	919.6557	1077.5736	995.3171	934.5270 (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	2736.1955	2593.8724	2246.3557	1868.9112	1426.1029	929.2216	591.9399	623.6530	1011.6152	1560.4117	2073.4253	2672.4387 (97)
Space heating kWh	1295.9319	922.5867	660.1373	329.2949	126.9292	0.0000	0.0000	0.0000	0.0000	359.2316	776.2379	1293.0063 (98a)
Space heating requirement - total per year (kWh/year)												5763.3557
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	1295.9319	922.5867	660.1373	329.2949	126.9292	0.0000	0.0000	0.0000	0.0000	359.2316	776.2379	1293.0063 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5763.3557
Space heating per m2										(98c) / (4) =		41.1345 (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 %)													347.4270 (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	1295.9319	922.5867	660.1373	329.2949	126.9292	0.0000	0.0000	0.0000	0.0000	359.2316	776.2379	1293.0063 (98)	
Space heating efficiency (main heating system 1)	347.4270	347.4270	347.4270	347.4270	347.4270	0.0000	0.0000	0.0000	0.0000	347.4270	347.4270	347.4270 (210)	
Space heating fuel (main heating system)	373.0084	265.5483	190.0075	94.7810	36.5341	0.0000	0.0000	0.0000	0.0000	103.3977	223.4247	372.1663 (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	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382 (64)	
Efficiency of water heater (217)m	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800 (216)	
Fuel for water heating, kWh/month	109.1208	96.4633	102.3255	89.5374	86.5170	77.6519	76.3852	79.5705	80.6177	90.2696	96.4524	107.8674 (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	46.2341	41.7598	46.2341	44.7426	46.2341	44.7426	46.2341	46.2341	44.7426	46.2341	44.7426	46.2341 (231)	
Lighting	28.6826	23.0102	20.7182	15.1790	11.7247	9.5792	10.6957	13.9026	18.0581	23.6933	26.7615	29.4797 (232)	
Electricity generated by PVs (Appendix M) (negative quantity)	-28.7129	-48.6976	-83.8793	-107.5248	-123.2632	-115.4189	-113.3114	-101.4826	-81.1234	-59.3400	-33.4667	-23.6202 (233a)	
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)	
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)	
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)	
Electricity generated by PVs (Appendix M) (negative quantity)	-6.1063	-16.6208	-44.6839	-86.8752	-133.8632	-143.7811	-139.7974	-108.7718	-67.9166	-29.0472	-9.3013	-4.5030 (233b)	
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)	
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)	
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)	

Full SAP Calculation Printout



Annual totals kWh/year	
Space heating fuel - main system 1	1658.8679 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	262.5800
Water heating fuel used	1092.7785 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 1.1625)	
mechanical ventilation fans (SFP = 1.1625)	544.3689 (230a)
Total electricity for the above, kWh/year	544.3689 (231)
Electricity for lighting (calculated in Appendix L)	231.4848 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-1711.1088 (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	1816.3913 (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	1658.8679	0.1562	259.1977 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1092.7785	0.1410	154.0683 (264)
Space and water heating			413.2660 (265)
Pumps, fans and electric keep-hot	544.3689	0.1387	75.5107 (267)
Energy for lighting	231.4848	0.1443	33.4104 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-919.8410	0.1322	-121.6169
PV Unit electricity exported	-791.2678	0.1199	-94.8910
Total			-216.5079 (269)
Total CO2, kg/year			305.6792 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			2.1800 (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	1658.8679	1.5784	2618.4113 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1092.7785	1.5213	1662.4719 (278)
Space and water heating			4280.8832 (279)
Pumps, fans and electric keep-hot	544.3689	1.5128	823.5212 (281)
Energy for lighting	231.4848	1.5338	355.0591 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-919.8410	1.4885	-1369.2072
PV Unit electricity exported	-791.2678	0.4399	-348.0633
Total			-1717.2704 (283)
Total Primary energy kWh/year			3742.1931 (286)
Dwelling Primary energy Rate (DPER)			26.7100 (287)

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

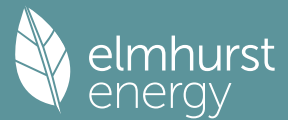
1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	97.6200 (1b)	x 2.6000 (2b)	= 253.8120 (1b) - (3b)
First floor	42.4900 (1c)	x 3.0600 (2c)	= 130.0194 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	140.1100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	383.8314 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1042 (8)
Pressure test	Yes
Pressure Test Method	Blower Door

Full SAP Calculation Printout



Measured/design AP50 5.0000 (17)
 Infiltration rate 0.3542 (18)
 Number of sides sheltered 0 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 1.0000 (20)
 Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3542 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750
Effective ac	0.4516	0.4428	0.4339	0.3896	0.3808	0.3365	0.3365	0.3276	0.3542	0.3808	0.3985	0.4162
	0.6020	0.5980	0.5941	0.5759	0.5725	0.5566	0.5566	0.5537	0.5627	0.5725	0.5794	0.5866

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			3.1200	1.0000	3.1200		(26)
TER Opening Type			30.1500	1.1450	34.5229		(27)
TER Roof Window			1.7500	1.1450	2.7856		(27a)
FT1 - Ground			97.6200	0.1300	12.6906		(28a)
WT1 - Brick faced	223.3700	33.2700	190.1000	0.1800	34.2180		(29a)
RT1 - GF Flat	55.3300	1.0900	54.2400	0.1100	5.9664		(30)
RT2 - FF Flat	42.2900	0.6600	41.6300	0.1100	4.5793		(30)
Total net area of external elements Aum(A, m2)			418.6100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	97.8828	(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 176.4696 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	21.9100	0.0500	1.0955
E3 Sill	8.7000	0.0500	0.4350
E4 Jamb	46.0400	0.0500	2.3020
E5 Ground floor (normal)	55.2300	0.1600	8.8368
E15 Flat roof with parapet	55.7000	0.5600	31.1920
E16 Corner (normal)	43.4400	0.0900	3.9096
E17 Corner (inverted - internal area greater than external area)	5.2000	-0.0900	-0.4680
R1 Head of roof window	8.1200	0.0800	0.6496
R2 Sill of roof window	8.1200	0.0600	0.4872
R3 Jamb of roof window	5.4200	0.0800	0.4336

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 48.8733 (36)

Point Thermal Bridges

Total fabric heat loss (33) + (36) + (36a) = 146.7561 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	76.2495	75.7479	75.2562	72.9469	72.5149	70.5035	70.5035	70.1310	71.2782	72.5149	73.3889	74.3027
Average = Sum(39)m / 12 =	223.0056	222.5040	222.0123	219.7030	219.2709	217.2596	217.2596	216.8871	218.0343	219.2709	220.1450	221.0588

219.7009 (39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.5916	1.5881	1.5846	1.5681	1.5650	1.5506	1.5506	1.5480	1.5562	1.5650	1.5712	1.5778
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

1.5681 (40)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												
Hot water usage for mixer showers												
Hot water usage for baths												
Hot water usage for other uses												
Average daily hot water use (litres/day)												

Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	149.2122	146.0258	142.1456	136.2455	131.4541	126.3030	124.3235	128.1871	132.2617	137.6694	143.6604	148.8252
Energy content (annual)	236.3156	207.9388	218.4725	186.5132	176.9624	155.3042	150.3586	158.7223	163.0919	186.8161	204.6706	233.0244

Distribution loss (46)m = 0.15 x (45)m 2278.1907 (45)

Water storage loss (or HIU loss): 34.9537 (46)

Store volume 250.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.8903 (48)

Temperature factor from Table 2b 0.5400 (49)

Enter (49) or (54) in (55) 1.0208 (55)

Total storage loss 31.6444 (56)

If cylinder contains dedicated solar storage 31.6444 (57)

Primary loss 23.2624 (58)

Combi loss 0.0000 (59)

Total heat required for water heating calculated for each month 287.9312 (62)

WWHRS -33.4335 -29.5688 -30.9628 -25.6384 -23.8941 -20.4463 -19.1652 -20.3802 -21.1546 -24.9389 -28.2527 -32.8143 (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 257.7889 227.9632 242.4165 214.0104 207.9752 187.9935 186.1002 193.2489 195.0729 216.7840 229.5535 255.1168 (64)

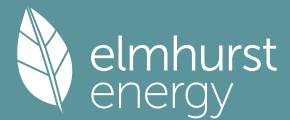
12Total per year (kWh/year) 2614.0240 (64)

Electric shower(s) 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 122.5004 108.8142 116.5675 104.5241 102.7654 94.1471 93.9197 96.7006 96.7365 106.0418 110.5615 121.4060 (65)

Full SAP Calculation Printout



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	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	145.8647	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	156.1259	172.8537	156.1259	161.3301	156.1259	161.3301	156.1259	156.1259	161.3301	156.1259	161.3301	156.1259	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	309.5371	312.7491	304.6549	287.4233	265.6715	245.2279	231.5703	228.3583	236.4525	253.6841	275.4359	295.8795	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	37.5865	(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)	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	(71)
Water heating gains (Table 5)	164.6510	161.9260	156.6768	145.1724	138.1256	130.7599	126.2361	129.9739	134.3563	142.5293	153.5576	163.1802	(72)
Total internal gains	700.0734	717.2882	687.2170	663.6852	629.6824	604.0773	580.6917	581.2175	598.8983	622.0987	660.0830	684.9450	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d		Gains W	
Northeast					3.9300	11.2829	0.6300	0.7000	0.7700		13.5515 (75)	
Southeast					9.0200	36.7938	0.6300	0.7000	0.7700		101.4270 (77)	
Southwest					12.5900	36.7938	0.6300	0.7000	0.7700		141.5704 (79)	
Northwest					4.6100	11.2829	0.6300	0.7000	0.7700		15.8963 (81)	
Horizontal					1.7500	26.0000	0.6300	0.7000	1.0000		18.0590 (82)	
Solar gains	290.5041	511.3633	741.0110	983.2641	1157.7476	1173.3805	1121.3337	988.0255	824.6928	576.5592	351.0287	246.5897 (83)
Total gains	990.5775	1228.6514	1428.2280	1646.9494	1787.4301	1777.4579	1702.0254	1569.2431	1423.5911	1198.6578	1011.1117	931.5347 (84)

