Summary for Input Data

Plot Reference	Plot 1	**Issued on Date**	22/10/2026
Assessment Reference	00001 Rev A	**Plot Type Ref**	
Plot Address	Rock House, Plot 1, Old Frome Road To Underhill, Somerset, BA3 4TQ	**SAP Version**	10.2

SAP Rating	94 A	**DER**	1.21	**TER**	10.45
Environmental	99 A	**% DER < TER**			88.42
CO_2 Emissions (t/year)	0.08	**DFEE**	37.47	**TFEE**	37.56
Compliance Check	See BREL	**% DFEE < TFEE**			0.24
% DPER < TPER	72.62	**DPER**	14.93	**TPER**	54.53

Assessor Details	Mr. Chris Law	**Assessor ID**	AX42-0001
Client	Rock House, Philip Jenkins		

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

Orientation	East	
Property Tenture	ND	
Transaction Type	5	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	73.61	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	30.00 m	53.00 m²	2.40 m
1st Storey:	30.00 m	53.00 m²	2.30 m

8.0 Living Area 43.00 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Timber Frame	Timber framed wall (one layer of plasterboard)	0.15	9.00	141.00	123.30	0.00	None	17.70	Enter Gross Area

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	196.00

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Plasterboard, insulated at ceiling level	0.07	9.00	53.00	53.00	None	0.00	Enter Gross Area	0.00

10.2 Internal Ceilings

Description	Storey	Construction	Kappa	Area (m²)
Internal Ceiling 1	+1	Plasterboard ceiling, carpeted chipboard floor	9.00	53.00

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.09	None	0.00	75.00	53.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double glazed			0.76		0.70	1.20
External Door	Manufacturer	Solid Door				0.00			1.00

Summary for Input Data

elmhurst energy

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Front	Window	External Wall 1	East	4.21	
Front	Window	External Wall 1	East	1.44	
Front	Window	External Wall 1	East	1.45	
Front	External Door	External Wall 1	East	1.95	
Rear	Window	External Wall 1	West	1.33	
Rear	Window	External Wall 1	West	1.44	
Rear	Window	External Wall 1	West	2.11	
Rear	Window	External Wall 1	West	3.76	

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

17.0 Thermal Bridging	User Input	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate		12.87			Yes
E3 Sill		11.94			Yes
E4 Jamb		27.20			Yes
E5 Ground floor (normal)		30.00			Yes
E6 Intermediate floor within a dwelling		30.00			Yes
E16 Corner (normal)		23.55			No
E10 Eaves (insulation at ceiling level)		10.87			No
E12 Gable (insulation at ceiling level)		15.69			No
E17 Corner (inverted – internal area greater than external area)		4.71			No

Y-value	0.08	W/m²K
Description	ECD	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	4	
Number of passive vents	0	
Number of flueless gas fires	0	

21.0 Fixed Cooling System	No	

22.0 Pressure Testing	Yes	
Designed AP_{50}	5.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	775.90	8.30	6440.00	24

24.0 Main Heating 1	Database	
Percentage of Heat	100.00	%
Database Ref. No.	102606	
Fuel Type	Electricity	
In Winter	228.09	
In Summer	163.62	
Model Name	aroTHERM 5kW	

Summary for Input Data

elmhurst energy

Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2207	
Controls description	Time and temperature zone control by arrangement	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	
Flow Temperature	Enter value	
Flow Temperature Value	55.00	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Main Heating 1	
SAP Code	901	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
Cold Water Source	From mains	
Bath Count	1	
Immersion Only Heating Hot Water	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	210.00	L
Loss	1.60	kWh/day
Pipes insulation	Fully insulated primary pipework	
31.0 Thermal Store	None	
32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	Yes	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.00	South	45°	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

Summary for Input Data

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			A 95	A 100
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Plot 1	**Issued on Date**	22/10/2026
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% DPER < TPER	72.62	**DPER**	14.93	**TPER**	54.53

Assessor Details	Mr. Chris Law	**Assessor ID**	AX42-0001
Client	Rock House, Philip Jenkins		

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

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.0000 (1b)	x	2.4000 (2b)	=	127.2000	(1b) - (3b)
First floor	53.0000 (1c)	x	2.3000 (2c)	=	121.9000	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	106.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	249.1000	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys		0 * 80 =	0.0000 (6a)
Number of open flues		0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000 (6d)
Number of flues attached to other heater		0 * 35 =	0.0000 (6e)
Number of blocked chimneys		0 * 20 =	0.0000 (6f)
Number of intermittent extract fans		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) =	0.1606 (8)
Pressure test			Yes
Pressure Test Method			Blower Door
Measured/design AP50			5.0000 (17)
Infiltration rate			0.4106 (18)
Number of sides sheltered			2 (19)
Shelter factor		(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor		(21) = (18) x (20) =	0.3490 (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	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101	(22b)
Effective ac	0.5990	0.5952	0.5914	0.5737	0.5704	0.5550	0.5550	0.5521	0.5609	0.5704	0.5771	0.5841	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Window			15.7400	1.1450	18.0229			(27)
External Door			1.9500	1.0000	1.9500			(26)
Heatloss Floor 1			53.0000	0.0900	4.7700	75.0000	3975.0000	(28a)
External Wall 1	141.0000	17.6900	123.3100	0.1500	18.4965	9.0000	1109.7900	(29a)
External Roof 1	53.0000		53.0000	0.0700	3.7100	9.0000	477.0000	(30)
Total net area of external elements Aum(A, m2)			247.0000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		46.9494			(33)
Main dwelling								
Internal Wall 1			196.0000			9.0000	1764.0000	(32c)
Internal Ceiling 1			53.0000			9.0000	477.0000	(32e)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	7802.7900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		73.6112 (35)
Thermal bridges (User defined value 0.080 * total exposed area)		19.7600 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	66.7094 (37)

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

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

(38)m	49.2393	48.9233	48.6136	47.1587	46.8865	45.6194	45.6194	45.3847	46.1075	46.8865	47.4372	48.0128	(38)
Heat transfer coeff													
	115.9487	115.6327	115.3230	113.8681	113.5959	112.3288	112.3288	112.0941	112.8169	113.5959	114.1466	114.7222	(39)
Average = Sum(39)m / 12 =												113.8668	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0939	1.0909	1.0880	1.0742	1.0717	1.0597	1.0597	1.0575	1.0643	1.0717	1.0769	1.0823	(40)
HLP (average)												1.0742	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.7886	(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													
	81.8650	80.6492	78.9371	75.7803	73.4165	70.7954	69.3796	71.0797	72.9309	75.7355	78.9574	81.5883	(42b)
Hot water usage for other uses													
	43.1877	41.6172	40.0467	38.4763	36.9058	35.3354	35.3354	36.9058	38.4763	40.0467	41.6172	43.1877	(42c)
Average daily hot water use (litres/day)												115.1633	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	125.0527	122.2664	118.9838	114.2565	110.3223	106.1307	104.7150	107.9856	111.4072	115.7823	120.5746	124.7759	(44)
Energy conte	198.0529	174.1057	182.8737	156.4115	148.5150	130.5001	126.6437	133.7087	137.3762	157.1155	171.7806	195.3689	(45)
Energy content (annual)										Total = Sum(45)m =		1912.4525	
Distribution loss (46)m = 0.15 x (45)m													
	29.7079	26.1159	27.4311	23.4617	22.2772	19.5750	18.9966	20.0563	20.6064	23.5673	25.7671	29.3053	(46)
Water storage loss (or HIU loss):													
Store volume												210.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6000	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8640	(55)
Total storage loss													
	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(56)
If cylinder contains dedicated solar storage													
	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(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													
	248.0993	219.3089	232.9201	204.8435	198.5614	178.9321	176.6901	183.7551	185.8082	207.1619	220.2126	245.4153	(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	-30.9028	-62.2324	-116.5264	-166.1420	-198.5614	-178.9321	-176.6901	-181.2300	-139.1110	-86.8910	-40.6716	-24.6880	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	217.1965	157.0765	116.3937	38.7015	0.0000	0.0000	0.0000	2.5251	46.6972	120.2708	179.5410	220.7273	(64)
									Total per year (kWh/year) = Sum(64)m =			1099.1297	(64)
12Total per year (kWh/year)												1099	(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													
	105.8897	94.0527	100.8426	90.7524	89.4184	82.1369	82.1461	84.4953	84.4232	92.2780	95.8626	104.9973	(65)

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

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	141.9572	157.1669	141.9572	146.6891	141.9572	146.6891	141.9572	141.9572	146.6891	141.9572	146.6891	141.9572	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	265.6788	268.4357	261.4884	246.6983	228.0285	210.4816	198.7591	196.0022	202.9495	217.7396	236.4094	253.9563	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	(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)													
	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	(71)
Water heating gains (Table 5)													
	142.3249	139.9594	135.5412	126.0450	120.1860	114.0790	110.4115	113.5689	117.2544	124.0296	133.1426	141.1254	(72)
Total internal gains													
	614.7893	630.3905	603.8152	584.2609	555.0002	536.0782	515.9563	516.3568	531.7215	548.5548	581.0695	601.8674	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
East	7.1000	19.6403	0.7600	0.7000	0.7700	51.4103	(76)
West	8.6400	19.6403	0.7600	0.7000	0.7700	62.5613	(80)

Solar gains	113.9717	222.9528	367.1714	535.4977	656.2725	671.8117	639.5921	549.4002	427.0356	264.5522	142.1093	93.7248	(83)
Total gains	728.7610	853.3432	970.9867	1119.7586	1211.2726	1207.8898	1155.5484	1065.7569	958.7571	813.1071	723.1788	695.5922	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	18.6931	18.7442	18.7945	19.0347	19.0803	19.2955	19.2955	19.3359	19.2120	19.0803	18.9882	18.8929	
alpha	2.2462	2.2496	2.2530	2.2690	2.2720	2.2864	2.2864	2.2891	2.2808	2.2720	2.2659	2.2595	
util living area													
	0.9275	0.8983	0.8514	0.7624	0.6457	0.5053	0.3903	0.4316	0.6202	0.8109	0.9006	0.9337	(86)
Living	18.0495	18.4331	19.0159	19.7628	20.3517	20.7421	20.8973	20.8678	20.5642	19.7664	18.7947	17.9940	

Non living	16.5504	17.0323	17.7607	18.6814	19.3790	19.8177	19.9684	19.9469	19.6396	18.7091	17.5012	16.4849	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	19.4906	18.4331	19.0159	19.7628	20.3517	20.7421	20.8973	20.8678	20.5642	19.7664	18.7947	18.4145	(87)
Th 2	20.0059	20.0083	20.0107	20.0219	20.0240	20.0339	20.0339	20.0357	20.0301	20.0240	20.0198	20.0153	(88)
util rest of house	0.9192	0.8869	0.8347	0.7356	0.6050	0.4466	0.3152	0.3551	0.5638	0.7831	0.8876	0.9261	(89)
MIT 2	18.6273	17.0323	17.7607	18.6814	19.3790	19.8177	19.9684	19.9469	19.6396	18.7091	17.5012	17.1208	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	18.9775	17.6005	18.2699	19.1201	19.7736	20.1927	20.3452	20.3205	20.0147	19.1380	18.0259	17.6456	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.9775	17.6005	18.2699	19.1201	19.7736	20.1927	20.3452	20.3205	20.0147	19.1380	18.0259	17.6456	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9091	0.8509	0.7983	0.7074	0.5936	0.4567	0.3402	0.3786	0.5629	0.7530	0.8530	0.9019	(94)
Useful gains	662.5303	726.1459	775.1871	792.0634	719.0292	551.6596	393.1497	403.5213	539.6584	612.2432	616.8648	627.3397	(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	1701.8367	1468.5964	1357.3346	1163.7411	917.1267	628.2203	420.6957	439.4623	667.2738	969.8842	1247.1512	1542.5082	(97)
Space heating kWh	773.2439	498.9267	433.1177	267.6079	147.3845	0.0000	0.0000	0.0000	0.0000	266.0849	453.8062	680.8854	(98a)
Space heating requirement - total per year (kWh/year)												3521.0574	
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	773.2439	498.9267	433.1177	267.6079	147.3845	0.0000	0.0000	0.0000	266.0849	453.8062		680.8854	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3521.0574	
Space heating per m2											(98c) / (4) =	33.2175	(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 %)												228.0950	(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	773.2439	498.9267	433.1177	267.6079	147.3845	0.0000	0.0000	0.0000	0.0000	266.0849	453.8062	680.8854	(98)
Space heating efficiency (main heating system 1)	228.0950	228.0950	228.0950	228.0950	228.0950	0.0000	0.0000	0.0000	0.0000	228.0950	228.0950	228.0950	(210)
Space heating fuel (main heating system)	339.0008	218.7364	189.8848	117.3230	64.6154	0.0000	0.0000	0.0000	0.0000	116.6553	198.9549	298.5096	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	217.1965	157.0765	116.3937	38.7015	0.0000	0.0000	0.0000	2.5251	46.6972	120.2708	179.5410	220.7273	(64)
Efficiency of water heater												163.6200	(216)
(217)m	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	(217)
Fuel for water heating, kWh/month	132.7445	96.0008	71.1366	23.6533	0.0000	0.0000	0.0000	1.5433	28.5400	73.5062	109.7305	134.9024	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.7473	19.0510	17.1533	12.5672	9.7073	7.9310	8.8553	11.5105	14.9510	19.6165	22.1568	24.4073	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-77.0126	-104.4235	-142.3315	-144.4744	-138.4837	-111.7335	-110.2355	-106.6577	-105.6009	-111.6003	-82.0188	-66.3347	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-0.5778	-6.8450	-20.3784	-43.5729	-87.0044	-122.7421	-123.2095	-76.5636	-54.3361	-18.2162	-4.2546	-0.7970	(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	1543.6802	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	163.6200	
Water heating fuel used	671.7575	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	191.6546	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1859.4046	(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	547.6877	(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	1543.6802	0.1549	239.1781	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	671.7575	0.1540	103.4738	(264)
Space and water heating			342.6519	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	191.6546	0.1443	27.6617	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1300.9071	0.1375	-178.8254	
PV Unit electricity exported	-558.4975	0.1141	-63.7034	
Total			-242.5288	(269)
Total CO2, kg/year			127.7848	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			1.2100	(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	1543.6802	1.5736	2429.0837	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	671.7575	1.5701	1054.7496	(278)
Space and water heating			3483.8334	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	191.6546	1.5338	293.9662	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1300.9071	1.5082	-1962.0638	
PV Unit electricity exported	-558.4975	0.4178	-233.3271	
Total			-2195.3909	(283)
Total Primary energy kWh/year			1582.4086	(286)
Dwelling Primary energy Rate (DPER)			14.9300	(287)

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.0000	(1b) x	2.4000	(2b) =	127.2000	(1b) - (3b)
First floor	53.0000	(1c) x	2.3000	(2c) =	121.9000	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	106.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		249.1000	(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	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) =	0.1606 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.4106 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3490 (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	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101	(22b)
Effective ac	0.5990	0.5952	0.5914	0.5737	0.5704	0.5550	0.5550	0.5521	0.5609	0.5704	0.5771	0.5841	(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			1.9500	1.0000	1.9500			(26)
TER Opening Type			15.7400	1.1450	18.0229			(27)

Heatloss Floor 1			53.0000	0.1300	6.8900	(28a)
External Wall 1	141.0000	17.6900	123.3100	0.1800	22.1958	(29a)
External Roof 1	53.0000		53.0000	0.1100	5.8300	(30)
Total net area of external elements Aum(A, m2)			247.0000			(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		54.8887	(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.6112 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	12.8700	0.0500	0.6435
E3 Sill	11.9400	0.0500	0.5970
E4 Jamb	27.2000	0.0500	1.3600
E5 Ground floor (normal)	30.0000	0.1600	4.8000
E6 Intermediate floor within a dwelling	30.0000	0.0000	0.0000
E16 Corner (normal)	23.5500	0.0900	2.1195
E10 Eaves (insulation at ceiling level)	10.8700	0.0600	0.6522
E12 Gable (insulation at ceiling level)	15.6900	0.0600	0.9414
E17 Corner (inverted - internal area greater than external area)	4.7100	-0.0900	-0.4239

Thermal bridges (Sum(L x Psi) calculated using Appendix K)		10.6897 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	65.5784 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	49.2393	48.9233	48.6136	47.1587	46.8865	45.6194	45.6194	45.3847	46.1075	46.8865	47.4372	48.0128	(38)
Heat transfer coeff	114.8177	114.5017	114.1920	112.7371	112.4649	111.1978	111.1978	110.9631	111.6859	112.4649	113.0156	113.5912	(39)
Average = Sum(39)m / 12 =												112.7358	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0832	1.0802	1.0773	1.0636	1.0610	1.0490	1.0490	1.0468	1.0536	1.0610	1.0662	1.0716	(40)
HLP (average)												1.0635	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.7886 (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

81.8650	80.6492	78.9371	75.7803	73.4165	70.7954	69.3796	71.0797	72.9309	75.7355	78.9574	81.5883	(42b)

Hot water usage for other uses

43.1877	41.6172	40.0467	38.4763	36.9058	35.3354	35.3354	36.9058	38.4763	40.0467	41.6172	43.1877	(42c)

Average daily hot water use (litres/day) 115.1633 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	125.0527	122.2664	118.9838	114.2565	110.3223	106.1307	104.7150	107.9856	111.4072	115.7823	120.5746	124.7759	(44)
Energy conte	198.0529	174.1057	182.8737	156.4115	148.5150	130.5001	126.6437	133.7087	137.3762	157.1155	171.7806	195.3689	(45)
Energy content (annual)										Total = Sum(45)m =		1912.4525	
Distribution loss (46)m = 0.15 x (45)m	29.7079	26.1159	27.4311	23.4617	22.2772	19.5750	18.9966	20.0563	20.6064	23.5673	25.7671	29.3053	(46)

Water storage loss (or HIU loss):

Store volume	210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.7016 (48)
Temperature factor from Table 2b	0.5400 (49)
Enter (49) or (54) in (55)	0.9188 (55)

Total storage loss

28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842	(56)

If cylinder contains dedicated solar storage

28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842	(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

249.7995	220.8446	234.6203	206.4888	200.2616	180.5775	178.3903	185.4553	187.4535	208.8620	221.8579	247.1155	(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

249.7995	220.8446	234.6203	206.4888	200.2616	180.5775	178.3903	185.4553	187.4535	208.8620	221.8579	247.1155	(64)
									Total per year (kWh/year) = Sum(64)m =		2521.7269	(64)
12Total per year (kWh/year)											2522	(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

107.2499	95.2812	102.2028	92.0687	90.7785	83.4532	83.5063	85.8554	85.7395	93.6382	97.1789	106.3574	(65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	141.9572	157.1669	141.9572	146.6891	141.9572	146.6891	141.9572	141.9572	146.6891	141.9572	146.6891	141.9572	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	265.6788	268.4357	261.4884	246.6983	228.0285	210.4816	198.7591	196.0022	202.9495	217.7396	236.4094	253.9563	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	(69)
Pumps, fans 3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	(71)
Water heating gains (Table 5)	144.1530	141.7876	137.3693	127.8732	122.0141	115.9072	112.2396	115.3971	119.0826	125.8577	134.9707	142.9536	(72)
Total internal gains	619.6175	635.2186	608.6434	589.0891	559.8283	537.9063	517.7844	518.1849	533.5497	553.3830	585.8977	606.6956	(73)

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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	
East				7.1000		19.6403	0.6300	0.7000		0.7700		42.6165	(76)
West				8.6400		19.6403	0.6300	0.7000		0.7700		51.8600	(80)
Solar gains	94.4765	184.8161	304.3658	443.8994	544.0154	556.8965	530.1882	455.4238	353.9900	219.2999	117.8011	77.6929	(83)
Total gains	714.0940	820.0348	913.0092	1032.9885	1103.8437	1094.8028	1047.9726	973.6087	887.5397	772.6829	703.6988	684.3885	(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	18.8772	18.9293	18.9807	19.2256	19.2722	19.4918	19.4918	19.5330	19.4066	19.2722	19.1783	19.0811	
alpha	2.2585	2.2620	2.2654	2.2817	2.2848	2.2995	2.2995	2.3022	2.2938	2.2848	2.2786	2.2721	
util living area	0.9298	0.9043	0.8641	0.7849	0.6766	0.5387	0.4199	0.4603	0.6459	0.8230	0.9046	0.9353	(86)
MIT	18.0523	18.4056	18.9564	19.6880	20.2901	20.7090	20.8825	20.8512	20.5300	19.7331	18.7869	18.0031	(87)
Th 2	20.0146	20.0170	20.0194	20.0307	20.0328	20.0427	20.0427	20.0445	20.0389	20.0328	20.0285	20.0241	(88)
util rest of house	0.9217	0.8936	0.8484	0.7597	0.6369	0.4791	0.3416	0.3814	0.5904	0.7965	0.8921	0.9279	(89)
MIT 2	16.5581	17.0028	17.6936	18.6006	19.3200	19.7957	19.9665	19.9431	19.6133	18.6763	17.4964	16.5006	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	17.1643	17.5719	18.2059	19.0417	19.7135	20.1662	20.3381	20.3115	19.9852	19.1050	18.0199	17.1101	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.1643	17.5719	18.2059	19.0417	19.7135	20.1662	20.3381	20.3115	19.9852	19.1050	18.0199	17.1101	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8896	0.8584	0.8123	0.7297	0.6226	0.4872	0.3667	0.4045	0.5870	0.7658	0.8580	0.8971	(94)
Useful gains	635.2629	703.8976	741.6350	753.8093	687.2151	533.4363	384.2689	393.7886	520.9764	591.7299	603.7638	613.9617	(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	1477.0446	1450.9536	1336.7205	1143.3492	901.2422	618.9506	415.6667	434.0293	657.2905	956.5171	1234.1169	1466.4738	(97)
Space heating kWh	626.2856	502.0216	442.7436	280.4688	159.2362	0.0000	0.0000	0.0000	0.0000	271.4017	453.8542	634.2690	(98a)
Space heating requirement - total per year (kWh/year)												3370.2807	
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	626.2856	502.0216	442.7436	280.4688	159.2362	0.0000	0.0000	0.0000	0.0000	271.4017	453.8542	634.2690	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3370.2807	
Space heating per m2											(98c) / (4) =	31.7951	(99)

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												92.3000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	626.2856	502.0216	442.7436	280.4688	159.2362	0.0000	0.0000	0.0000	0.0000	271.4017	453.8542	634.2690	(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)	678.5326	543.9021	479.6789	303.8665	172.5202	0.0000	0.0000	0.0000	0.0000	294.0430	491.7164	687.1820	(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	249.7995	220.8446	234.6203	206.4888	200.2616	180.5775	178.3903	185.4553	187.4535	208.8620	221.8579	247.1155	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.0334	85.8422	85.4615	84.7471	83.5508	79.8000	79.8000	79.8000	79.8000	84.6482	85.6292	86.0781	(217)
Fuel for water heating, kWh/month	290.3519	257.2681	274.5334	243.6531	239.6884	226.2876	223.5467	232.4001	234.9042	246.7413	259.0916	287.0828	(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	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	29.4959	23.6627	21.3057	15.6094	12.0572	9.8508	10.9990	14.2969	18.5702	24.3651	27.5203	30.3157	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-48.2307	-67.3046	-95.7498	-106.4826	-113.7962	-105.7974	-104.4378	-99.0691	-89.4785	-76.3656	-52.7580	-41.7755	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-29.3718	-61.5408	-121.8889	-182.4749	-240.7391	-241.7412	-238.9433	-202.5953	-148.8405	-87.8643	-39.1629	-23.2491	(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												3651.4418	(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	3015.5491	(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)	238.0489	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-2619.6578	(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	4371.3819	(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	3651.4418	0.2100	766.8028	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3015.5491	0.2100	633.2653	(264)
Space and water heating			1400.0681	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	238.0489	0.1443	34.3578	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1001.2458	0.1348	-134.9902	
PV Unit electricity exported	-1618.4120	0.1260	-203.8992	
Total			-338.8894	(269)
Total CO2, kg/year			1107.4658	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.4500	(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	3651.4418	1.1300	4126.1292	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3015.5491	1.1300	3407.5705	(278)
Space and water heating			7533.6996	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	238.0489	1.5338	365.1273	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1001.2458	1.4983	-1500.1599	
PV Unit electricity exported	-1618.4120	0.4625	-748.4564	
Total			-2248.6163	(283)
Total Primary energy kWh/year			5780.3115	(286)
Target Primary Energy Rate (TPER)			54.5300	(287)

Full SAP Calculation Printout

Plot Reference	Plot 1	**Issued on Date**	22/10/2026
Assessment Reference	00001 Rev A	**Plot Type Ref**	
Plot Address	Rock House, Plot 1, Old Frome Road To Underhill, Somerset, BA3 4TQ	**SAP Version**	10.2