7. Mean internal temperature (heating season)

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

21.0000 (85)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	30.7979	30.8673	30.9357	31.2608	31.3224	31.6124	31.6124	31.6667	31.5001	31.3224	31.1981	31.0691	
alpha	3.0532	3.0578	3.0624	3.0841	3.0882	3.1075	3.1075	3.1111	3.1000	3.0882	3.0799	3.0713	
util living area	0.9871	0.9748	0.9521	0.8988	0.8027	0.6573	0.5164	0.5688	0.7766	0.9298	0.9776	0.9892	(86)
MIT	18.5219	18.8466	19.3197	19.9315	20.4514	20.7977	20.9299	20.9042	20.6373	19.9420	19.1226	18.4730	(87)
Th 2	19.6195	19.6221	19.6247	19.6368	19.6391	19.6497	19.6497	19.6517	19.6456	19.6391	19.6345	19.6297	(88)
util rest of house	0.9837	0.9682	0.9392	0.8705	0.7453	0.5561	0.3763	0.4281	0.6913	0.9041	0.9707	0.9864	(89)
MIT 2	16.7921	17.2049	17.8013	18.5601	19.1633	19.5227	19.6240	19.6126	19.3831	18.5930	17.5670	16.7358	(90)
Living area fraction	17.2119	17.6033	18.1698	18.8929	19.4759	19.8321	19.9409	19.9260	19.6875	18.9204	17.9445	17.1573	(91)
MIT	17.2119	17.6033	18.1698	18.8929	19.4759	19.8321	19.9409	19.9260	19.6875	18.9204	17.9445	17.1573	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.2119	17.6033	18.1698	18.8929	19.4759	19.8321	19.9409	19.9260	19.6875	18.9204	17.9445	17.1573	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9744	0.9542	0.9205	0.8510	0.7373	0.5712	0.4086	0.4592	0.6944	0.8857	0.9578	0.9784	(94)
Useful gains	965.2459	1172.3713	1314.6733	1401.5318	1317.8395	1015.2047	695.4662	720.5499	988.5446	1061.7085	968.4862	911.3683	(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	2879.4248	2826.5340	2590.8296	2195.4620	1705.0234	1136.7277	725.8445	764.7444	1218.2590	1824.4165	2387.3545	2864.3320	(97)
Space heating kWh	1424.1491	1111.5973	949.4603	571.6297	288.0648	0.0000	0.0000	0.0000	0.0000	567.4547	1021.5851	1453.0050	(98a)
Space heating requirement - total per year (kWh/year)												7386.9461	
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	1424.1491	1111.5973	949.4603	571.6297	288.0648	0.0000	0.0000	0.0000	0.0000	567.4547	1021.5851	1453.0050	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												7386.9461	
Space heating per m2										(98c) / (4) =		52.7225	(99)

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

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

0.0000 (201)

Efficiency of main space heating system 1 (in %)

1.0000 (202)

Efficiency of main space heating system 2 (in %)

92.3000 (206)

Efficiency of secondary/supplementary heating system, %

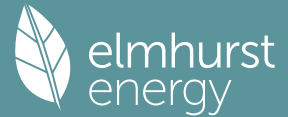
0.0000 (207)

Efficiency of secondary/supplementary heating system, %

0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1424.1491	1111.5973	949.4603	571.6297	288.0648	0.0000	0.0000	0.0000	0.0000	567.4547	1021.5851	1453.0050	(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)	1542.9568	1204.3308	1028.6677	619.3172	312.0962	0.0000	0.0000	0.0000	0.0000	614.7938	1106.8095	1574.2199	(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)

Full SAP Calculation Printout



Water heating												
Water heating requirement												
	257.7889	227.9632	242.4165	214.0104	207.9752	187.9935	186.1002	193.2489	195.0729	216.7840	229.5535	255.1168 (64)
Efficiency of water heater												
(217)m	87.2911	87.1278	86.8087	86.1532	84.7906	79.8000	79.8000	79.8000	79.8000	86.1153	86.9997	79.8000 (216)
Fuel for water heating, kWh/month												
	295.3210	261.6425	279.2536	248.4068	245.2810	235.5808	233.2082	242.1665	244.4523	251.7370	263.8554	87.3290 (217)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (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												
	32.4399	26.0245	23.4322	17.1674	13.2606	10.8340	12.0968	15.7238	20.4237	26.7970	30.2671	33.3415 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-78.0162	-103.8470	-141.0000	-149.4120	-153.7334	-140.7991	-138.8603	-134.4501	-125.9556	-114.0088	-83.4636	-68.1760 (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	-64.9187	-133.4716	-259.8658	-382.8152	-499.2804	-499.3276	-493.6087	-421.1815	-313.0010	-188.4840	-85.8443	-51.5920 (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											8003.1919	(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											3093.0382	(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)											261.8084	(232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation											-4825.1132	(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											6618.9254	(238)

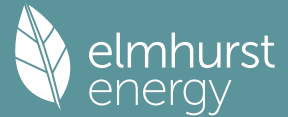
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1			
	8003.1919	0.2100	1680.6703 (261)
Total CO2 associated with community systems			
			0.0000 (373)
Water heating (other fuel)			
	3093.0382	0.2100	649.5380 (264)
Space and water heating			
			2330.2083 (265)
Pumps, fans and electric keep-hot			
	86.0000	0.1387	11.9293 (267)
Energy for lighting			
	261.8084	0.1443	37.7870 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling			
	-1431.7223	0.1359	-194.5192
PV Unit electricity exported			
	-3393.3909	0.1265	-429.1609
Total			
			-623.6801 (269)
Total CO2, kg/year			
			1756.2445 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			
			12.5300 (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			
	8003.1919	1.1300	9043.6069 (275)
Total CO2 associated with community systems			
			0.0000 (473)
Water heating (other fuel)			
	3093.0382	1.1300	3495.1332 (278)
Space and water heating			
			12538.7401 (279)
Pumps, fans and electric keep-hot			
	86.0000	1.5128	130.1008 (281)
Energy for lighting			
	261.8084	1.5338	401.5705 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling			
	-1431.7223	1.5022	-2150.7324
PV Unit electricity exported			
	-3393.3909	0.4643	-1575.4004
Total			
			-3726.1328 (283)
Total Primary energy kWh/year			
			9344.2786 (286)
Target Primary Energy Rate (TPER)			
			66.6900 (287)

Full SAP Calculation Printout



Plot Reference	3 Be Green				Issued on Date	21/04/2026	
Assessment Reference	001			Plot Type Ref	Lat_2 Coleridge Road N8 8EJ		
Plot Address					SAP Version	10.2	
SAP Rating	89 B	DER	2.18	TER	12.53		
Environmental	98 A	% DER < TER				82.60	
CO ₂ Emissions (t/year)	0.22	DFEE	52.98	TFEE	59.79		
Compliance Check	See BREL	% DFEE < TFEE				11.40	
% DPER < TPER	59.95	DPER	26.71	TPER	66.69		
Assessor Details	Mr. Derek White				Assessor ID	B381-0001	
Client							

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	97.6200 (1b)	x 2.6000 (2b)	= 253.8120 (1b) - (3b)
First floor	42.4900 (1c)	x 3.0600 (2c)	= 130.0194 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	140.1100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	383.8314 (5)

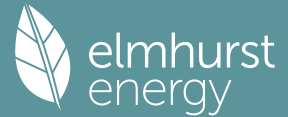
2. Ventilation rate

	m ³ per hour											
Number of open chimneys	0 * 80 = 0.0000 (6a)											
Number of open flues	0 * 20 = 0.0000 (6b)											
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)											
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)											
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)											
Number of blocked chimneys	0 * 20 = 0.0000 (6f)											
Number of intermittent extract fans	0 * 10 = 0.0000 (7a)											
Number of passive vents	0 * 10 = 0.0000 (7b)											
Number of flueless gas fires	0 * 40 = 0.0000 (7c)											
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											
Pressure test	0.0000 / (5) = 0.0000 (8)											
Pressure Test Method	Yes											
Measured/design AP50	Blower Door 4.0000 (17)											
Infiltration rate	0.2000 (18)											
Number of sides sheltered	0 (19)											
Shelter factor	(20) = 1 - [0.075 x (19)] = 1.0000 (20)											
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2000 (21)											
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 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	0.2550	0.2500	0.2450	0.2200	0.2150	0.1900	0.1900	0.1850	0.2000	0.2150	0.2250	0.2350 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												77.4000 (23c)
Effective ac	0.3680	0.3630	0.3580	0.3330	0.3280	0.3030	0.3030	0.2980	0.3130	0.3280	0.3380	0.3480 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
NE-GD1			3.1200	1.0000	3.1200		(26)
NE-GW1			45.9400	1.1450	52.6031		(27)
H-RL1			2.6600	1.5918	4.2341		(27a)
FT1 - Ground			97.6200	0.1000	9.7620	110.0000	10738.2003 (28a)
WT1 - Brick faced	223.3700	49.0600	174.3100	0.1500	26.1465	60.0000	10458.5997 (29a)
RT1 - GF Flat	55.3300	1.6600	53.6700	0.1000	5.3670	9.0000	483.0300 (30)
RT2 - FF Flat	42.2900	1.0000	41.2900	0.1000	4.1290	9.0000	371.6100 (30)
Total net area of external elements Aum(A, m ²)			418.6100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		105.3616		(33)
Main dwelling							
IW1			170.2100			9.0000	1531.8901 (32c)
IF1			42.2900			18.0000	761.2200 (32d)
IC1			42.2900			9.0000	380.6100 (32e)

Full SAP Calculation Printout



Heat capacity $C_m = \text{Sum}(A \times k)$
Thermal mass parameter (TMP = C_m / TFA) in $\text{kJ/m}^2\text{K}$
List of Thermal Bridges

K1 Element	
E2 Other lintels (including other steel lintels)	
E3 Sill	
E4 Jamb	
E5 Ground floor (normal)	
E15 Flat roof with parapet	
E16 Corner (normal)	
E17 Corner (inverted - internal area greater than external area)	
R1 Head of roof window	
R2 Sill of roof window	
R3 Jamb of roof window	

(28)...(30) + (32) + (32a)...(32e) = 24725.1601 (34)
176.4696 (35)

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 27.3045 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 132.6661 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	46.6125	45.9792	45.3458	42.1792	41.5459	38.3793	38.3793	37.7460	39.6459	41.5459	42.8126	44.0792	(38)
Heat transfer coeff	179.2786	178.6453	178.0120	174.8454	174.2121	171.0454	171.0454	170.4121	172.3121	174.2121	175.4787	176.7453	(39)
Average = Sum(39)m / 12 =												174.6871	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2796	1.2750	1.2705	1.2479	1.2434	1.2208	1.2208	1.2163	1.2298	1.2434	1.2524	1.2615	(40)
HLP (average)												1.2468	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9173 (42)
Hot water usage for mixer showers													
73.1333	72.0342	70.4327	67.3684	65.1071	62.5853	61.1519	62.7413	64.4836	67.1913	70.3213	72.8531	72.8531	(42a)
Hot water usage for baths													
31.5729	31.1040	30.4437	29.2262	28.3146	27.3037	26.7577	27.4134	28.1273	29.2090	30.4515	31.4662	31.4662	(42b)
Hot water usage for other uses													
44.5060	42.8876	41.2692	39.6508	38.0324	36.4140	36.4140	38.0324	39.6508	41.2692	42.8876	44.5060	44.5060	(42c)
Average daily hot water use (litres/day)												137.1595	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.2122	146.0258	142.1456	136.2455	131.4541	126.3030	124.3235	128.1871	132.2617	137.6694	143.6604	148.8252	(44)
Energy conte	236.3156	207.9388	218.4725	186.5132	176.9624	155.3042	150.3586	158.7223	163.0919	186.8161	204.6706	233.0244	(45)
Energy content (annual)										Total = Sum(45)m =		2278.1907	
Distribution loss (46)m = $0.15 \times (45)\text{m}$	35.4473	31.1908	32.7709	27.9770	26.5444	23.2956	22.5538	23.8084	24.4638	28.0224	30.7006	34.9537	(46)
Water storage loss (or HIU loss):													
Store volume												250.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6100	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8694	(55)
Total storage loss													
26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	(56)
If cylinder contains dedicated solar storage													
26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	(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													
286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382	283.2382	(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	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382	(64)
												2869.4177	(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	0.0000	(64a)
												0.0000	(64a)
Heat gains from water heating, kWh/month													
118.7460	105.4232	112.8131	100.8908	99.0111	90.5139	90.1653	92.9462	93.1032	102.2874	106.9282	117.6516	117.6516	(65)

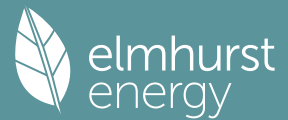
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
(66)m	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
32.7691	29.1052	23.6699	17.9197	13.3952	11.3088	12.2195	15.8834	21.3186	27.0689	31.5934	33.6798	33.6798	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
461.9956	466.7897	454.7088	428.9900	396.5246	366.0118	345.6273	340.8332	352.9141	378.6329	411.0983	441.6112	441.6112	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	(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)													
-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	(71)
Water heating gains (Table 5)													
159.6048	156.8797	151.6306	140.1262	133.0794	125.7137	121.1899	124.9277	129.3101	137.4831	148.5114	158.1339	158.1339	(72)
Total internal gains	768.1365	766.5416	743.7762	700.8028	656.7661	616.8011	592.8036	595.4113	617.3098	656.9518	704.9700	747.1918	(73)

6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.9800	11.2829	0.4000	0.8000	1.0000	19.4319	(75)
Southeast	13.7500	36.7938	0.4000	0.8000	1.0000	145.7036	(77)

Full SAP Calculation Printout



Southwest			19.1900		36.7938		0.4000		0.8000		1.0000		203.3492 (79)
Northwest			7.0200		11.2829		0.4000		0.8000		1.0000		22.8114 (81)
Horizontal			2.6600		26.0000		0.4000		0.8000		1.0000		19.9181 (82)

Solar gains	411.2142	721.9219	1041.9771	1377.3185	1618.1082	1638.6805	1566.4977	1382.5131	1157.7349	812.7670	496.5185	349.3022 (83)
Total gains	1179.3507	1488.4635	1785.7533	2078.1213	2274.8743	2255.4817	2159.3013	1977.9243	1775.0446	1469.7188	1201.4885	1096.4940 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	38.3096	38.4455	38.5822	39.2810	39.4238	40.1537	40.1537	40.3029	39.8585	39.4238	39.1392	38.8587
alpha	3.5540	3.5630	3.5721	3.6187	3.6283	3.6769	3.6769	3.6869	3.6572	3.6283	3.6093	3.5906
util living area												
	0.9776	0.9514	0.8985	0.7904	0.6367	0.4672	0.3438	0.3883	0.6094	0.8575	0.9590	0.9822 (86)
Living	19.5779	19.8534	20.2038	20.5692	20.7894	20.8861	20.9086	20.9047	20.8370	20.5117	19.9753	19.5358
Non living	18.2171	18.5641	18.9960	19.4365	19.6728	19.7776	19.7930	19.7949	19.7341	19.3891	18.7356	18.1745
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	0	0	0	0	0	0	0	0	0	0	0	0
16 / 9	22	26	0	0	0	0	0	0	0	0	0	31
MIT	20.4284	20.3151	20.2038	20.5692	20.7894	20.8861	20.9086	20.9047	20.8370	20.5117	19.9753	20.1707 (87)
Th 2	19.8569	19.8604	19.8640	19.8819	19.8854	19.9034	19.9034	19.9070	19.8962	19.8854	19.8783	19.8711 (88)
util rest of house												
	0.9724	0.9409	0.8775	0.7515	0.5783	0.3936	0.2603	0.2996	0.5304	0.8198	0.9483	0.9780 (89)
MIT 2	19.3432	19.2366	18.9960	19.4365	19.6728	19.7776	19.7930	19.7949	19.7341	19.3891	18.7356	19.1223 (90)
Living area fraction												
										fLA = Living area / (4) =		0.2427 (91)
MIT	19.6066	19.4983	19.2891	19.7114	19.9437	20.0466	20.0637	20.0642	20.0018	19.6615	19.0365	19.3767 (92)
Temperature adjustment												0.0000
adjusted MIT	19.6066	19.4983	19.2891	19.7114	19.9437	20.0466	20.0637	20.0642	20.0018	19.6615	19.0365	19.3767 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9710	0.9369	0.8650	0.7450	0.5815	0.4035	0.2727	0.3126	0.5384	0.8110	0.9378	0.9758 (94)
Useful gains	1145.1838	1394.5701	1544.5896	1548.1150	1322.8873	910.0904	588.7401	618.3105	955.7385	1191.9954	1126.8111	1069.9503 (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												
	2744.1399	2607.9134	2276.6087	1890.3224	1436.1564	931.6131	592.4487	624.4280	1016.9468	1578.6236	2094.5928	2682.4096 (97)
Space heating kWh												
	1189.6234	815.3667	544.6222	246.3893	84.2722	0.0000	0.0000	0.0000	0.0000	287.6514	696.8028	1199.6697 (98a)
Space heating requirement - total per year (kWh/year)												5064.3976
Solar heating kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh												
	1189.6234	815.3667	544.6222	246.3893	84.2722	0.0000	0.0000	0.0000	0.0000	287.6514	696.8028	1199.6697 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5064.3976
Space heating per m2										(98c) / (4) =		36.1459 (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 %)												347.4270 (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												
	1189.6234	815.3667	544.6222	246.3893	84.2722	0.0000	0.0000	0.0000	0.0000	287.6514	696.8028	1199.6697 (98)
Space heating efficiency (main heating system 1)												
	347.4270	347.4270	347.4270	347.4270	347.4270	0.0000	0.0000	0.0000	0.0000	347.4270	347.4270	347.4270 (210)
Space heating fuel (main heating system)												
	342.4096	234.6872	156.7587	70.9183	24.2561	0.0000	0.0000	0.0000	0.0000	82.7948	200.5609	345.3012 (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												
	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382 (64)
Efficiency of water heater (217)m												
	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800 (216)
Fuel for water heating, kWh/month												
	109.1208	96.4633	102.3255	89.5374	86.5170	77.6519	76.3852	79.5705	80.6177	90.2696	96.4524	107.8674 (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												
	46.2341	41.7598	46.2341	44.7426	46.2341	44.7426	46.2341	46.2341	44.7426	46.2341	44.7426	46.2341 (231)
Lighting												
	28.6826	23.0102	20.7182	15.1790	11.7247	9.5792	10.6957	13.9026	18.0581	23.6933	26.7615	29.4797 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m												
	-28.6164	-48.3913	-83.0032	-106.1301	-122.0973	-115.4189	-113.3114	-101.4826	-81.1234	-58.8878	-33.3276	-23.5562 (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												
	-6.2028	-16.9271	-45.5600	-88.2699	-135.0291	-143.7811	-139.7974	-108.7718	-67.9166	-29.4994	-9.4404	-4.5670 (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												