SAP Rating	94 A	**DER**	1.21	**TER**	10.45
Environmental	99 A	**% DER < TER**			88.42
CO_2 Emissions (t/year)	0.08	**DFEE**	37.47	**TFEE**	37.56
Compliance Check	See BREL	**% DFEE < TFEE**			0.24
% DPER < TPER	72.62	**DPER**	14.93	**TPER**	54.53

Assessor Details	Mr. Chris Law	**Assessor ID**	AX42-0001
Client	Rock House, Philip Jenkins		

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.0000 (1b)	x	2.4000 (2b)	=	127.2000	(1b) - (3b)
First floor	53.0000 (1c)	x	2.3000 (2c)	=	121.9000	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	106.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	249.1000	(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	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) =	0.1606	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.4106	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3490	(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	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101	(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)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Effective ac	0.5990	0.5952	0.5914	0.5737	0.5704	0.5550	0.5550	0.5521	0.5609	0.5704	0.5771	0.5841	(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								
Window			15.7400	1.1450	18.0229			(27)
External Door			1.9500	1.0000	1.9500			(26)
Heatloss Floor 1			53.0000	0.0900	4.7700	75.0000	3975.0000	(28a)
External Wall 1	141.0000	17.6900	123.3100	0.1500	18.4965	9.0000	1109.7900	(29a)
External Roof 1	53.0000		53.0000	0.0700	3.7100	9.0000	477.0000	(30)
Total net area of external elements Aum(A, m2)			247.0000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		46.9494			(33)
Main dwelling								
Internal Wall 1			196.0000			9.0000	1764.0000	(32c)
Internal Ceiling 1			53.0000			9.0000	477.0000	(32e)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	7802.7900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		73.6112 (35)
Thermal bridges (User defined value 0.080 * total exposed area)		19.7600 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	66.7094 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	49.2393	48.9233	48.6136	47.1587	46.8865	45.6194	45.6194	45.3847	46.1075	46.8865	47.4372	48.0128	(38)
Heat transfer coeff	115.9487	115.6327	115.3230	113.8681	113.5959	112.3288	112.3288	112.0941	112.8169	113.5959	114.1466	114.7222	(39)
Average = Sum(39)m / 12 =												113.8668	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0939	1.0909	1.0880	1.0742	1.0717	1.0597	1.0597	1.0575	1.0643	1.0717	1.0769	1.0823	(40)
HLP (average)												1.0742	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.7886	(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	30.6447	30.1896	29.5487	28.3670	27.4821	26.5010	25.9710	26.6074	27.3004	28.3502	29.5563	30.5411	(42b)
Hot water usage for other uses	43.1877	41.6172	40.0467	38.4763	36.9058	35.3354	35.3354	36.9058	38.4763	40.0467	41.6172	43.1877	(42c)
Average daily hot water use (litres/day)												67.6740	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	73.8324	71.8068	69.5954	66.8433	64.3880	61.8363	61.3064	63.5133	65.7767	68.3970	71.1735	73.7288	(44)
Energy conte	116.9324	102.2519	106.9656	91.5051	86.6786	76.0350	74.1448	78.6427	81.1092	92.8141	101.3997	115.4414	(45)
Energy content (annual)										Total = Sum(45)m =		1123.9204	
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss (or HIU loss):													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	99.3926	86.9141	90.9208	77.7793	73.6768	64.6298	63.0230	66.8463	68.9428	78.8920	86.1897	98.1252	(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	99.3926	86.9141	90.9208	77.7793	73.6768	64.6298	63.0230	66.8463	68.9428	78.8920	86.1897	98.1252	(64)
									Total per year (kWh/year) = Sum(64)m =			955.3324	(64)
12Total per year (kWh/year)												955	(64)
Electric shower(s)	56.8390	50.6440	55.3013	52.7734	53.7636	51.2853	52.9948	53.7636	52.7734	55.3013	54.2614	56.8390	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			646.5403	(64a)
Heat gains from water heating, kWh/month	39.0579	34.3895	36.5555	32.6382	31.8601	28.9788	29.0045	30.1525	30.4290	33.5483	35.1128	38.7411	(65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	141.9572	157.1669	141.9572	146.6891	141.9572	146.6891	141.9572	141.9572	146.6891	141.9572	146.6891	141.9572	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	265.6788	268.4357	261.4884	246.6983	228.0285	210.4816	198.7591	196.0022	202.9495	217.7396	236.4094	253.9563	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	(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)	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	(71)
Water heating gains (Table 5)	52.4972	51.1749	49.1338	45.3308	42.8227	40.2483	38.9845	40.5275	42.2626	45.0918	48.7678	52.0713	(72)
Total internal gains	524.9616	541.6060	517.4078	503.5467	477.6369	462.2474	444.5293	443.3154	456.7297	469.6171	496.6947	512.8133	(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	
East	7.1000	19.6403	0.7600	0.7000	0.7700	51.4103	(76)
West	8.6400	19.6403	0.7600	0.7000	0.7700	62.5613	(80)

Solar gains	113.9717	222.9528	367.1714	535.4977	656.2725	671.8117	639.5921	549.4002	427.0356	264.5522	142.1093	93.7248	(83)
Total gains	638.9333	764.5587	884.5793	1039.0444	1133.9094	1134.0591	1084.1214	992.7156	883.7653	734.1693	638.8040	606.5381	(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)													
tau	18.6931	18.7442	18.7945	19.0347	19.0803	19.2955	19.2955	19.3359	19.2120	19.0803	18.9882	18.8929	
alpha	2.2462	2.2496	2.2530	2.2690	2.2720	2.2864	2.2864	2.2891	2.2808	2.2720	2.2659	2.2595	
util living area	0.9429	0.9157	0.8716	0.7849	0.6695	0.5285	0.4114	0.4564	0.6500	0.8372	0.9199	0.9485	(86)
MIT	17.8775	18.2775	18.8852	19.6727	20.2974	20.7161	20.8853	20.8512	20.5165	19.6608	18.6445	17.8195	(87)
Th 2	20.0059	20.0083	20.0107	20.0219	20.0240	20.0339	20.0339	20.0357	20.0301	20.0240	20.0198	20.0153	(88)
util rest of house													

	0.9361	0.9060	0.8565	0.7594	0.6293	0.4689	0.3335	0.3772	0.5942	0.8119	0.9089	0.9424	(89)
MIT 2	17.1430	17.5370	18.1322	18.8952	19.4758	19.8471	19.9764	19.9571	19.6890	18.9028	17.9116	17.0918	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	17.4410	17.8374	18.4377	19.2106	19.8091	20.1996	20.3451	20.3198	20.0247	19.2103	18.2089	17.3870	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4410	17.8374	18.4377	19.2106	19.8091	20.1996	20.3451	20.3198	20.0247	19.2103	18.2089	17.3870	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9123	0.8782	0.8270	0.7353	0.6197	0.4796	0.3595	0.4016	0.5939	0.7865	0.8825	0.9200	(94)
Useful gains	582.9273	671.4733	731.5561	763.9867	702.6607	543.9478	389.7440	398.6906	524.8394	577.4539	563.7674	557.9972	(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													
	1523.6764	1495.9844	1376.6881	1174.0478	921.1600	628.9956	420.6819	439.3863	668.4073	978.0950	1268.0424	1512.8455	(97)
Space heating kWh													
	699.9173	554.0715	479.9782	295.2441	162.5635	0.0000	0.0000	0.0000	0.0000	298.0770	507.0780	710.4072	(98a)
Space heating requirement - total per year (kWh/year)												3707.3366	
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													
	699.9173	554.0715	479.9782	295.2441	162.5635	0.0000	0.0000	0.0000	0.0000	298.0770	507.0780	710.4072	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3707.3366	
Space heating per m2											(98c) / (4) =	34.9749	(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	1055.8905	831.2329	851.9153	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7551	0.8122	0.7798	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	797.3078	675.0891	664.3396	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1262.3462	1206.9272	1102.9605	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	334.8276	395.6876	326.3340	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	83.7069	98.9219	81.5835	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												264.2123	(107)
Energy for space heating												34.9749	(99)
Energy for space cooling												2.4926	(108)
Total												37.4674	(109)
Fabric Energy Efficiency (DFEE)												37.5	(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	53.0000	(1b)	x 2.4000	(2b) =	127.2000	(1b) - (3b)
First floor	53.0000	(1c)	x 2.3000	(2c) =	121.9000	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	106.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		249.1000	(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	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) =	0.1606	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.4106	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3490	(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	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101 (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 0.5990 0.5952 0.5914 0.5737 0.5704 0.5550 0.5550 0.5521 0.5609 0.5704 0.5771 0.5841 (25)

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3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Main dwelling								
TER Opaque door			1.9500	1.0000	1.9500			(26)
TER Opening Type			15.7400	1.1450	18.0229			(27)
Heatloss Floor 1			53.0000	0.1300	6.8900			(28a)
External Wall 1	141.0000	17.6900	123.3100	0.1800	22.1958			(29a)
External Roof 1	53.0000		53.0000	0.1100	5.8300			(30)
Total net area of external elements Aum(A, m2)			247.0000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	54.8887			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.6112 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	12.8700	0.0500	0.6435
E3 Sill	11.9400	0.0500	0.5970
E4 Jamb	27.2000	0.0500	1.3600
E5 Ground floor (normal)	30.0000	0.1600	4.8000
E6 Intermediate floor within a dwelling	30.0000	0.0000	0.0000
E16 Corner (normal)	23.5500	0.0900	2.1195
E10 Eaves (insulation at ceiling level)	10.8700	0.0600	0.6522
E12 Gable (insulation at ceiling level)	15.6900	0.0600	0.9414
E17 Corner (inverted - internal area greater than external area)	4.7100	-0.0900	-0.4239

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 10.6897 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 65.5784 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	49.2393	48.9233	48.6136	47.1587	46.8865	45.6194	45.6194	45.3847	46.1075	46.8865	47.4372	48.0128	(38)
Heat transfer coeff	114.8177	114.5017	114.1920	112.7371	112.4649	111.1978	111.1978	110.9631	111.6859	112.4649	113.0156	113.5912	(39)
Average = Sum(39)m / 12 =												112.7358	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0832	1.0802	1.0773	1.0636	1.0610	1.0490	1.0490	1.0468	1.0536	1.0610	1.0662	1.0716	(40)
HLP (average)												1.0635	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.7886 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
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	30.6447	30.1896	29.5487	28.3670	27.4821	26.5010	25.9710	26.6074	27.3004	28.3502	29.5563	30.5411	(42b)
Hot water usage for other uses	43.1877	41.6172	40.0467	38.4763	36.9058	35.3354	35.3354	36.9058	38.4763	40.0467	41.6172	43.1877	(42c)
Average daily hot water use (litres/day)												67.6740	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	73.8324	71.8068	69.5954	66.8433	64.3880	61.8363	61.3064	63.5133	65.7767	68.3970	71.1735	73.7288	(44)
Energy conte	116.9324	102.2519	106.9656	91.5051	86.6786	76.0350	74.1448	78.6427	81.1092	92.8141	101.3997	115.4414	(45)
Energy content (annual)										Total = Sum(45)m =		1123.9204	
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss (or HIU loss):													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	99.3926	86.9141	90.9208	77.7793	73.6768	64.6298	63.0230	66.8463	68.9428	78.8920	86.1897	98.1252	(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	99.3926	86.9141	90.9208	77.7793	73.6768	64.6298	63.0230	66.8463	68.9428	78.8920	86.1897	98.1252	(64)
										Total per year (kWh/year) = Sum(64)m =		955.3324	(64)
12Total per year (kWh/year)												955	(64)
Electric shower(s)	56.8390	50.6440	55.3013	52.7734	53.7636	51.2853	52.9948	53.7636	52.7734	55.3013	54.2614	56.8390	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		646.5403	(64a)
Heat gains from water heating, kWh/month	39.0579	34.3895	36.5555	32.6382	31.8601	28.9788	29.0045	30.1525	30.4290	33.5483	35.1128	38.7411	(65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	141.9572	157.1669	141.9572	146.6891	141.9572	146.6891	141.9572	141.9572	146.6891	141.9572	146.6891	141.9572	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	265.6788	268.4357	261.4884	246.6983	228.0285	210.4816	198.7591	196.0022	202.9495	217.7396	236.4094	253.9563	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	(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)													