Full SAP Calculation Printout



Space heating fuel - main system 1	1457.6867 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	262.5800
Water heating fuel used	1092.7785 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 1.1625)	
mechanical ventilation fans (SFP = 1.1625)	544.3689 (230a)
Total electricity for the above, kWh/year	544.3689 (231)
Electricity for lighting (calculated in Appendix L)	231.4848 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-1711.1088 (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	1615.2100 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1457.6867	16.4900	240.3725 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1092.7785	16.4900	180.1992 (247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000 (247a)
Pumps, fans and electric keep-hot	544.3689	16.4900	89.7664 (249)
Energy for lighting	231.4848	16.4900	38.1718 (250)
Additional standing charges			0.0000 (251)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-915.3463	16.4900	-150.9406
PV Unit electricity exported	-795.7625	5.5900	-44.4831
Total			-195.4237 (252)
Total energy cost			353.0862 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	0.6867 (257)
SAP value		88.8689
SAP rating (Section 12)		89 (258)
SAP band		B

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1457.6867	0.1568	228.5188 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1092.7785	0.1410	154.0683 (264)
Space and water heating			382.5871 (265)
Pumps, fans and electric keep-hot	544.3689	0.1387	75.5107 (267)
Energy for lighting	231.4848	0.1443	33.4104 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-915.3463	0.1322	-120.9718
PV Unit electricity exported	-795.7625	0.1201	-95.5837
Total			-216.5556 (269)
Total CO2, kg/year			274.9526 (272)
CO2 emissions per m2			1.9600 (273)
EI value			98.0096
EI rating			98 (274)
EI band			A

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

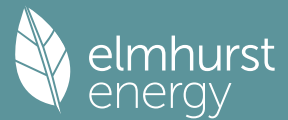
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	97.6200 (1b)	x 2.6000 (2b)	= 253.8120 (1b) - (3b)
First floor	42.4900 (1c)	x 3.0600 (2c)	= 130.0194 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	140.1100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)... (3n) =	383.8314 (5)

2. Ventilation rate

m3 per hour

Full SAP Calculation Printout



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	0 * 10 =	0.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		4.0000	(17)
Infiltration rate		0.2000	(18)
Number of sides sheltered		0	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	1.0000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2000	(21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.2100	0.2000	0.2000	0.1850	0.1850	0.1650	0.1700	0.1600	0.1650	0.1750	0.1750	0.1900	(22b)
Balanced mechanical ventilation with heat recovery													
If mechanical ventilation													0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)													0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =													77.4000 (23c)
Effective ac	0.3230	0.3130	0.3130	0.2980	0.2980	0.2780	0.2830	0.2730	0.2780	0.2880	0.2880	0.3030	(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								
NE-GD1			3.1200	1.0000	3.1200			(26)
NE-GW1			45.9400	1.1450	52.6031			(27)
H-RL1			2.6600	1.5918	4.2341			(27a)
FT1 - Ground			97.6200	0.1000	9.7620	110.0000	10738.2003	(28a)
WT1 - Brick faced	223.3700	49.0600	174.3100	0.1500	26.1465	60.0000	10458.5997	(29a)
RT1 - GF Flat	55.3300	1.6600	53.6700	0.1000	5.3670	9.0000	483.0300	(30)
RT2 - FF Flat	42.2900	1.0000	41.2900	0.1000	4.1290	9.0000	371.6100	(30)
Total net area of external elements Aum(A, m2)			418.6100					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	105.3616			(33)
Main dwelling								
IW1			170.2100			9.0000	1531.8901	(32c)
IF1			42.2900			18.0000	761.2200	(32d)
IC1			42.2900			9.0000	380.6100	(32e)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	24725.1601	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		176.4696	(35)

List of Thermal Bridges

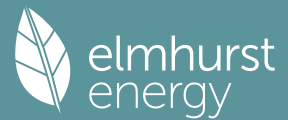
K1 Element	Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)	21.9100	0.0250	0.5478	
E3 Sill	8.7000	0.0220	0.1914	
E4 Jamb	46.0400	0.0180	0.8287	
E5 Ground floor (normal)	55.2300	0.0480	2.6510	
E15 Flat roof with parapet	55.7000	0.3000	16.7100	
E16 Corner (normal)	43.4400	0.0350	1.5204	
E17 Corner (inverted - internal area greater than external area)	5.2000	-0.0660	-0.3432	
R1 Head of roof window	8.1200	0.2400	1.9488	
R2 Sill of roof window	8.1200	0.2400	1.9488	
R3 Jamb of roof window	5.4200	0.2400	1.3008	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			27.3045	(36)
Point Thermal bridges			0.0000	(36a) =
Total fabric heat loss	(33) + (36) + (36a) =		132.6661	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	40.9126	39.6459	39.6459	37.7460	37.7460	35.2127	35.8460	34.5794	35.2127	36.4793	36.4793	38.3793	(38)
Heat transfer coeff	173.5787	172.3121	172.3121	170.4121	170.4121	167.8788	168.5122	167.2455	167.8788	169.1455	169.1455	171.0454	(39)
Average = Sum(39)m / 12 =												169.9899	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	1.2389	1.2298	1.2298	1.2163	1.2163	1.1982	1.2027	1.1937	1.1982	1.2072	1.2072	1.2208	(40)
HLP (average)												1.2133	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9173	(42)
Hot water usage for mixer showers														
	73.1333	72.0342	70.4327	67.3684	65.1071	62.5853	61.1519	62.7413	64.4836	67.1913	70.3213	72.8531	72.8531	(42a)
Hot water usage for baths														
	31.5729	31.1040	30.4437	29.2262	28.3146	27.3037	26.7577	27.4134	28.1273	29.2090	30.4515	31.4662	31.4662	(42b)
Hot water usage for other uses														
	44.5060	42.8876	41.2692	39.6508	38.0324	36.4140	36.4140	38.0324	39.6508	41.2692	42.8876	44.5060	44.5060	(42c)
Average daily hot water use (litres/day)													137.1595	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
	149.2122	146.0258	142.1456	136.2455	131.4541	126.3030	124.3235	128.1871	132.2617	137.6694	143.6604	148.8252	148.8252	(44)
Energy conte	236.3156	207.9388	218.4725	186.5132	176.9624	155.3042	150.3586	158.7223	163.0919	186.8161	204.6706	233.0244	233.0244	(45)
Energy content (annual)										Total =	Sum(45)m =	2278.1907		
Distribution loss (46)m = 0.15 x (45)m														
	35.4473	31.1908	32.7709	27.9770	26.5444	23.2956	22.5538	23.8084	24.4638	28.0224	30.7006	34.9537	34.9537	(46)
Water storage loss (or HIU loss):														
Store volume													250.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6100	(48)
Temperature factor from Table 2b													0.5400	(49)

Full SAP Calculation Printout



Enter (49) or (54) in (55)												0.8694 (55)
Total storage loss	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514 (56)
If cylinder contains dedicated solar storage	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514 (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	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382 (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	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382 (64)
	Total per year (kWh/year) = Sum(64)m =											2869.4177 (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	118.7460	105.4232	112.8131	100.8908	99.0111	90.5139	90.1653	92.9462	93.1032	102.2874	106.9282	117.6516 (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	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	32.7691	29.1052	23.6699	17.9197	13.3952	11.3088	12.2195	15.8834	21.3186	27.0689	31.5934	33.6798	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	461.9956	466.7897	454.7088	428.9900	396.5246	366.0118	345.6273	340.8332	352.9141	378.6329	411.0983	441.6112	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	(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)	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	(71)
Water heating gains (Table 5)	159.6048	156.8797	151.6306	140.1262	133.0794	125.7137	121.1899	124.9277	129.3101	137.4831	148.5114	158.1339	(72)
Total internal gains	768.1365	766.5416	743.7762	700.8028	656.7661	616.8011	592.8036	595.4113	617.3098	656.9518	704.9700	747.1918	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W				
Northeast				5.9800	12.9236	0.4000	0.8000	1.0000	22.2575 (75)				
Southeast				13.7500	40.4699	0.4000	0.8000	1.0000	160.2609 (77)				
Southwest				19.1900	40.4699	0.4000	0.8000	1.0000	223.6659 (79)				
Northwest				7.0200	12.9236	0.4000	0.8000	1.0000	26.1283 (81)				
Horizontal				2.6600	30.0000	0.4000	0.8000	1.0000	22.9824 (82)				
Solar gains	455.2950	720.2984	1030.6314	1411.2054	1621.5265	1760.0333	1663.2607	1496.6014	1243.7331	866.8145	563.3857	382.9125	(83)
Total gains	1223.4314	1486.8400	1774.4076	2112.0082	2278.2926	2376.8345	2256.0643	2092.0127	1861.0429	1523.7663	1268.3557	1130.1043	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	39.5676	39.8585	39.8585	40.3029	40.3029	40.9111	40.7573	41.0660	40.9111	40.6047	40.6047	40.1537
alpha	3.6378	3.6572	3.6572	3.6869	3.6869	3.7274	3.7172	3.7377	3.7274	3.7070	3.7070	3.6769
util living area												
	0.9705	0.9433	0.8791	0.7413	0.5586	0.3484	0.2308	0.2547	0.4998	0.8040	0.9405	0.9765 (86)
Living	19.7638	19.9978	20.3408	20.6765	20.8497	20.9089	20.9158	20.9157	20.8851	20.6476	20.1747	19.7278
Non living	18.4759	18.7718	19.1875	19.5770	19.7504	19.8115	19.8111	19.8188	19.7970	19.5651	19.0104	18.4419
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	7	0	0	0	0	0	0	0	0	0	0	0
16 / 9	24	19	0	0	0	0	0	0	0	0	0	31
MIT	20.4579	20.2927	20.3408	20.6765	20.8497	20.9089	20.9158	20.9157	20.8851	20.6476	20.1747	20.2795 (87)
Th 2	19.8890	19.8962	19.8962	19.9070	19.9070	19.9214	19.9178	19.9251	19.9214	19.9142	19.9142	19.9034 (88)
util rest of house												
	0.9635	0.9309	0.8540	0.6958	0.4937	0.2753	0.1506	0.1697	0.4156	0.7549	0.9249	0.9708 (89)
MIT 2	19.4061	19.1980	19.1875	19.5770	19.7504	19.8115	19.8111	19.8188	19.7970	19.5651	19.0104	19.2583 (90)
Living area fraction									fLA =	Living area / (4) =		0.2427 (91)
MIT	19.6614	19.4636	19.4673	19.8438	20.0171	20.0778	20.0792	20.0850	20.0611	19.8278	19.2929	19.5061 (92)
Temperature adjustment												0.0000
adjusted MIT	19.6614	19.4636	19.4673	19.8438	20.0171	20.0778	20.0792	20.0850	20.0611	19.8278	19.2929	19.5061 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	1176.7532	1375.4828	1495.4040	1463.5372	1140.3386	679.8559	366.8600	381.6116	794.4206	1143.5663	1159.0410	1094.3507	(94)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)
Heat loss rate W	2527.5465	2388.8732	2079.3485	1694.5466	1195.8071	684.5782	367.2207	382.1550	816.0710	1391.6989	1910.1481	2464.1017	(97)
Space heating kWh	1004.9902	680.9984	434.4547	166.3267	41.2685	0.0000	0.0000	0.0000	0.0000	184.6107	540.7972	1019.0948	(98a)
Space heating requirement - total per year (kWh/year)												4072.5412	
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	1004.9902	680.9984	434.4547	166.3267	41.2685	0.0000	0.0000	0.0000	0.0000	184.6107	540.7972	1019.0948	(98c)

Full SAP Calculation Printout



Space heating requirement after solar contribution - total per year (kWh/year)
Space heating per m2

4072.5412
(98c) / (4) = 29.0667 (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 %)												344.0235 (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	1004.9902	680.9984	434.4547	166.3267	41.2685	0.0000	0.0000	0.0000	0.0000	184.6107	540.7972	1019.0948 (98)
Space heating efficiency (main heating system 1)	344.0235	344.0235	344.0235	344.0235	344.0235	0.0000	0.0000	0.0000	0.0000	344.0235	344.0235	344.0235 (210)
Space heating fuel (main heating system)	292.1283	197.9511	126.2863	48.3475	11.9958	0.0000	0.0000	0.0000	0.0000	53.6622	157.1977	296.2282 (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	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382 (64)
Efficiency of water heater (217)m	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631 (216)
Fuel for water heating, kWh/month	109.2526	96.5798	102.4491	89.6455	86.6215	77.7457	76.4775	79.6666	80.7151	90.3786	96.5689	107.9977 (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	46.2341	41.7598	46.2341	44.7426	46.2341	44.7426	46.2341	46.2341	44.7426	46.2341	44.7426	46.2341 (231)
Lighting	28.6826	23.0102	20.7182	15.1790	11.7247	9.5792	10.6957	13.9026	18.0581	23.6933	26.7615	29.4797 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-32.3250	-49.4953	-83.4689	-108.0499	-122.0639	-121.0019	-118.1324	-107.7691	-86.8044	-62.9794	-38.1672	-26.4367 (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	-7.8510	-18.2423	-47.7727	-95.4221	-139.0801	-160.2301	-153.7252	-123.9125	-77.7876	-34.7822	-12.3768	-5.7041 (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												1183.7973 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												262.2631
Water heating fuel used												1094.0987 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 1.1625)												
mechanical ventilation fans (SFP = 1.1625)												544.3689 (230a)
Total electricity for the above, kWh/year												544.3689 (231)
Electricity for lighting (calculated in Appendix L)												231.4848 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1833.5808 (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												1220.1688 (238)

10a. Fuel costs - using BEDF prices (593)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1183.7973	27.6700	327.5567 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1094.0987	27.6700	302.7371 (247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000 (247a)
Pumps, fans and electric keep-hot	544.3689	27.6700	150.6269 (249)
Energy for lighting	231.4848	27.6700	64.0518 (250)
Additional standing charges			0.0000 (251)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-956.6941	27.6700	-264.7173
PV Unit electricity exported	-876.8867	5.8100	-50.9471
Total			-315.6644 (252)
Total energy cost			529.3081 (255)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1183.7973	0.1575	186.4282 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1094.0987	0.1410	154.2544 (264)
Space and water heating			340.6826 (265)

Full SAP Calculation Printout



Pumps, fans and electric keep-hot	544.3689	0.1387	75.5107 (267)
Energy for lighting	231.4848	0.1443	33.4104 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-956.6941	0.1322	-126.4534
PV Unit electricity exported	-876.8867	0.1199	-105.1289
Total			-231.5823 (269)
Total CO2, kg/year			218.0214 (272)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1183.7973	1.5830	1873.9242 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1094.0987	1.5213	1664.4804 (278)
Space and water heating			3538.4047 (279)
Pumps, fans and electric keep-hot	544.3689	1.5128	823.5212 (281)
Energy for lighting	231.4848	1.5338	355.0591 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-956.6941	1.4884	-1423.9130
PV Unit electricity exported	-876.8867	0.4397	-385.5733
Total			-1809.4863 (283)
Total Primary energy kWh/year			2907.4987 (286)

SAP 10 EPC IMPROVEMENTS

001

Current energy efficiency rating:	B 89
Current environmental impact rating:	A 98

N Solar water heating	SAP increase too small
U Solar photovoltaic panels	Already installed
V2 Wind turbine	Not applicable

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

Measures omitted - SAP change or cost saving too small:	
N Solar water heating	+ 0.9 -£ 52 -25 kg (11.5%)

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

Potential energy efficiency rating:	B 89
Potential environmental impact rating:	A 98

Fuel prices for cost data on this page from database revision number 593 TEST (31 Mar 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current	Potential	Saving
Electricity	£845	£845	£0
Space heating	£478	£478	£0
Water heating	£303	£303	£0
Lighting	£64	£64	£0
Generated (PV)	-£316	-£316	£0
Total cost of fuels	£529	£529	£0
Total cost of uses	£529	£529	£0
Delivered energy	9 kWh/m²	9 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.2 tonnes	0.2 tonnes	0.0 tonnes
CO2 emissions per m²	2 kg/m²	2 kg/m²	0 kg/m²
Primary energy	21 kWh/m²	21 kWh/m²	0 kWh/m²

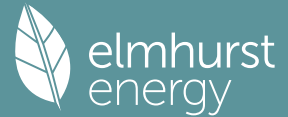
SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022) CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m²)	Storey height (m)	Volume (m³)
Main dwelling			
Ground floor	97.6200 (1b)	x 2.6000 (2b)	= 253.8120 (1b) - (3b)
First floor	42.4900 (1c)	x 3.0600 (2c)	= 130.0194 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	140.1100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 383.8314 (5)

2. Ventilation rate

Full SAP Calculation Printout



											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											0 * 10 =	0.0000 (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) =											0.0000 / (5) =	0.0000 (8)
Pressure test											Yes	
Pressure Test Method											Blower Door	
Measured/design AP50											4.0000 (17)	
Infiltration rate											0.2000 (18)	
Number of sides sheltered											0 (19)	
Shelter factor											(20) = 1 - [0.075 x (19)] =	1.0000 (20)
Infiltration rate adjusted to include shelter factor											(21) = (18) x (20) =	0.2000 (21)
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
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												
	0.2550	0.2500	0.2450	0.2200	0.2150	0.1900	0.1900	0.1850	0.2000	0.2150	0.2250	0.2350 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation											0.5000 (23a)	
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)											0.5000 (23b)	
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =											77.4000 (23c)	
Effective ac	0.3680	0.3630	0.3580	0.3330	0.3280	0.3030	0.3030	0.2980	0.3130	0.3280	0.3380	0.3480 (25)

3. Heat losses and heat loss parameter

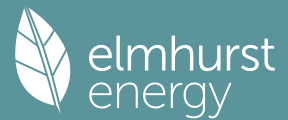
Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
NE-GD1			3.1200	1.0000	3.1200			(26)
NE-GW1			45.9400	1.1450	52.6031			(27)
H-RL1			2.6600	1.5918	4.2341			(27a)
FT1 - Ground			97.6200	0.1000	9.7620	110.0000	10738.2003	(28a)
WT1 - Brick faced	223.3700	49.0600	174.3100	0.1500	26.1465	60.0000	10458.5997	(29a)
RT1 - GF Flat	55.3300	1.6600	53.6700	0.1000	5.3670	9.0000	483.0300	(30)
RT2 - FF Flat	42.2900	1.0000	41.2900	0.1000	4.1290	9.0000	371.6100	(30)
Total net area of external elements Aum(A, m2)			418.6100					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 105.3616			(33)
Main dwelling								
IW1			170.2100			9.0000	1531.8901	(32c)
IF1			42.2900			18.0000	761.2200	(32d)
IC1			42.2900			9.0000	380.6100	(32e)
Heat capacity Cm = Sum(A x k)								(28)...(30) + (32) + (32a)...(32e) = 24725.1601 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								176.4696 (35)
List of Thermal Bridges								
K1 Element				Length	Psi-value	Total		
E2 Other lintels (including other steel lintels)				21.9100	0.0250	0.5478		
E3 Sill				8.7000	0.0220	0.1914		
E4 Jamb				46.0400	0.0180	0.8287		
E5 Ground floor (normal)				55.2300	0.0480	2.6510		
E15 Flat roof with parapet				55.7000	0.3000	16.7100		
E16 Corner (normal)				43.4400	0.0350	1.5204		
E17 Corner (inverted - internal area greater than external area)				5.2000	-0.0660	-0.3432		
R1 Head of roof window				8.1200	0.2400	1.9488		
R2 Sill of roof window				8.1200	0.2400	1.9488		
R3 Jamb of roof window				5.4200	0.2400	1.3008		
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							27.3045	(36)
Point Thermal bridges							(36a) = 0.0000	
Total fabric heat loss							(33) + (36) + (36a) = 132.6661	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	46.6125	45.9792	45.3458	42.1792	41.5459	38.3793	38.3793	37.7460	39.6459	41.5459	42.8126	44.0792
Average = Sum(39)m / 12 =	179.2786	178.6453	178.0120	174.8454	174.2121	171.0454	171.0454	170.4121	172.3121	174.2121	175.4787	176.7453
												174.6871
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2796	1.2750	1.2705	1.2479	1.2434	1.2208	1.2208	1.2163	1.2298	1.2434	1.2524	1.2615
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9173 (42)											
Hot water usage for mixer showers	73.1333	72.0342	70.4327	67.3684	65.1071	62.5853	61.1519	62.7413	64.4836	67.1913	70.3213	72.8531
Hot water usage for baths	31.5729	31.1040	30.4437	29.2262	28.3146	27.3037	26.7577	27.4134	28.1273	29.2090	30.4515	31.4662
Hot water usage for other uses	44.5060	42.8876	41.2692	39.6508	38.0324	36.4140	36.4140	38.0324	39.6508	41.2692	42.8876	44.5060
Average daily hot water use (litres/day)												137.1595
												(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	149.2122	146.0258	142.1456	136.2455	131.4541	126.3030	124.3235	128.1871	132.2617	137.6694	143.6604	148.8252
Energy content (annual)	236.3156	207.9388	218.4725	186.5132	176.9624	155.3042	150.3586	158.7223	163.0919	186.8161	204.6706	233.0244
Distribution loss (46)m = 0.15 x (45)m	35.4473	31.1908	32.7709	27.9770	26.5444	23.2956	22.5538	23.8084	24.4638	28.0224	30.7006	34.9537
Water storage loss (or HIU loss):												