	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	(71)
Water heating gains (Table 5)												
	52.4972	51.1749	49.1338	45.3308	42.8227	40.2483	38.9845	40.5275	42.2626	45.0918	48.7678	52.0713 (72)
Total internal gains												
	524.9616	541.6060	517.4078	503.5467	477.6369	462.2474	444.5293	443.3154	456.7297	469.6171	496.6947	512.8133 (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	
East	7.1000	19.6403	0.6300	0.7000	0.7700	42.6165	(76)
West	8.6400	19.6403	0.6300	0.7000	0.7700	51.8600	(80)

Solar gains	94.4765	184.8161	304.3658	443.8994	544.0154	556.8965	530.1882	455.4238	353.9900	219.2999	117.8011	77.6929 (83)
Total gains	619.4381	726.4221	821.7736	947.4461	1021.6523	1019.1439	974.7175	898.7392	810.7197	688.9170	614.4958	590.5062 (84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	18.8772	18.9293	18.9807	19.2256	19.2722	19.4918	19.4918	19.5330	19.4066	19.2722	19.1783	19.0811	
alpha	2.2585	2.2620	2.2654	2.2817	2.2848	2.2995	2.2995	2.3022	2.2938	2.2848	2.2786	2.2721	
util living area													
	0.9459	0.9226	0.8853	0.8094	0.7037	0.5654	0.4448	0.4890	0.6786	0.8512	0.9248	0.9509	(86)
MIT	17.8689	18.2375	18.8118	19.5838	20.2238	20.6768	20.8672	20.8307	20.4749	19.6156	18.6252	17.8173	(87)
Th 2	20.0146	20.0170	20.0194	20.0307	20.0328	20.0427	20.0427	20.0445	20.0389	20.0328	20.0285	20.0241	(88)
util rest of house													
	0.9394	0.9135	0.8715	0.7858	0.6650	0.5052	0.3636	0.4076	0.6241	0.8275	0.9145	0.9450	(89)
MIT 2	17.1401	17.5040	18.0684	18.8206	19.4210	19.8271	19.9749	19.9535	19.6642	18.8677	17.8988	17.0952	(90)
Living area fraction									fLA = Living area / (4) =			0.4057	(91)
MIT	17.4357	17.8015	18.3699	19.1302	19.7467	20.1718	20.3368	20.3093	19.9930	19.1711	18.1935	17.3881	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4357	17.8015	18.3699	19.1302	19.7467	20.1718	20.3368	20.3093	19.9930	19.1711	18.1935	17.3881	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9164	0.8868	0.8426	0.7603	0.6524	0.5138	0.3897	0.4314	0.6212	0.8018	0.8889	0.9233	(94)
Useful gains	567.6668	644.1713	692.3887	720.3439	666.5440	523.6601	379.8245	387.6789	503.6079	552.3889	546.1948	545.2045	(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													
	1508.2165	1477.2478	1355.4522	1153.3204	904.9688	619.5726	415.5294	433.7904	658.1692	963.9478	1253.7348	1498.0567	(97)
Space heating kWh													
	699.7690	559.8274	493.3193	311.7431	177.3881	0.0000	0.0000	0.0000	0.0000	306.1999	509.4288	708.9221	(98a)
Space heating requirement - total per year (kWh/year)												3766.5976	
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													
	699.7690	559.8274	493.3193	311.7431	177.3881	0.0000	0.0000	0.0000	0.0000	306.1999	509.4288	708.9221	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3766.5976	
Space heating per m2											(98c) / (4) =	35.5339	(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	1045.2591	822.8635	843.3197	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7230	0.7846	0.7519	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	755.7303	645.6497	634.0664	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1128.0297	1079.0525	993.1180	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	268.0556	322.4517	267.1343	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	67.0139	80.6129	66.7836	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												214.4104	(107)
Energy for space heating												35.5339	(99)
Energy for space cooling												2.0227	(108)
Total												37.5567	(109)
Fabric Energy Efficiency (TFEE)												37.6	(109)

Full SAP Calculation Printout

Plot Reference	Plot 1	**Issued on Date**	22/10/2026
Assessment Reference	00001 Rev A	**Plot Type Ref**	
Plot Address	Rock House, Plot 1, Old Frome Road To Underhill, Somerset, BA3 4TQ	**SAP Version**	10.2

SAP Rating	94 A	**DER**	1.21	**TER**	10.45
Environmental	99 A	**% DER < TER**			88.42
CO_2 Emissions (t/year)	0.08	**DFEE**	37.47	**TFEE**	37.56
Compliance Check	See BREL	**% DFEE < TFEE**			0.24
% DPER < TPER	72.62	**DPER**	14.93	**TPER**	54.53

Assessor Details	Mr. Chris Law	**Assessor ID**	AX42-0001
Client	Rock House, Philip Jenkins		

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

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.0000 (1b)	x	2.4000 (2b)	=	127.2000	(1b) - (3b)
First floor	53.0000 (1c)	x	2.3000 (2c)	=	121.9000	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	106.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	249.1000	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys		0 * 80 =	0.0000 (6a)
Number of open flues		0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000 (6d)
Number of flues attached to other heater		0 * 35 =	0.0000 (6e)
Number of blocked chimneys		0 * 20 =	0.0000 (6f)
Number of intermittent extract fans		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) =	0.1606 (8)
Pressure test			Yes
Pressure Test Method			Blower Door
Measured/design AP50			5.0000 (17)
Infiltration rate			0.4106 (18)
Number of sides sheltered			2 (19)
Shelter factor		(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor		(21) = (18) x (20) =	0.3490 (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	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101	(22b)
Effective ac	0.5990	0.5952	0.5914	0.5737	0.5704	0.5550	0.5550	0.5521	0.5609	0.5704	0.5771	0.5841	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Window			15.7400	1.1450	18.0229			(27)
External Door			1.9500	1.0000	1.9500			(26)
Heatloss Floor 1			53.0000	0.0900	4.7700	75.0000	3975.0000	(28a)
External Wall 1	141.0000	17.6900	123.3100	0.1500	18.4965	9.0000	1109.7900	(29a)
External Roof 1	53.0000		53.0000	0.0700	3.7100	9.0000	477.0000	(30)
Total net area of external elements Aum(A, m2)			247.0000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		46.9494			(33)
Main dwelling								
Internal Wall 1			196.0000			9.0000	1764.0000	(32c)
Internal Ceiling 1			53.0000			9.0000	477.0000	(32e)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	7802.7900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		73.6112 (35)
Thermal bridges (User defined value 0.080 * total exposed area)		19.7600 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	66.7094 (37)

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

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

(38)m	49.2393	48.9233	48.6136	47.1587	46.8865	45.6194	45.6194	45.3847	46.1075	46.8865	47.4372	48.0128	(38)
Heat transfer coeff													
	115.9487	115.6327	115.3230	113.8681	113.5959	112.3288	112.3288	112.0941	112.8169	113.5959	114.1466	114.7222	(39)
Average = Sum(39)m / 12 =												113.8668	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0939	1.0909	1.0880	1.0742	1.0717	1.0597	1.0597	1.0575	1.0643	1.0717	1.0769	1.0823	(40)
HLP (average)												1.0742	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.7886	(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													
	81.8650	80.6492	78.9371	75.7803	73.4165	70.7954	69.3796	71.0797	72.9309	75.7355	78.9574	81.5883	(42b)
Hot water usage for other uses													
	43.1877	41.6172	40.0467	38.4763	36.9058	35.3354	35.3354	36.9058	38.4763	40.0467	41.6172	43.1877	(42c)
Average daily hot water use (litres/day)												115.1633	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	125.0527	122.2664	118.9838	114.2565	110.3223	106.1307	104.7150	107.9856	111.4072	115.7823	120.5746	124.7759	(44)
Energy conte	198.0529	174.1057	182.8737	156.4115	148.5150	130.5001	126.6437	133.7087	137.3762	157.1155	171.7806	195.3689	(45)
Energy content (annual)										Total = Sum(45)m =		1912.4525	
Distribution loss (46)m = 0.15 x (45)m													
	29.7079	26.1159	27.4311	23.4617	22.2772	19.5750	18.9966	20.0563	20.6064	23.5673	25.7671	29.3053	(46)
Water storage loss (or HIU loss):													
Store volume												210.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6000	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8640	(55)
Total storage loss													
	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(56)
If cylinder contains dedicated solar storage													
	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(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													
	248.0993	219.3089	232.9201	204.8435	198.5614	178.9321	176.6901	183.7551	185.8082	207.1619	220.2126	245.4153	(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	-30.9028	-62.2324	-116.5264	-166.1420	-198.5614	-178.9321	-176.6901	-181.2300	-139.1110	-86.8910	-40.6716	-24.6880	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	217.1965	157.0765	116.3937	38.7015	0.0000	0.0000	0.0000	2.5251	46.6972	120.2708	179.5410	220.7273	(64)
									Total per year (kWh/year) = Sum(64)m =			1099.1297	(64)
12Total per year (kWh/year)												1099	(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													
	105.8897	94.0527	100.8426	90.7524	89.4184	82.1369	82.1461	84.4953	84.4232	92.2780	95.8626	104.9973	(65)

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

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	141.9572	157.1669	141.9572	146.6891	141.9572	146.6891	141.9572	141.9572	146.6891	141.9572	146.6891	141.9572	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	265.6788	268.4357	261.4884	246.6983	228.0285	210.4816	198.7591	196.0022	202.9495	217.7396	236.4094	253.9563	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	(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)													
	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	(71)
Water heating gains (Table 5)													
	142.3249	139.9594	135.5412	126.0450	120.1860	114.0790	110.4115	113.5689	117.2544	124.0296	133.1426	141.1254	(72)
Total internal gains													
	614.7893	630.3905	603.8152	584.2609	555.0002	536.0782	515.9563	516.3568	531.7215	548.5548	581.0695	601.8674	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
East	7.1000	19.6403	0.7600	0.7000	0.7700	51.4103	(76)
West	8.6400	19.6403	0.7600	0.7000	0.7700	62.5613	(80)

Solar gains	113.9717	222.9528	367.1714	535.4977	656.2725	671.8117	639.5921	549.4002	427.0356	264.5522	142.1093	93.7248	(83)
Total gains	728.7610	853.3432	970.9867	1119.7586	1211.2726	1207.8898	1155.5484	1065.7569	958.7571	813.1071	723.1788	695.5922	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	18.6931	18.7442	18.7945	19.0347	19.0803	19.2955	19.2955	19.3359	19.2120	19.0803	18.9882	18.8929	
alpha	2.2462	2.2496	2.2530	2.2690	2.2720	2.2864	2.2864	2.2891	2.2808	2.2720	2.2659	2.2595	
util living area													
	0.9275	0.8983	0.8514	0.7624	0.6457	0.5053	0.3903	0.4316	0.6202	0.8109	0.9006	0.9337	(86)
Living	18.0495	18.4331	19.0159	19.7628	20.3517	20.7421	20.8973	20.8678	20.5642	19.7664	18.7947	17.9940	