Full SAP Calculation Printout



Store volume													250.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6100 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8694 (55)
Total storage loss													
	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	(56)
If cylinder contains dedicated solar storage													
	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	(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													
	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382	(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													
	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382	(64)
													(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)
													(64a)
Heat gains from water heating, kWh/month													
	118.7460	105.4232	112.8131	100.8908	99.0111	90.5139	90.1653	92.9462	93.1032	102.2874	106.9282	117.6516	(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	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	175.0376	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	32.7691	29.1052	23.6699	17.9197	13.3952	11.3088	12.2195	15.8834	21.3186	27.0689	31.5934	33.6798	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	461.9956	466.7897	454.7088	428.9900	396.5246	366.0118	345.6273	340.8332	352.9141	378.6329	411.0983	441.6112	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	55.4211	(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)													
	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	-116.6918	(71)
Water heating gains (Table 5)													
	159.6048	156.8797	151.6306	140.1262	133.0794	125.7137	121.1899	124.9277	129.3101	137.4831	148.5114	158.1339	(72)
Total internal gains													
	768.1365	766.5416	743.7762	700.8028	656.7661	616.8011	592.8036	595.4113	617.3098	656.9518	704.9700	747.1918	(73)

6. Solar gains

[Jan]												Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d		Gains W			
														Northeast	5.9800	11.2829	0.4000	0.8000	1.0000		19.4319	(75)
														Southeast	13.7500	36.7938	0.4000	0.8000	1.0000		145.7036	(77)
														Southwest	19.1900	36.7938	0.4000	0.8000	1.0000		203.3492	(79)
														Northwest	7.0200	11.2829	0.4000	0.8000	1.0000		22.8114	(81)
														Horizontal	2.6600	26.0000	0.4000	0.8000	1.0000		19.9181	(82)
Solar gains		411.2142	721.9219	1041.9771	1377.3185	1618.1082	1638.6805	1566.4977	1382.5131	1157.7349	812.7670	496.5185	349.3022	(83)								
Total gains		1179.3507	1488.4635	1785.7533	2078.1213	2274.8743	2255.4817	2159.3013	1977.9243	1775.0446	1469.7188	1201.4885	1096.4940	(84)								

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.3096	38.4455	38.5822	39.2810	39.4238	40.1537	40.1537	40.3029	39.8585	39.4238	39.1392	38.8587	
alpha	3.5540	3.5630	3.5721	3.6187	3.6283	3.6769	3.6769	3.6869	3.6572	3.6283	3.6093	3.5906	
util living area													
	0.9776	0.9514	0.8985	0.7904	0.6367	0.4672	0.3438	0.3883	0.6094	0.8575	0.9590	0.9822 (86)	
Living	19.5779	19.8534	20.2038	20.5692	20.7894	20.8861	20.9086	20.9047	20.8370	20.5117	19.9753	19.5358	
Non living	18.2171	18.5641	18.9960	19.4365	19.6728	19.7776	19.7930	19.7949	19.7341	19.3891	18.7356	18.1745	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	9	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	22	26	0	0	0	0	0	0	0	0	0	31	
MIT	20.4284	20.3151	20.2038	20.5692	20.7894	20.8861	20.9086	20.9047	20.8370	20.5117	19.9753	20.1707 (87)	
Th 2	19.8569	19.8604	19.8640	19.8819	19.8854	19.9034	19.9034	19.9070	19.8962	19.8854	19.8783	19.8711 (88)	
util rest of house													
	0.9724	0.9409	0.8775	0.7515	0.5783	0.3936	0.2603	0.2996	0.5304	0.8198	0.9483	0.9780 (89)	
MIT 2	19.3432	19.2366	18.9960	19.4365	19.6728	19.7776	19.7930	19.7949	19.7341	19.3891	18.7356	19.1223 (90)	
Living area fraction													
	19.6066	19.4983	19.2891	19.7114	19.9437	20.0466	20.0637	20.0642	20.0018	19.6615	19.0365	19.3767 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.6066	19.4983	19.2891	19.7114	19.9437	20.0466	20.0637	20.0642	20.0018	19.6615	19.0365	19.3767 (93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9710	0.9369	0.8650	0.7450	0.5815	0.4035	0.2727	0.3126	0.5384	0.8110	0.9378	0.9758 (94)	
Useful gains	1145.1838	1394.5701	1544.5896	1548.1150	1322.8873	910.0904	588.7401	618.3105	955.7385	1191.9954	1126.8111	1069.9503 (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													
	2744.1399	2607.9134	2276.6087	1890.3224	1436.1564	931.6131	592.4487	624.4280	1016.9468	1578.6236	2094.5928	2682.4096 (97)	
Space heating kWh													
	1189.6234	815.3667	544.6222	246.3893	84.2722	0.0000	0.0000	0.0000	0.0000	287.6514	696.8028	1199.6697 (98a)	
Space heating requirement - total per year (kWh/year)												5064.3976	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)	

Full SAP Calculation Printout



Solar heating contribution - total per year (kWh/year)	0.0000										
Space heating kWh	1189.6234	815.3667	544.6222	246.3893	84.2722	0.0000	0.0000	0.0000	0.0000	287.6514	696.8028
Space heating requirement after solar contribution - total per year (kWh/year)											1199.6697 (98c)
Space heating per m2											5064.3976
											(98c) / (4) = 36.1459 (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 %)												347.4270 (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	1189.6234	815.3667	544.6222	246.3893	84.2722	0.0000	0.0000	0.0000	0.0000	287.6514	696.8028	1199.6697 (98)
Space heating efficiency (main heating system 1)	347.4270	347.4270	347.4270	347.4270	347.4270	0.0000	0.0000	0.0000	0.0000	347.4270	347.4270	347.4270 (210)
Space heating fuel (main heating system)	342.4096	234.6872	156.7587	70.9183	24.2561	0.0000	0.0000	0.0000	0.0000	82.7948	200.5609	345.3012 (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	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382 (64)
Efficiency of water heater	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800	262.5800 (216)
Fuel for water heating, kWh/month	109.1208	96.4633	102.3255	89.5374	86.5170	77.6519	76.3852	79.5705	80.6177	90.2696	96.4524	107.8674 (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	46.2341	41.7598	46.2341	44.7426	46.2341	44.7426	46.2341	46.2341	44.7426	46.2341	44.7426	46.2341 (231)
Lighting	28.6826	23.0102	20.7182	15.1790	11.7247	9.5792	10.6957	13.9026	18.0581	23.6933	26.7615	29.4797 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-28.6164	-48.3913	-83.0032	-106.1301	-122.0973	-115.4189	-113.3114	-101.4826	-81.1234	-58.8878	-33.3276	-23.5562 (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	-6.2028	-16.9271	-45.5600	-88.2699	-135.0291	-143.7811	-139.7974	-108.7718	-67.9166	-29.4994	-9.4404	-4.5670 (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												1457.6867 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												262.5800
Water heating fuel used												1092.7785 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans:

(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 1.1625)		
mechanical ventilation fans (SFP = 1.1625)		544.3689 (230a)
Total electricity for the above, kWh/year		544.3689 (231)
Electricity for lighting (calculated in Appendix L)		231.4848 (232)

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

PV generation												-1711.1088 (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												1615.2100 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1457.6867	16.4900	240.3725 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1092.7785	16.4900	180.1992 (247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000 (247a)
Pumps, fans and electric keep-hot	544.3689	16.4900	89.7664 (249)
Energy for lighting	231.4848	16.4900	38.1718 (250)
Additional standing charges			0.0000 (251)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-915.3463	16.4900	-150.9406
PV Unit electricity exported	-795.7625	5.5900	-44.4831
Total			-195.4237 (252)
Total energy cost			353.0862 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):												0.3600 (256)
Energy cost factor (ECF)												0.6867 (257)
SAP value												88.8689

Full SAP Calculation Printout



SAP rating (Section 12)
SAP band

89 (258)
B

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	1457.6867	0.1568	228.5188	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1092.7785	0.1410	154.0683	(264)
Space and water heating			382.5871	(265)
Pumps, fans and electric keep-hot	544.3689	0.1387	75.5107	(267)
Energy for lighting	231.4848	0.1443	33.4104	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-915.3463	0.1322	-120.9718	
PV Unit electricity exported	-795.7625	0.1201	-95.5837	
Total			-216.5556	(269)
Total CO2, kg/year			274.9526	(272)
CO2 emissions per m2			1.9600	(273)
EI value			98.0096	
EI rating			98	(274)
EI band			A	