Non living	16.5504	17.0323	17.7607	18.6814	19.3790	19.8177	19.9684	19.9469	19.6396	18.7091	17.5012	16.4849	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	19.4906	18.4331	19.0159	19.7628	20.3517	20.7421	20.8973	20.8678	20.5642	19.7664	18.7947	18.4145	(87)
Th 2	20.0059	20.0083	20.0107	20.0219	20.0240	20.0339	20.0339	20.0357	20.0301	20.0240	20.0198	20.0153	(88)
util rest of house	0.9192	0.8869	0.8347	0.7356	0.6050	0.4466	0.3152	0.3551	0.5638	0.7831	0.8876	0.9261	(89)
MIT 2	18.6273	17.0323	17.7607	18.6814	19.3790	19.8177	19.9684	19.9469	19.6396	18.7091	17.5012	17.1208	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	18.9775	17.6005	18.2699	19.1201	19.7736	20.1927	20.3452	20.3205	20.0147	19.1380	18.0259	17.6456	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.9775	17.6005	18.2699	19.1201	19.7736	20.1927	20.3452	20.3205	20.0147	19.1380	18.0259	17.6456	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9091	0.8509	0.7983	0.7074	0.5936	0.4567	0.3402	0.3786	0.5629	0.7530	0.8530	0.9019	(94)
Useful gains	662.5303	726.1459	775.1871	792.0634	719.0292	551.6596	393.1497	403.5213	539.6584	612.2432	616.8648	627.3397	(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	1701.8367	1468.5964	1357.3346	1163.7411	917.1267	628.2203	420.6957	439.4623	667.2738	969.8842	1247.1512	1542.5082	(97)
Space heating kWh	773.2439	498.9267	433.1177	267.6079	147.3845	0.0000	0.0000	0.0000	0.0000	266.0849	453.8062	680.8854	(98a)
Space heating requirement - total per year (kWh/year)												3521.0574	
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	773.2439	498.9267	433.1177	267.6079	147.3845	0.0000	0.0000	0.0000	266.0849	453.8062		680.8854	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3521.0574	
Space heating per m2											(98c) / (4) =	33.2175	(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 %)												228.0950	(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	773.2439	498.9267	433.1177	267.6079	147.3845	0.0000	0.0000	0.0000	0.0000	266.0849	453.8062	680.8854	(98)
Space heating efficiency (main heating system 1)	228.0950	228.0950	228.0950	228.0950	228.0950	0.0000	0.0000	0.0000	0.0000	228.0950	228.0950	228.0950	(210)
Space heating fuel (main heating system)	339.0008	218.7364	189.8848	117.3230	64.6154	0.0000	0.0000	0.0000	0.0000	116.6553	198.9549	298.5096	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	217.1965	157.0765	116.3937	38.7015	0.0000	0.0000	0.0000	2.5251	46.6972	120.2708	179.5410	220.7273	(64)
Efficiency of water heater												163.6200	(216)
(217)m	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	(217)
Fuel for water heating, kWh/month	132.7445	96.0008	71.1366	23.6533	0.0000	0.0000	0.0000	1.5433	28.5400	73.5062	109.7305	134.9024	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.7473	19.0510	17.1533	12.5672	9.7073	7.9310	8.8553	11.5105	14.9510	19.6165	22.1568	24.4073	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-77.0126	-104.4235	-142.3315	-144.4744	-138.4837	-111.7335	-110.2355	-106.6577	-105.6009	-111.6003	-82.0188	-66.3347	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-0.5778	-6.8450	-20.3784	-43.5729	-87.0044	-122.7421	-123.2095	-76.5636	-54.3361	-18.2162	-4.2546	-0.7970	(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	1543.6802	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	163.6200	
Water heating fuel used	671.7575	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	191.6546	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1859.4046	(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	547.6877	(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	1543.6802	0.1549	239.1781	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	671.7575	0.1540	103.4738	(264)
Space and water heating			342.6519	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	191.6546	0.1443	27.6617	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1300.9071	0.1375	-178.8254	
PV Unit electricity exported	-558.4975	0.1141	-63.7034	
Total			-242.5288	(269)
Total CO2, kg/year			127.7848	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			1.2100	(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	1543.6802	1.5736	2429.0837	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	671.7575	1.5701	1054.7496	(278)
Space and water heating			3483.8334	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	191.6546	1.5338	293.9662	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1300.9071	1.5082	-1962.0638	
PV Unit electricity exported	-558.4975	0.4178	-233.3271	
Total			-2195.3909	(283)
Total Primary energy kWh/year			1582.4086	(286)
Dwelling Primary energy Rate (DPER)			14.9300	(287)

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.0000	(1b) x	2.4000	(2b) =	127.2000	(1b) - (3b)
First floor	53.0000	(1c) x	2.3000	(2c) =	121.9000	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	106.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		249.1000	(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	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) =	0.1606 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.4106 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3490 (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	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101	(22b)
Effective ac	0.5990	0.5952	0.5914	0.5737	0.5704	0.5550	0.5550	0.5521	0.5609	0.5704	0.5771	0.5841	(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			1.9500	1.0000	1.9500			(26)
TER Opening Type			15.7400	1.1450	18.0229			(27)

Heatloss Floor 1			53.0000	0.1300	6.8900	(28a)
External Wall 1	141.0000	17.6900	123.3100	0.1800	22.1958	(29a)
External Roof 1	53.0000		53.0000	0.1100	5.8300	(30)
Total net area of external elements Aum(A, m2)			247.0000			(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		54.8887	(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.6112 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	12.8700	0.0500	0.6435
E3 Sill	11.9400	0.0500	0.5970
E4 Jamb	27.2000	0.0500	1.3600
E5 Ground floor (normal)	30.0000	0.1600	4.8000
E6 Intermediate floor within a dwelling	30.0000	0.0000	0.0000
E16 Corner (normal)	23.5500	0.0900	2.1195
E10 Eaves (insulation at ceiling level)	10.8700	0.0600	0.6522
E12 Gable (insulation at ceiling level)	15.6900	0.0600	0.9414
E17 Corner (inverted - internal area greater than external area)	4.7100	-0.0900	-0.4239

Thermal bridges (Sum(L x Psi) calculated using Appendix K)		10.6897 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	65.5784 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	49.2393	48.9233	48.6136	47.1587	46.8865	45.6194	45.6194	45.3847	46.1075	46.8865	47.4372	48.0128	(38)
Heat transfer coeff	114.8177	114.5017	114.1920	112.7371	112.4649	111.1978	111.1978	110.9631	111.6859	112.4649	113.0156	113.5912	(39)
Average = Sum(39)m / 12 =												112.7358	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0832	1.0802	1.0773	1.0636	1.0610	1.0490	1.0490	1.0468	1.0536	1.0610	1.0662	1.0716	(40)
HLP (average)												1.0635	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.7886 (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

81.8650	80.6492	78.9371	75.7803	73.4165	70.7954	69.3796	71.0797	72.9309	75.7355	78.9574	81.5883	(42b)

Hot water usage for other uses

43.1877	41.6172	40.0467	38.4763	36.9058	35.3354	35.3354	36.9058	38.4763	40.0467	41.6172	43.1877	(42c)

Average daily hot water use (litres/day) 115.1633 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	125.0527	122.2664	118.9838	114.2565	110.3223	106.1307	104.7150	107.9856	111.4072	115.7823	120.5746	124.7759	(44)
Energy conte	198.0529	174.1057	182.8737	156.4115	148.5150	130.5001	126.6437	133.7087	137.3762	157.1155	171.7806	195.3689	(45)
Energy content (annual)										Total = Sum(45)m =		1912.4525	
Distribution loss (46)m = 0.15 x (45)m	29.7079	26.1159	27.4311	23.4617	22.2772	19.5750	18.9966	20.0563	20.6064	23.5673	25.7671	29.3053	(46)

Water storage loss (or HIU loss):

Store volume	210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.7016 (48)
Temperature factor from Table 2b	0.5400 (49)
Enter (49) or (54) in (55)	0.9188 (55)

Total storage loss

28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842	(56)

If cylinder contains dedicated solar storage

28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842	(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

249.7995	220.8446	234.6203	206.4888	200.2616	180.5775	178.3903	185.4553	187.4535	208.8620	221.8579	247.1155	(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

249.7995	220.8446	234.6203	206.4888	200.2616	180.5775	178.3903	185.4553	187.4535	208.8620	221.8579	247.1155	(64)
									Total per year (kWh/year) = Sum(64)m =		2521.7269	(64)
12Total per year (kWh/year)											2522	(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

107.2499	95.2812	102.2028	92.0687	90.7785	83.4532	83.5063	85.8554	85.7395	93.6382	97.1789	106.3574	(65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	141.9572	157.1669	141.9572	146.6891	141.9572	146.6891	141.9572	141.9572	146.6891	141.9572	146.6891	141.9572	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	265.6788	268.4357	261.4884	246.6983	228.0285	210.4816	198.7591	196.0022	202.9495	217.7396	236.4094	253.9563	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	36.9428	(69)
Pumps, fans 3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	(71)
Water heating gains (Table 5)	144.1530	141.7876	137.3693	127.8732	122.0141	115.9072	112.2396	115.3971	119.0826	125.8577	134.9707	142.9536	(72)
Total internal gains	619.6175	635.2186	608.6434	589.0891	559.8283	537.9063	517.7844	518.1849	533.5497	553.3830	585.8977	606.6956	(73)

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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	
East				7.1000		19.6403	0.6300	0.7000		0.7700		42.6165	(76)
West				8.6400		19.6403	0.6300	0.7000		0.7700		51.8600	(80)
Solar gains	94.4765	184.8161	304.3658	443.8994	544.0154	556.8965	530.1882	455.4238	353.9900	219.2999	117.8011	77.6929	(83)
Total gains	714.0940	820.0348	913.0092	1032.9885	1103.8437	1094.8028	1047.9726	973.6087	887.5397	772.6829	703.6988	684.3885	(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	18.8772	18.9293	18.9807	19.2256	19.2722	19.4918	19.4918	19.5330	19.4066	19.2722	19.1783	19.0811	
alpha	2.2585	2.2620	2.2654	2.2817	2.2848	2.2995	2.2995	2.3022	2.2938	2.2848	2.2786	2.2721	
util living area	0.9298	0.9043	0.8641	0.7849	0.6766	0.5387	0.4199	0.4603	0.6459	0.8230	0.9046	0.9353	(86)
MIT	18.0523	18.4056	18.9564	19.6880	20.2901	20.7090	20.8825	20.8512	20.5300	19.7331	18.7869	18.0031	(87)
Th 2	20.0146	20.0170	20.0194	20.0307	20.0328	20.0427	20.0427	20.0445	20.0389	20.0328	20.0285	20.0241	(88)
util rest of house	0.9217	0.8936	0.8484	0.7597	0.6369	0.4791	0.3416	0.3814	0.5904	0.7965	0.8921	0.9279	(89)
MIT 2	16.5581	17.0028	17.6936	18.6006	19.3200	19.7957	19.9665	19.9431	19.6133	18.6763	17.4964	16.5006	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	17.1643	17.5719	18.2059	19.0417	19.7135	20.1662	20.3381	20.3115	19.9852	19.1050	18.0199	17.1101	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.1643	17.5719	18.2059	19.0417	19.7135	20.1662	20.3381	20.3115	19.9852	19.1050	18.0199	17.1101	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8896	0.8584	0.8123	0.7297	0.6226	0.4872	0.3667	0.4045	0.5870	0.7658	0.8580	0.8971	(94)
Useful gains	635.2629	703.8976	741.6350	753.8093	687.2151	533.4363	384.2689	393.7886	520.9764	591.7299	603.7638	613.9617	(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	1477.0446	1450.9536	1336.7205	1143.3492	901.2422	618.9506	415.6667	434.0293	657.2905	956.5171	1234.1169	1466.4738	(97)
Space heating kWh	626.2856	502.0216	442.7436	280.4688	159.2362	0.0000	0.0000	0.0000	0.0000	271.4017	453.8542	634.2690	(98a)
Space heating requirement - total per year (kWh/year)												3370.2807	
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	626.2856	502.0216	442.7436	280.4688	159.2362	0.0000	0.0000	0.0000	0.0000	271.4017	453.8542	634.2690	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3370.2807	
Space heating per m2											(98c) / (4) =	31.7951	(99)

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												92.3000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	626.2856	502.0216	442.7436	280.4688	159.2362	0.0000	0.0000	0.0000	0.0000	271.4017	453.8542	634.2690	(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)	678.5326	543.9021	479.6789	303.8665	172.5202	0.0000	0.0000	0.0000	0.0000	294.0430	491.7164	687.1820	(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	249.7995	220.8446	234.6203	206.4888	200.2616	180.5775	178.3903	185.4553	187.4535	208.8620	221.8579	247.1155	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.0334	85.8422	85.4615	84.7471	83.5508	79.8000	79.8000	79.8000	79.8000	84.6482	85.6292	86.0781	(217)
Fuel for water heating, kWh/month	290.3519	257.2681	274.5334	243.6531	239.6884	226.2876	223.5467	232.4001	234.9042	246.7413	259.0916	287.0828	(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	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	29.4959	23.6627	21.3057	15.6094	12.0572	9.8508	10.9990	14.2969	18.5702	24.3651	27.5203	30.3157	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-48.2307	-67.3046	-95.7498	-106.4826	-113.7962	-105.7974	-104.4378	-99.0691	-89.4785	-76.3656	-52.7580	-41.7755	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-29.3718	-61.5408	-121.8889	-182.4749	-240.7391	-241.7412	-238.9433	-202.5953	-148.8405	-87.8643	-39.1629	-23.2491	(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												3651.4418	(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	3015.5491	(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)	238.0489	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-2619.6578	(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	4371.3819	(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	3651.4418	0.2100	766.8028	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3015.5491	0.2100	633.2653	(264)
Space and water heating			1400.0681	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	238.0489	0.1443	34.3578	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1001.2458	0.1348	-134.9902	
PV Unit electricity exported	-1618.4120	0.1260	-203.8992	
Total			-338.8894	(269)
Total CO2, kg/year			1107.4658	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.4500	(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	3651.4418	1.1300	4126.1292	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3015.5491	1.1300	3407.5705	(278)
Space and water heating			7533.6996	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	238.0489	1.5338	365.1273	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1001.2458	1.4983	-1500.1599	
PV Unit electricity exported	-1618.4120	0.4625	-748.4564	
Total			-2248.6163	(283)
Total Primary energy kWh/year			5780.3115	(286)
Target Primary Energy Rate (TPER)			54.5300	(287)

Full SAP Calculation Printout

Plot Reference	Plot 1	**Issued on Date**	22/10/2026
Assessment Reference	00001 Rev A	**Plot Type Ref**	
Plot Address	Rock House, Plot 1, Old Frome Road To Underhill, Somerset, BA3 4TQ	**SAP Version**	10.2

SAP Rating	94 A	**DER**	1.21	**TER**	10.45
Environmental	99 A	**% DER < TER**			88.42
CO_2 Emissions (t/year)	0.08	**DFEE**	37.47	**TFEE**	37.56
Compliance Check	See BREL	**% DFEE < TFEE**			0.24
% DPER < TPER	72.62	**DPER**	14.93	**TPER**	54.53

Assessor Details	Mr. Chris Law	**Assessor ID**	AX42-0001
Client	Rock House, Philip Jenkins		

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

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.0000 (1b)	x	2.4000 (2b)	=	127.2000	(1b) - (3b)
First floor	53.0000 (1c)	x	2.3000 (2c)	=	121.9000	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	106.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	249.1000	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	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) =	0.1606	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.4106	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3490	(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	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101	(22b)
Effective ac	0.5990	0.5952	0.5914	0.5737	0.5704	0.5550	0.5550	0.5521	0.5609	0.5704	0.5771	0.5841	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Window			15.7400	1.1450	18.0229			(27)
External Door			1.9500	1.0000	1.9500			(26)
Heatloss Floor 1			53.0000	0.0900	4.7700	75.0000	3975.0000	(28a)
External Wall 1	141.0000	17.6900	123.3100	0.1500	18.4965	9.0000	1109.7900	(29a)
External Roof 1	53.0000		53.0000	0.0700	3.7100	9.0000	477.0000	(30)
Total net area of external elements Aum(A, m2)			247.0000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		46.9494			(33)
Main dwelling								
Internal Wall 1			196.0000			9.0000	1764.0000	(32c)
Internal Ceiling 1			53.0000			9.0000	477.0000	(32e)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	7802.7900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		73.6112 (35)
Thermal bridges (User defined value 0.080 * total exposed area)		19.7600 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	66.7094 (37)

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

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

(38)m	49.2393	48.9233	48.6136	47.1587	46.8865	45.6194	45.6194	45.3847	46.1075	46.8865	47.4372	48.0128	(38)
Heat transfer coeff													
	115.9487	115.6327	115.3230	113.8681	113.5959	112.3288	112.3288	112.0941	112.8169	113.5959	114.1466	114.7222	(39)
Average = Sum(39)m / 12 =												113.8668	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0939	1.0909	1.0880	1.0742	1.0717	1.0597	1.0597	1.0575	1.0643	1.0717	1.0769	1.0823	(40)
HLP (average)												1.0742	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.7886	(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													
	81.8650	80.6492	78.9371	75.7803	73.4165	70.7954	69.3796	71.0797	72.9309	75.7355	78.9574	81.5883	(42b)
Hot water usage for other uses													
	43.1877	41.6172	40.0467	38.4763	36.9058	35.3354	35.3354	36.9058	38.4763	40.0467	41.6172	43.1877	(42c)
Average daily hot water use (litres/day)												115.1633	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	125.0527	122.2664	118.9838	114.2565	110.3223	106.1307	104.7150	107.9856	111.4072	115.7823	120.5746	124.7759	(44)
Energy conte	198.0529	174.1057	182.8737	156.4115	148.5150	130.5001	126.6437	133.7087	137.3762	157.1155	171.7806	195.3689	(45)
Energy content (annual)										Total = Sum(45)m =		1912.4525	
Distribution loss (46)m = 0.15 x (45)m													
	29.7079	26.1159	27.4311	23.4617	22.2772	19.5750	18.9966	20.0563	20.6064	23.5673	25.7671	29.3053	(46)
Water storage loss (or HIU loss):													
Store volume												210.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6000	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8640	(55)
Total storage loss													
	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(56)
If cylinder contains dedicated solar storage													
	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(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													
	248.0993	219.3089	232.9201	204.8435	198.5614	178.9321	176.6901	183.7551	185.8082	207.1619	220.2126	245.4153	(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	-30.9028	-62.2324	-116.5264	-166.1420	-198.5614	-178.9321	-176.6901	-181.2300	-139.1110	-86.8910	-40.6716	-24.6880	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	217.1965	157.0765	116.3937	38.7015	0.0000	0.0000	0.0000	2.5251	46.6972	120.2708	179.5410	220.7273	(64)
									Total per year (kWh/year) = Sum(64)m =			1099.1297	(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													
	105.8897	94.0527	100.8426	90.7524	89.4184	82.1369	82.1461	84.4953	84.4232	92.2780	95.8626	104.9973	(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	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	27.1307	24.0972	19.5972	14.8363	11.0903	9.3629	10.1170	13.1504	17.6505	22.4113	26.1573	27.8847	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	396.5355	400.6503	390.2812	368.2065	340.3411	314.1516	296.6554	292.5406	302.9098	324.9845	352.8498	379.0393	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	(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)													
	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	(71)
Water heating gains (Table 5)													
	142.3249	139.9594	135.5412	126.0450	120.1860	114.0790	110.4115	113.5689	117.2544	124.0296	133.1426	141.1254	(72)
Total internal gains													
	676.2823	674.9981	655.7107	619.3790	581.9086	547.8847	527.4750	529.5511	548.1058	581.7165	622.4409	658.3406	(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	
East	7.1000	19.6403	0.7600	0.7000	0.7700	51.4103	(76)
West	8.6400	19.6403	0.7600	0.7000	0.7700	62.5613	(80)

Solar gains	113.9717	222.9528	367.1714	535.4977	656.2725	671.8117	639.5921	549.4002	427.0356	264.5522	142.1093	93.7248	(83)
Total gains	790.2539	897.9509	1022.8821	1154.8766	1238.1810	1219.6964	1167.0671	1078.9512	975.1414	846.2688	764.5502	752.0654	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	18.6931	18.7442	18.7945	19.0347	19.0803	19.2955	19.2955	19.3359	19.2120	19.0803	18.9882	18.8929	
alpha	2.2462	2.2496	2.2530	2.2690	2.2720	2.2864	2.2864	2.2891	2.2808	2.2720	2.2659	2.2595	
util living area													
	0.9164	0.8892	0.8392	0.7527	0.6377	0.5017	0.3871	0.4274	0.6139	0.7999	0.8909	0.9237	(86)
Living	18.1624	18.5080	19.0902	19.7997	20.3694	20.7459	20.8991	20.8705	20.5738	19.8079	18.8649	18.1003	
Non living	16.6912	17.1247	17.8505	18.7241	19.3977	19.8212	19.9696	19.9489	19.6489	18.7572	17.5874	16.6179	

24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	19.5484	18.5080	19.0902	19.7997	20.3694	20.7459	20.8991	20.8705	20.5738	19.8079	18.8649	18.5059	(87)
Th 2	20.0059	20.0083	20.0107	20.0219	20.0240	20.0339	20.0339	20.0357	20.0301	20.0240	20.0198	20.0153	(88)
util rest of house													
	0.9070	0.8771	0.8215	0.7254	0.5968	0.4432	0.3124	0.3513	0.5575	0.7711	0.8769	0.9151	(89)
MIT 2	18.6834	17.1247	17.8505	18.7241	19.3977	19.8212	19.9696	19.9489	19.6489	18.7572	17.5874	17.2298	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.0343	17.6859	18.3534	19.1604	19.7919	20.1963	20.3467	20.3227	20.0241	19.1835	18.1056	17.7475	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0343	17.6859	18.3534	19.1604	19.7919	20.1963	20.3467	20.3227	20.0241	19.1835	18.1056	17.7475	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8964	0.8406	0.7855	0.6981	0.5863	0.4535	0.3374	0.3749	0.5572	0.7419	0.8417	0.8895	(94)
Useful gains	708.3904	754.7952	803.4902	806.2249	725.9298	553.1488	393.7798	404.4974	543.3033	627.8490	643.5130	668.9893	(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													
	1708.4242	1478.4666	1366.9709	1168.3343	919.2051	628.6270	420.8573	439.7168	668.3412	975.0458	1256.2557	1554.1994	(97)
Space heating kWh													
	744.0251	486.3072	419.2297	260.7188	143.7968	0.0000	0.0000	0.0000	0.0000	258.3144	441.1747	658.5963	(98a)
Space heating requirement - total per year (kWh/year)												3412.1629	
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													
	744.0251	486.3072	419.2297	260.7188	143.7968	0.0000	0.0000	0.0000	0.0000	258.3144	441.1747	658.5963	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3412.1629	
Space heating per m2											(98c) / (4) =	32.1902	(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 %)												228.0950	(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													
	744.0251	486.3072	419.2297	260.7188	143.7968	0.0000	0.0000	0.0000	0.0000	258.3144	441.1747	658.5963	(98)
Space heating efficiency (main heating system 1)													
	228.0950	228.0950	228.0950	228.0950	228.0950	0.0000	0.0000	0.0000	0.0000	228.0950	228.0950	228.0950	(210)
Space heating fuel (main heating system)													
	326.1909	213.2038	183.7961	114.3027	63.0425	0.0000	0.0000	0.0000	0.0000	113.2486	193.4171	288.7377	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	217.1965	157.0765	116.3937	38.7015	0.0000	0.0000	0.0000	2.5251	46.6972	120.2708	179.5410	220.7273	(64)
Efficiency of water heater												163.6200	(216)
(217)m	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	(217)
Fuel for water heating, kWh/month													
	132.7445	96.0008	71.1366	23.6533	0.0000	0.0000	0.0000	1.5433	28.5400	73.5062	109.7305	134.9024	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.7473	19.0510	17.1533	12.5672	9.7073	7.9310	8.8553	11.5105	14.9510	19.6165	22.1568	24.4073	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-76.7771	-104.1615	-141.7856	-143.9885	-138.1065	-111.7335	-110.2355	-106.6577	-105.6009	-111.3067	-81.8361	-66.1785	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-0.8133	-7.1070	-20.9243	-44.0588	-87.3816	-122.7421	-123.2095	-76.5636	-54.3361	-18.5098	-4.4374	-0.9532	(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												1495.9394	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												163.6200	
Water heating fuel used												671.7575	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												191.6546	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1859.4046	(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												499.9469	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1495.9394	16.4900	246.6804	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	671.7575	16.4900	110.7728	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	191.6546	16.4900	31.6038	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1298.3680	16.4900	-214.1009	
PV Unit electricity exported	-561.0366	5.5900	-31.3619	
Total			-245.4628	(252)
Total energy cost			143.5942	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	0.3423 (257)
SAP value		94.4506
SAP rating (Section 12)		94 (258)
SAP band		A

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	1495.9394	0.1549	231.7415	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	671.7575	0.1540	103.4738	(264)
Space and water heating			335.2152	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	191.6546	0.1443	27.6617	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1298.3680	0.1374	-178.4493	
PV Unit electricity exported	-561.0366	0.1143	-64.1201	
Total			-242.5694	(269)
Total CO2, kg/year			120.3075	(272)
CO2 emissions per m2			1.1300	(273)
EI value			98.9324	
EI rating			99	(274)
EI band			A	

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.0000	(1b) x	2.4000	(2b) =	127.2000	(1b) - (3b)
First floor	53.0000	(1c) x	2.3000	(2c) =	121.9000	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	106.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		249.1000	(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	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) =	0.1606 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.4106 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3490 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.0000	4.8000	4.8000	4.4000	4.3000	3.9000	3.9000	3.8000	3.9000	4.3000	4.3000	4.6000	(22)
Wind factor	1.2500	1.2000	1.2000	1.1000	1.0750	0.9750	0.9750	0.9500	0.9750	1.0750	1.0750	1.1500	(22a)