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

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	97.6200 (1b)	x 2.6000 (2b)	= 253.8120 (1b) - (3b)	
First floor	42.4900 (1c)	x 3.0600 (2c)	= 130.0194 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	140.1100		(4)	
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 383.8314 (5)	

2. Ventilation rate

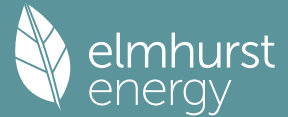
	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	0 * 10 =	0.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		4.0000 (17)
Infiltration rate		0.2000 (18)
Number of sides sheltered		0 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	1.0000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2000 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000	(22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500	(22a)
Adj infilt rate	0.2100	0.2000	0.2000	0.1850	0.1850	0.1650	0.1700	0.1600	0.1650	0.1750	0.1750	0.1900	(22b)
Balanced mechanical ventilation with heat recovery													
If mechanical ventilation												0.5000	(23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												77.4000	(23c)
Effective ac	0.3230	0.3130	0.3130	0.2980	0.2980	0.2780	0.2830	0.2730	0.2780	0.2880	0.2880	0.3030	(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								
NE-GD1			3.1200	1.0000	3.1200			(26)
NE-GW1			45.9400	1.1450	52.6031			(27)
H-RL1			2.6600	1.5918	4.2341			(27a)
FT1 - Ground			97.6200	0.1000	9.7620	110.0000	10738.2003	(28a)
WT1 - Brick faced	223.3700	49.0600	174.3100	0.1500	26.1465	60.0000	10458.5997	(29a)
RT1 - GF Flat	55.3300	1.6600	53.6700	0.1000	5.3670	9.0000	483.0300	(30)
RT2 - FF Flat	42.2900	1.0000	41.2900	0.1000	4.1290	9.0000	371.6100	(30)
Total net area of external elements Aum(A, m2)			418.6100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		105.3616			(33)
Main dwelling								
IW1			170.2100			9.0000	1531.8901	(32c)

Full SAP Calculation Printout



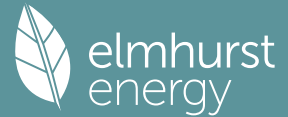
IF1	42.2900	18.0000	761.2200 (32d)
IC1	42.2900	9.0000	380.6100 (32e)
Heat capacity Cm = Sum(A x k)			
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K			
List of Thermal Bridges			
(28)...(30) + (32) + (32a)...(32e) = 24725.1601 (34)			
176.4696 (35)			
List of Thermal Bridges			
K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	21.9100	0.0250	0.5478
E3 Sill	8.7000	0.0220	0.1914
E4 Jamb	46.0400	0.0180	0.8287
E5 Ground floor (normal)	55.2300	0.0480	2.6510
E15 Flat roof with parapet	55.7000	0.3000	16.7100
E16 Corner (normal)	43.4400	0.0350	1.5204
E17 Corner (inverted - internal area greater than external area)	5.2000	-0.0660	-0.3432
R1 Head of roof window	8.1200	0.2400	1.9488
R2 Sill of roof window	8.1200	0.2400	1.9488
R3 Jamb of roof window	5.4200	0.2400	1.3008
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			
Point Thermal bridges			
(36a) = 0.0000			
Total fabric heat loss			
(33) + (36) + (36a) = 132.6661 (37)			
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)			
(38)m	Jan	Feb	Mar
Heat transfer coeff	40.9126	39.6459	39.6459
Average = Sum(39)m / 12 =	173.5787	172.3121	172.3121
HLP			
HLP (average)	1.2389	1.2298	1.2298
Days in mont	31	28	31
HLP			
HLP (average)	1.2389	1.2298	1.2298
Days in mont	31	28	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												
Hot water usage for mixer showers												
Hot water usage for baths												
Hot water usage for other uses												
Average daily hot water use (litres/day)												
Daily hot water use												
Energy conte												
Energy content (annual)												
Distribution loss (46)m = 0.15 x (45)m												
Water storage loss (or HIU loss):												
Store volume												
a) If manufacturer declared loss factor is known (kWh/day):												
Temperature factor from Table 2b												
Enter (49) or (54) in (55)												
Total storage loss												
If cylinder contains dedicated solar storage												
Primary loss												
Combi loss												
Total heat required for water heating calculated for each month												
WWHRS												
PV diverter												
Solar input												
FGHRS												
Output from w/h												
Electric shower(s)												
Heat gains from water heating, kWh/month												

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
(66)m												
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
Pumps, fans												
Losses e.g. evaporation (negative values) (Table 5)												
Water heating gains (Table 5)												
Total internal gains												

6. Solar gains							
[Jan]	Area	Solar flux	g	FF	Access	Gains	
	m2	Table 6a	Specific data	Specific data	factor	W	
		W/m2	or Table 6b	or Table 6c	Table 6d		

Full SAP Calculation Printout



Northeast	5.9800	12.9236	0.4000	0.8000	1.0000	22.2575 (75)
Southeast	13.7500	40.4699	0.4000	0.8000	1.0000	160.2609 (77)
Southwest	19.1900	40.4699	0.4000	0.8000	1.0000	223.6659 (79)
Northwest	7.0200	12.9236	0.4000	0.8000	1.0000	26.1283 (81)
Horizontal	2.6600	30.0000	0.4000	0.8000	1.0000	22.9824 (82)

Solar gains	455.2950	720.2984	1030.6314	1411.2054	1621.5265	1760.0333	1663.2607	1496.6014	1243.7331	866.8145	563.3857	382.9125 (83)
Total gains	1223.4314	1486.8400	1774.4076	2112.0082	2278.2926	2376.8345	2256.0643	2092.0127	1861.0429	1523.7663	1268.3557	1130.1043 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	39.5676	39.8585	39.8585	40.3029	40.3029	40.9111	40.7573	41.0660	40.9111	40.6047	40.6047	40.1537
alpha	3.6378	3.6572	3.6572	3.6869	3.6869	3.7274	3.7172	3.7377	3.7274	3.7070	3.7070	3.6769
util living area	0.9705	0.9433	0.8791	0.7413	0.5586	0.3484	0.2308	0.2547	0.4998	0.8040	0.9405	0.9765 (86)
Living	19.7638	19.9978	20.3408	20.6765	20.8497	20.9089	20.9158	20.9157	20.8851	20.6476	20.1747	19.7278
Non living	18.4759	18.7718	19.1875	19.5770	19.7504	19.8115	19.8111	19.8188	19.7970	19.5651	19.0104	18.4419
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	7	0	0	0	0	0	0	0	0	0	0	0
16 / 9	24	19	0	0	0	0	0	0	0	0	0	31
MIT	20.4579	20.2927	20.3408	20.6765	20.8497	20.9089	20.9158	20.9157	20.8851	20.6476	20.1747	20.2795 (87)
Th 2	19.8890	19.8962	19.8962	19.9070	19.9070	19.9214	19.9178	19.9251	19.9214	19.9142	19.9142	19.9034 (88)
util rest of house	0.9635	0.9309	0.8540	0.6958	0.4937	0.2753	0.1506	0.1697	0.4156	0.7549	0.9249	0.9708 (89)
MIT 2	19.4061	19.1980	19.1875	19.5770	19.7504	19.8115	19.8111	19.8188	19.7970	19.5651	19.0104	19.2583 (90)
Living area fraction									fLA =	Living area / (4) =		0.2427 (91)
MIT	19.6614	19.4636	19.4673	19.8438	20.0171	20.0778	20.0792	20.0850	20.0611	19.8278	19.2929	19.5061 (92)
Temperature adjustment												0.0000
adjusted MIT	19.6614	19.4636	19.4673	19.8438	20.0171	20.0778	20.0792	20.0850	20.0611	19.8278	19.2929	19.5061 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9618	0.9251	0.8428	0.6930	0.5005	0.2860	0.1626	0.1824	0.4269	0.7505	0.9138	0.9684 (94)
Useful gains	1176.7532	1375.4828	1495.4040	1463.5372	1140.3386	679.8559	366.8600	381.6116	794.4206	1143.5663	1159.0410	1094.3507 (95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000 (96)
Heat loss rate W	2527.5465	2388.8732	2079.3485	1694.5466	1195.8071	684.5782	367.2207	382.1550	816.0710	1391.6989	1910.1481	2464.1017 (97)
Space heating kWh	1004.9902	680.9984	434.4547	166.3267	41.2685	0.0000	0.0000	0.0000	0.0000	184.6107	540.7972	1019.0948 (98a)
Space heating requirement - total per year (kWh/year)												4072.5412
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	1004.9902	680.9984	434.4547	166.3267	41.2685	0.0000	0.0000	0.0000	0.0000	184.6107	540.7972	1019.0948 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4072.5412
Space heating per m2										(98c) / (4) =		29.0667 (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 %)												344.0235 (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	1004.9902	680.9984	434.4547	166.3267	41.2685	0.0000	0.0000	0.0000	0.0000	184.6107	540.7972	1019.0948 (98)
Space heating efficiency (main heating system 1)	344.0235	344.0235	344.0235	344.0235	344.0235	0.0000	0.0000	0.0000	0.0000	344.0235	344.0235	344.0235 (210)
Space heating fuel (main heating system)	292.1283	197.9511	126.2863	48.3475	11.9958	0.0000	0.0000	0.0000	0.0000	53.6622	157.1977	296.2282 (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	286.5294	253.2932	268.6863	235.1072	227.1762	203.8982	200.5724	208.9361	211.6859	237.0299	253.2646	283.2382 (64)
Efficiency of water heater	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631	262.2631 (216)
Fuel for water heating, kWh/month	109.2526	96.5798	102.4491	89.6455	86.6215	77.7457	76.4775	79.6666	80.7151	90.3786	96.5689	107.9977 (219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	46.2341	41.7598	46.2341	44.7426	46.2341	44.7426	46.2341	46.2341	44.7426	46.2341	44.7426	46.2341 (231)
Lighting	28.6826	23.0102	20.7182	15.1790	11.7247	9.5792	10.6957	13.9026	18.0581	23.6933	26.7615	29.4797 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-32.3250	-49.4953	-83.4689	-108.0499	-122.0639	-121.0019	-118.1324	-107.7691	-86.8044	-62.9794	-38.1672	-26.4367 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)	-7.8510	-18.2423	-47.7727	-95.4221	-139.0801	-160.2301	-153.7252	-123.9125	-77.7876	-34.7822	-12.3768	-5.7041 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)