Adj infilt rate													
	0.4362	0.4188	0.4188	0.3839	0.3752	0.3403	0.3403	0.3315	0.3403	0.3752	0.3752	0.4013	(22b)
Effective ac	0.5952	0.5877	0.5877	0.5737	0.5704	0.5579	0.5579	0.5550	0.5579	0.5704	0.5704	0.5805	(25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Main dwelling								
Window			15.7400	1.1450	18.0229			(27)
External Door			1.9500	1.0000	1.9500			(26)
Heatloss Floor 1			53.0000	0.0900	4.7700	75.0000	3975.0000	(28a)
External Wall 1	141.0000	17.6900	123.3100	0.1500	18.4965	9.0000	1109.7900	(29a)
External Roof 1	53.0000		53.0000	0.0700	3.7100	9.0000	477.0000	(30)
Total net area of external elements Aum(A, m2)			247.0000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	46.9494			(33)
Main dwelling								
Internal Wall 1			196.0000			9.0000	1764.0000	(32c)
Internal Ceiling 1			53.0000			9.0000	477.0000	(32e)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	7802.7900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		73.6112 (35)
Thermal bridges (User defined value 0.080 * total exposed area)		19.7600 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	66.7094 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	48.9233	48.3101	48.3101	47.1587	46.8865	45.8603	45.8603	45.6194	45.8603	46.8865	46.8865	47.7219	(38)
Heat transfer coeff	115.6327	115.0195	115.0195	113.8681	113.5959	112.5697	112.5697	112.3288	112.5697	113.5959	113.5959	114.4313	(39)
Average = Sum(39)m / 12 =												113.7331	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0909	1.0851	1.0851	1.0742	1.0717	1.0620	1.0620	1.0597	1.0620	1.0717	1.0717	1.0795	(40)
HLP (average)												1.0730	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.7886	(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													
	81.8650	80.6492	78.9371	75.7803	73.4165	70.7954	69.3796	71.0797	72.9309	75.7355	78.9574	81.5883	(42b)
Hot water usage for other uses													
	43.1877	41.6172	40.0467	38.4763	36.9058	35.3354	35.3354	36.9058	38.4763	40.0467	41.6172	43.1877	(42c)
Average daily hot water use (litres/day)												115.1633	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	125.0527	122.2664	118.9838	114.2565	110.3223	106.1307	104.7150	107.9856	111.4072	115.7823	120.5746	124.7759	(44)
Energy conte	198.0529	174.1057	182.8737	156.4115	148.5150	130.5001	126.6437	133.7087	137.3762	157.1155	171.7806	195.3689	(45)
Energy content (annual)										Total = Sum(45)m =		1912.4525	
Distribution loss (46)m = 0.15 x (45)m													
	29.7079	26.1159	27.4311	23.4617	22.2772	19.5750	18.9966	20.0563	20.6064	23.5673	25.7671	29.3053	(46)
Water storage loss (or HIU loss):													
Store volume												210.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6000	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8640	(55)
Total storage loss													
	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(56)
If cylinder contains dedicated solar storage													
	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(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													
	248.0993	219.3089	232.9201	204.8435	198.5614	178.9321	176.6901	183.7551	185.8082	207.1619	220.2126	245.4153	(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	-38.8790	-66.4008	-123.6354	-181.5479	-198.5614	-178.9321	-176.6901	-183.7551	-156.4476	-96.0813	-49.9946	-29.6753	(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													
	209.2203	152.9082	109.2847	23.2956	0.0000	0.0000	0.0000	0.0000	29.3606	111.0805	170.2180	215.7401	(64)
									Total per year (kWh/year) = Sum(64)m =			1021.1079	(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													
	105.8897	94.0527	100.8426	90.7524	89.4184	82.1369	82.1461	84.4953	84.4232	92.2780	95.8626	104.9973	(65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	27.1307	24.0972	19.5972	14.8363	11.0903	9.3629	10.1170	13.1504	17.6505	22.4113	26.1573	27.8847	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	396.5355	400.6503	390.2812	368.2065	340.3411	314.1516	296.6554	292.5406	302.9098	324.9845	352.8498	379.0393	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	(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)													
	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	(71)
Water heating gains (Table 5)													
	142.3249	139.9594	135.5412	126.0450	120.1860	114.0790	110.4115	113.5689	117.2544	124.0296	133.1426	141.1254	(72)
Total internal gains													
	676.2823	674.9981	655.7107	619.3790	581.9086	547.8847	527.4750	529.5511	548.1058	581.7165	622.4409	658.3406	(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	
East	7.1000	23.7652	0.7600	0.7000	0.7700	62.2079	(76)
West	8.6400	23.7652	0.7600	0.7000	0.7700	75.7008	(80)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	137.9087	239.7244	392.2040	582.3237	663.8160	746.3988	684.4726	602.5239	476.4575	292.0934	169.3920	109.6734	(83)
Total gains	814.1910	914.7226	1047.9147	1201.7027	1245.7246	1294.2835	1211.9476	1132.0750	1024.5633	873.8100	791.8329	768.0140	(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	18.7442	18.8441	18.8441	19.0347	19.0803	19.2542	19.2542	19.2955	19.2542	19.0803	19.0803	18.9410	
alpha	2.2496	2.2563	2.2563	2.2690	2.2720	2.2836	2.2836	2.2864	2.2836	2.2720	2.2720	2.2627	
util living area	0.9080	0.8818	0.8277	0.7346	0.6234	0.4578	0.3684	0.3970	0.5840	0.7793	0.8768	0.9173	(86)
Living	18.3151	18.6253	19.2004	19.8853	20.4193	20.8032	20.9108	20.8936	20.6301	19.9249	19.0436	18.2393	
Non living	16.8847	17.2740	17.9876	18.8249	19.4546	19.8746	19.9767	19.9658	19.7081	18.8972	17.8125	16.7946	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	19.6265	18.6253	19.2004	19.8853	20.4193	20.8032	20.9108	20.8936	20.6301	19.9249	19.0436	18.6255	(87)
Th 2	20.0083	20.0130	20.0130	20.0219	20.0240	20.0320	20.0320	20.0339	20.0320	20.0240	20.0240	20.0176	(88)
util rest of house	0.8977	0.8689	0.8088	0.7059	0.5809	0.3977	0.2945	0.3210	0.5259	0.7477	0.8609	0.9079	(89)
MIT 2	18.7622	17.2740	17.9876	18.8249	19.4546	19.8746	19.9767	19.9658	19.7081	18.8972	17.8125	17.3752	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.1128	17.8222	18.4796	19.2550	19.8460	20.2513	20.3556	20.3422	20.0821	19.3141	18.3119	17.8824	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1128	17.8222	18.4796	19.2550	19.8460	20.2513	20.3556	20.3422	20.0821	19.3141	18.3119	17.8824	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8869	0.8323	0.7736	0.6806	0.5725	0.4119	0.3199	0.3461	0.5291	0.7209	0.8257	0.8817	(94)
Useful gains	722.0960	761.2949	810.6399	817.9193	713.2262	533.0683	387.7609	391.8178	542.1327	629.9234	653.7995	677.1324	(95)
Ext temp.	4.7000	5.2000	6.8000	9.1000	12.0000	15.0000	16.7000	16.6000	14.3000	11.0000	7.6000	4.6000	(96)
Heat loss rate W	1666.5916	1451.7934	1343.3792	1156.3361	891.2679	591.1402	411.5115	420.3535	650.8910	944.4474	1216.8323	1519.9196	(97)
Space heating kWh	702.7047	464.0150	396.3580	243.6601	132.4630	0.0000	0.0000	0.0000	0.0000	234.0059	405.3836	627.0337	(98a)
Space heating requirement - total per year (kWh/year)												3205.6240	
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	702.7047	464.0150	396.3580	243.6601	132.4630	0.0000	0.0000	0.0000	0.0000	234.0059	405.3836	627.0337	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3205.6240	
Space heating per m2											(98c) / (4) =	30.2417	(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 %) 228.0950 (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	702.7047	464.0150	396.3580	243.6601	132.4630	0.0000	0.0000	0.0000	0.0000	234.0059	405.3836	627.0337	(98)
Space heating efficiency (main heating system 1)	228.0950	228.0950	228.0950	228.0950	228.0950	0.0000	0.0000	0.0000	0.0000	228.0950	228.0950	228.0950	(210)
Space heating fuel (main heating system)	308.0755	203.4306	173.7688	106.8239	58.0736	0.0000	0.0000	0.0000	0.0000	102.5914	177.7258	274.9002	(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	209.2203	152.9082	109.2847	23.2956	0.0000	0.0000	0.0000	0.0000	29.3606	111.0805	170.2180	215.7401	(64)
Efficiency of water heater												163.6200	(216)
(217)m	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	(217)
Fuel for water heating, kWh/month	127.8696	93.4532	66.7918	14.2376	0.0000	0.0000	0.0000	0.0000	17.9444	67.8893	104.0325	131.8544	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.7473	19.0510	17.1533	12.5672	9.7073	7.9310	8.8553	11.5105	14.9510	19.6165	22.1568	24.4073	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-87.0460	-107.1457	-144.4105	-146.0567	-136.9457	-114.9154	-112.1462	-109.0155	-107.2960	-115.1388	-90.6762	-73.2897	(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	-1.7403	-8.2952	-23.6994	-51.1705	-88.8818	-163.6080	-147.1461	-102.9462	-63.0738	-22.1306	-6.5070	-1.5701	(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	1405.3899	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	163.6200	
Water heating fuel used	624.0728	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	191.6546	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-2024.8515	(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	196.2658	(238)

10a. Fuel costs - using BEDF prices (599)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1405.3899	26.0000	365.4014	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	624.0728	26.0000	162.2589	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0000	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	191.6546	26.0000	49.8302	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1344.0824	26.0000	-349.4614	
PV Unit electricity exported	-680.7691	5.8100	-39.5527	
Total			-389.0141	(252)
Total energy cost			188.4764	(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	1405.3899	0.1550	217.8911	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	624.0728	0.1549	96.6737	(264)
Space and water heating			314.5648	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	191.6546	0.1443	27.6617	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1344.0824	0.1378	-185.2247	
PV Unit electricity exported	-680.7691	0.1134	-77.2145	
Total			-262.4391	(269)
Total CO2, kg/year			79.7874	(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	1405.3899	1.5739	2212.0017	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	624.0728	1.5734	981.9152	(278)
Space and water heating			3193.9168	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	191.6546	1.5338	293.9662	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1344.0824	1.5095	-2028.9004	
PV Unit electricity exported	-680.7691	0.4152	-282.6822	
Total			-2311.5825	(283)
Total Primary energy kWh/year			1176.3005	(286)

SAP 10 EPC IMPROVEMENTS

00001 Rev A

Current energy efficiency rating:	A 94
Current environmental impact rating:	A 99

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

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

Measures omitted - SAP change or cost saving too small:
N Solar water heating + 0.4 -£ -25 -142 kg (178.1%)

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

Potential energy efficiency rating: A 94
Potential environmental impact rating: A 99

Fuel prices for cost data on this page from database revision number 599 TEST (30 Sep 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

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

	Current	Potential	Saving
Electricity	£577	£577	£0
Space heating	£365	£365	£0
Water heating	£162	£162	£0
Lighting	£50	£50	£0
Generated (PV)	-£389	-£389	£0
Total cost of fuels	£188	£188	£0
Total cost of uses	£188	£188	£0
Delivered energy	2 kWh/m²	2 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.1 tonnes	0.1 tonnes	0.0 tonnes
CO2 emissions per m²	1 kg/m²	1 kg/m²	0 kg/m²
Primary energy	11 kWh/m²	11 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	53.0000 (1b)	x	2.4000 (2b)	=	127.2000 (1b) - (3b)	
First floor	53.0000 (1c)	x	2.3000 (2c)	=	121.9000 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	106.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	249.1000	(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	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) =	0.1606	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.4106	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3490	(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	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101	(22b)
Effective ac	0.5990	0.5952	0.5914	0.5737	0.5704	0.5550	0.5550	0.5521	0.5609	0.5704	0.5771	0.5841	(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								
Window			15.7400	1.1450	18.0229			(27)
External Door			1.9500	1.0000	1.9500			(26)
Heatloss Floor 1			53.0000	0.0900	4.7700	75.0000	3975.0000	(28a)
External Wall 1	141.0000	17.6900	123.3100	0.1500	18.4965	9.0000	1109.7900	(29a)
External Roof 1	53.0000		53.0000	0.0700	3.7100	9.0000	477.0000	(30)
Total net area of external elements Aum(A, m2)			247.0000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		46.9494			(33)
Main dwelling								
Internal Wall 1			196.0000			9.0000	1764.0000	(32c)
Internal Ceiling 1			53.0000			9.0000	477.0000	(32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 7802.7900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.6112 (35)
Thermal bridges (User defined value 0.080 * total exposed area) 19.7600 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 66.7094 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	49.2393	48.9233	48.6136	47.1587	46.8865	45.6194	45.6194	45.3847	46.1075	46.8865	47.4372	48.0128	(38)
Heat transfer coeff	115.9487	115.6327	115.3230	113.8681	113.5959	112.3288	112.3288	112.0941	112.8169	113.5959	114.1466	114.7222	(39)
Average = Sum(39)m / 12 =												113.8668	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0939	1.0909	1.0880	1.0742	1.0717	1.0597	1.0597	1.0575	1.0643	1.0717	1.0769	1.0823	(40)
HLP (average)												1.0742	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.7886 (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