Full SAP Calculation Printout



Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year												
Space heating fuel - main system 1											1183.7973	(211)
Space heating fuel - main system 2											0.0000	(213)
Space heating fuel - secondary											0.0000	(215)
Efficiency of water heater											262.2631	
Water heating fuel used											1094.0987	(219)
Space cooling fuel											0.0000	(221)

Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 1.1625)												
mechanical ventilation fans (SFP = 1.1625)											544.3689	(230a)
Total electricity for the above, kWh/year											544.3689	(231)
Electricity for lighting (calculated in Appendix L)											231.4848	(232)

Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation											-1833.5808	(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											1220.1688	(238)

10a. Fuel costs - using BEDF prices (593)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1183.7973	27.6700	327.5567 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1094.0987	27.6700	302.7371 (247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000 (247a)
Pumps, fans and electric keep-hot	544.3689	27.6700	150.6269 (249)
Energy for lighting	231.4848	27.6700	64.0518 (250)
Additional standing charges			0.0000 (251)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-956.6941	27.6700	-264.7173
PV Unit electricity exported	-876.8867	5.8100	-50.9471
Total			-315.6644 (252)
Total energy cost			529.3081 (255)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1183.7973	0.1575	186.4282 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1094.0987	0.1410	154.2544 (264)
Space and water heating			340.6826 (265)
Pumps, fans and electric keep-hot	544.3689	0.1387	75.5107 (267)
Energy for lighting	231.4848	0.1443	33.4104 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-956.6941	0.1322	-126.4534
PV Unit electricity exported	-876.8867	0.1199	-105.1289
Total			-231.5823 (269)
Total CO2, kg/year			218.0214 (272)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1183.7973	1.5830	1873.9242 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1094.0987	1.5213	1664.4804 (278)
Space and water heating			3538.4047 (279)
Pumps, fans and electric keep-hot	544.3689	1.5128	823.5212 (281)
Energy for lighting	231.4848	1.5338	355.0591 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-956.6941	1.4884	-1423.9130
PV Unit electricity exported	-876.8867	0.4397	-385.5733
Total			-1809.4863 (283)
Total Primary energy kWh/year			2907.4987 (286)

Predicted Energy Assessment

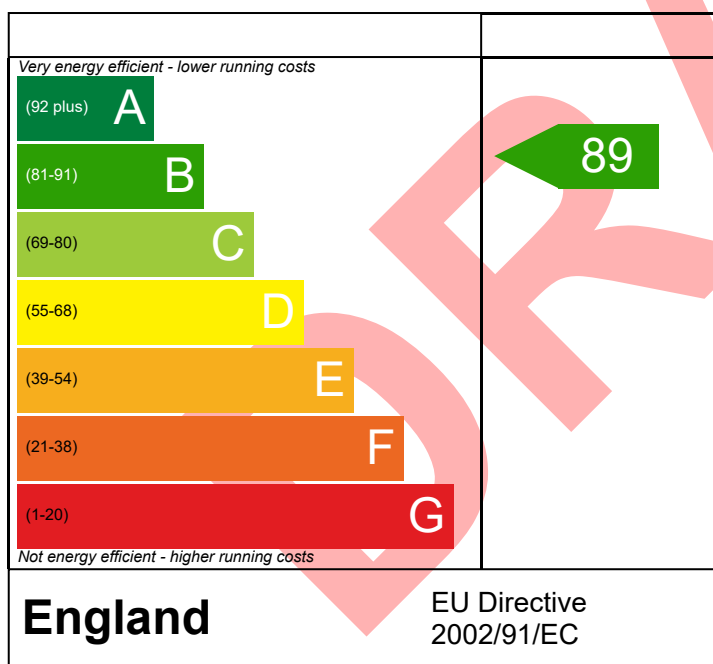


Dwelling type: House, Detached
Date of assessment: 21/04/2026
SAP Version: 10.2
Produced by: Derek White
Total floor area: 140.11 m²
DRRN:

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.

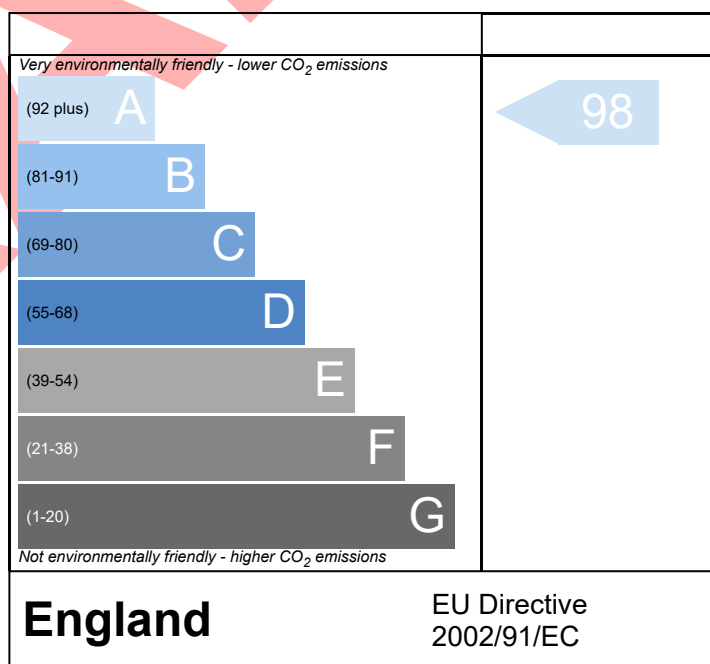
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

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 (CO₂) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Thermal Bridging

Plot Reference	3 Be Green	Issued on Date	21/04/2026
Assessment Reference	001	Plot Type Ref	Detached House
Plot Address		SAP Version	10.2

SAP Rating	89 B	DER	2.18	TER	12.53
Environmental	98 A	% DER < TER			82.60
CO ₂ Emissions (t/year)	0.22	DFEE	52.98	TFEE	59.79
Compliance Check	See BREL	% DFEE < TFEE			11.40
% DPER < TPER	59.95	DPER	26.71	TPER	66.69

Assessor Details	Mr. Derek White	Assessor ID	B381-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E2 Other lintels (including other steel lintels)	Independently assessed	0.025	21.91	0.55	
External wall	E3 Sill	Independently assessed	0.022	8.70	0.19	
External wall	E4 Jamb	Independently assessed	0.018	46.04	0.83	
External wall	E5 Ground floor (normal)	Independently assessed	0.048	55.23	2.65	
External wall	E15 Flat roof with parapet	Table K1 - Default	0.300	55.70	16.71	
External wall	E16 Corner (normal)	Independently assessed	0.035	43.44	1.52	
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.066	5.20	-0.34	
External roof	R1 Head of roof window	Table K1 - Default	0.240	8.12	1.95	
External roof	R2 Sill of roof window	Table K1 - Default	0.240	8.12	1.95	
External roof	R3 Jamb of roof window	Table K1 - Default	0.240	5.42	1.30	

Total: 257.88 W/mK:
Y-Value: 0.07 W/m²K:

Energy Report



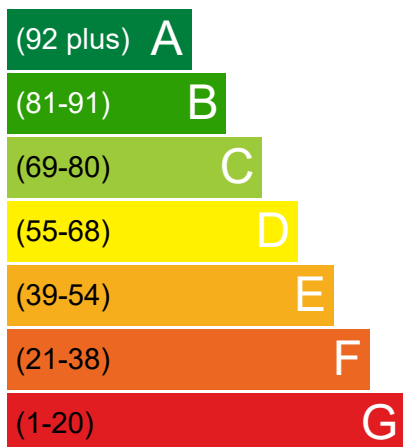
Dwelling Address	
Reference	3 Be Green-001
SAP Version	10.2
Assessment Date	21/04/2026
Submission Date	
Property Type	House, Detached
Total Floor Area	140

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

Most energy efficient - lower running costs

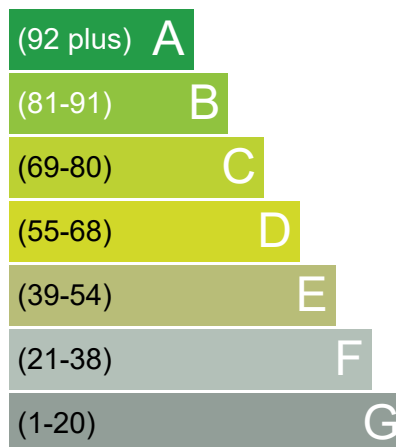


CURRENT POTENTIAL

89 89

Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



CURRENT POTENTIAL

98 98

Additional ratings for your home

	Primary Energy	Energy	Carbon	Cost	HTC
CURRENT	20.75 kWh	1220 kWh	218 kg	529.31 £	175 W/K
POTENTIAL	20.75 kWh	1220 kWh	218 kg	529.31 £	175 W/K

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
-----------	------	---------	------	-----------

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.15 W/m ² K	Very Good
Roof	Average thermal transmittance 0.1 W/m ² K	Very Good
Floor	Average thermal transmittance 0.1 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, radiators and underfloor, electric	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] = 4.0 m ³ /h.m ² (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	£52	B 90			A 98

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		£64	£64	
Heating		£478	£478	
Hot Water		£303	£303	
New Technologies e.g. Impact of PV		-(£316)	-(£316)	
TOTAL		£529	£529	

Estimated energy use and potential savings



Space Heating

1184

kWh per year



Water Heating

1094

kWh per year

About this document

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

Disclaimer

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

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	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.