81.8650	80.6492	78.9371	75.7803	73.4165	70.7954	69.3796	71.0797	72.9309	75.7355	78.9574	81.5883	(42b)

Hot water usage for other uses

43.1877	41.6172	40.0467	38.4763	36.9058	35.3354	35.3354	36.9058	38.4763	40.0467	41.6172	43.1877	(42c)

Average daily hot water use (litres/day) 115.1633 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	125.0527	122.2664	118.9838	114.2565	110.3223	106.1307	104.7150	107.9856	111.4072	115.7823	120.5746	124.7759	(44)
Energy conte	198.0529	174.1057	182.8737	156.4115	148.5150	130.5001	126.6437	133.7087	137.3762	157.1155	171.7806	195.3689	(45)
Energy content (annual)										Total = Sum(45)m =		1912.4525	
Distribution loss (46)m = 0.15 x (45)m	29.7079	26.1159	27.4311	23.4617	22.2772	19.5750	18.9966	20.0563	20.6064	23.5673	25.7671	29.3053	(46)
Water storage loss (or HIU loss):													
Store volume												210.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6000	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8640	(55)
Total storage loss	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(56)
If cylinder contains dedicated solar storage	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(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	248.0993	219.3089	232.9201	204.8435	198.5614	178.9321	176.6901	183.7551	185.8082	207.1619	220.2126	245.4153	(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	-30.9028	-62.2324	-116.5264	-166.1420	-198.5614	-178.9321	-176.6901	-181.2300	-139.1110	-86.8910	-40.6716	-24.6880	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	217.1965	157.0765	116.3937	38.7015	0.0000	0.0000	0.0000	2.5251	46.6972	120.2708	179.5410	220.7273	(64)
									Total per year (kWh/year) = Sum(64)m =			1099.1297	(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	105.8897	94.0527	100.8426	90.7524	89.4184	82.1369	82.1461	84.4953	84.4232	92.2780	95.8626	104.9973	(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	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	27.1307	24.0972	19.5972	14.8363	11.0903	9.3629	10.1170	13.1504	17.6505	22.4113	26.1573	27.8847	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	396.5355	400.6503	390.2812	368.2065	340.3411	314.1516	296.6554	292.5406	302.9098	324.9845	352.8498	379.0393	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	(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)	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	(71)
Water heating gains (Table 5)	142.3249	139.9594	135.5412	126.0450	120.1860	114.0790	110.4115	113.5689	117.2544	124.0296	133.1426	141.1254	(72)
Total internal gains	676.2823	674.9981	655.7107	619.3790	581.9086	547.8847	527.4750	529.5511	548.1058	581.7165	622.4409	658.3406	(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	
East	7.1000	19.6403	0.7600	0.7000	0.7700	51.4103	(76)
West	8.6400	19.6403	0.7600	0.7000	0.7700	62.5613	(80)

Solar gains	113.9717	222.9528	367.1714	535.4977	656.2725	671.8117	639.5921	549.4002	427.0356	264.5522	142.1093	93.7248	(83)
Total gains	790.2539	897.9509	1022.8821	1154.8766	1238.1810	1219.6964	1167.0671	1078.9512	975.1414	846.2688	764.5502	752.0654	(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	18.6931	18.7442	18.7945	19.0347	19.0803	19.2955	19.2955	19.3359	19.2120	19.0803	18.9882	18.8929	
alpha	2.2462	2.2496	2.2530	2.2690	2.2720	2.2864	2.2864	2.2891	2.2808	2.2720	2.2659	2.2595	
util living area													
	0.9164	0.8892	0.8392	0.7527	0.6377	0.5017	0.3871	0.4274	0.6139	0.7999	0.8909	0.9237	(86)
Living	18.1624	18.5080	19.0902	19.7997	20.3694	20.7459	20.8991	20.8705	20.5738	19.8079	18.8649	18.1003	
Non living	16.6912	17.1247	17.8505	18.7241	19.3977	19.8212	19.9696	19.9489	19.6489	18.7572	17.5874	16.6179	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	19.5484	18.5080	19.0902	19.7997	20.3694	20.7459	20.8991	20.8705	20.5738	19.8079	18.8649	18.5059	(87)
Th 2	20.0059	20.0083	20.0107	20.0219	20.0240	20.0339	20.0339	20.0357	20.0301	20.0240	20.0198	20.0153	(88)
util rest of house													
	0.9070	0.8771	0.8215	0.7254	0.5968	0.4432	0.3124	0.3513	0.5575	0.7711	0.8769	0.9151	(89)
MIT 2	18.6834	17.1247	17.8505	18.7241	19.3977	19.8212	19.9696	19.9489	19.6489	18.7572	17.5874	17.2298	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.0343	17.6859	18.3534	19.1604	19.7919	20.1963	20.3467	20.3227	20.0241	19.1835	18.1056	17.7475	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0343	17.6859	18.3534	19.1604	19.7919	20.1963	20.3467	20.3227	20.0241	19.1835	18.1056	17.7475	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8964	0.8406	0.7855	0.6981	0.5863	0.4535	0.3374	0.3749	0.5572	0.7419	0.8417	0.8895	(94)
Useful gains	708.3904	754.7952	803.4902	806.2249	725.9298	553.1488	393.7798	404.4974	543.3033	627.8490	643.5130	668.9893	(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													
	1708.4242	1478.4666	1366.9709	1168.3343	919.2051	628.6270	420.8573	439.7168	668.3412	975.0458	1256.2557	1554.1994	(97)
Space heating kWh													
	744.0251	486.3072	419.2297	260.7188	143.7968	0.0000	0.0000	0.0000	0.0000	258.3144	441.1747	658.5963	(98a)
Space heating requirement - total per year (kWh/year)												3412.1629	
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													
	744.0251	486.3072	419.2297	260.7188	143.7968	0.0000	0.0000	0.0000	0.0000	258.3144	441.1747	658.5963	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3412.1629	
Space heating per m2											(98c) / (4) =	32.1902	(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 %)	228.0950	(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													
	744.0251	486.3072	419.2297	260.7188	143.7968	0.0000	0.0000	0.0000	0.0000	258.3144	441.1747	658.5963	(98)
Space heating efficiency (main heating system 1)													
	228.0950	228.0950	228.0950	228.0950	228.0950	0.0000	0.0000	0.0000	0.0000	228.0950	228.0950	228.0950	(210)
Space heating fuel (main heating system)													
	326.1909	213.2038	183.7961	114.3027	63.0425	0.0000	0.0000	0.0000	0.0000	113.2486	193.4171	288.7377	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	217.1965	157.0765	116.3937	38.7015	0.0000	0.0000	0.0000	2.5251	46.6972	120.2708	179.5410	220.7273	(64)
Efficiency of water heater												163.6200	(216)
(217)m	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	(217)
Fuel for water heating, kWh/month													
	132.7445	96.0008	71.1366	23.6533	0.0000	0.0000	0.0000	1.5433	28.5400	73.5062	109.7305	134.9024	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.7473	19.0510	17.1533	12.5672	9.7073	7.9310	8.8553	11.5105	14.9510	19.6165	22.1568	24.4073	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-76.7771	-104.1615	-141.7856	-143.9885	-138.1065	-111.7335	-110.2355	-106.6577	-105.6009	-111.3067	-81.8361	-66.1785	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-0.8133	-7.1070	-20.9243	-44.0588	-87.3816	-122.7421	-123.2095	-76.5636	-54.3361	-18.5098	-4.4374	-0.9532	(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	1495.9394	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	163.6200	
Water heating fuel used	671.7575	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	191.6546	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1859.4046	(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	499.9469	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1495.9394	16.4900	246.6804	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	671.7575	16.4900	110.7728	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	191.6546	16.4900	31.6038	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1298.3680	16.4900	-214.1009	
PV Unit electricity exported	-561.0366	5.5900	-31.3619	
Total			-245.4628	(252)
Total energy cost			143.5942	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	0.3423	(257)
SAP value		94.4506	
SAP rating (Section 12)		94	(258)
SAP band		A	

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	1495.9394	0.1549	231.7415	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	671.7575	0.1540	103.4738	(264)
Space and water heating			335.2152	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	191.6546	0.1443	27.6617	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1298.3680	0.1374	-178.4493	
PV Unit electricity exported	-561.0366	0.1143	-64.1201	
Total			-242.5694	(269)
Total CO2, kg/year			120.3075	(272)
CO2 emissions per m2			1.1300	(273)
EI value			98.9324	
EI rating			99	(274)
EI band			A	

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	53.0000	(1b) x	2.4000	(2b) =	127.2000	(1b) - (3b)
First floor	53.0000	(1c) x	2.3000	(2c) =	121.9000	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	106.0000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		249.1000	(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	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) =	0.1606	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.4106	(18)

Number of sides sheltered 2 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3490 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.0000	4.8000	4.8000	4.4000	4.3000	3.9000	3.9000	3.8000	3.9000	4.3000	4.3000	4.6000	(22)
Wind factor	1.2500	1.2000	1.2000	1.1000	1.0750	0.9750	0.9750	0.9500	0.9750	1.0750	1.0750	1.1500	(22a)
Adj infilt rate	0.4362	0.4188	0.4188	0.3839	0.3752	0.3403	0.3403	0.3315	0.3403	0.3752	0.3752	0.4013	(22b)
Effective ac	0.5952	0.5877	0.5877	0.5737	0.5704	0.5579	0.5579	0.5550	0.5579	0.5704	0.5704	0.5805	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
Window			15.7400	1.1450	18.0229			(27)
External Door			1.9500	1.0000	1.9500			(26)
Heatloss Floor 1			53.0000	0.0900	4.7700	75.0000	3975.0000	(28a)
External Wall 1	141.0000	17.6900	123.3100	0.1500	18.4965	9.0000	1109.7900	(29a)
External Roof 1	53.0000		53.0000	0.0700	3.7100	9.0000	477.0000	(30)
Total net area of external elements Aum(A, m2)			247.0000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	46.9494			(33)
Main dwelling								
Internal Wall 1			196.0000			9.0000	1764.0000	(32c)
Internal Ceiling 1			53.0000			9.0000	477.0000	(32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 7802.7900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.6112 (35)
Thermal bridges (User defined value 0.080 * total exposed area) 19.7600 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 66.7094 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	48.9233	48.3101	48.3101	47.1587	46.8865	45.8603	45.8603	45.6194	45.8603	46.8865	46.8865	47.7219	(38)
Heat transfer coeff	115.6327	115.0195	115.0195	113.8681	113.5959	112.5697	112.5697	112.3288	112.5697	113.5959	113.5959	114.4313	(39)
Average = Sum(39)m / 12 =												113.7331	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0909	1.0851	1.0851	1.0742	1.0717	1.0620	1.0620	1.0597	1.0620	1.0717	1.0717	1.0795	(40)
HLP (average)												1.0730	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.7886 (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

81.8650	80.6492	78.9371	75.7803	73.4165	70.7954	69.3796	71.0797	72.9309	75.7355	78.9574	81.5883	(42b)

Hot water usage for other uses

43.1877	41.6172	40.0467	38.4763	36.9058	35.3354	35.3354	36.9058	38.4763	40.0467	41.6172	43.1877	(42c)

Average daily hot water use (litres/day) 115.1633 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	125.0527	122.2664	118.9838	114.2565	110.3223	106.1307	104.7150	107.9856	111.4072	115.7823	120.5746	124.7759	(44)
Energy conte	198.0529	174.1057	182.8737	156.4115	148.5150	130.5001	126.6437	133.7087	137.3762	157.1155	171.7806	195.3689	(45)
Energy content (annual)										Total = Sum(45)m =		1912.4525	
Distribution loss (46)m = 0.15 x (45)m	29.7079	26.1159	27.4311	23.4617	22.2772	19.5750	18.9966	20.0563	20.6064	23.5673	25.7671	29.3053	(46)
Water storage loss (or HIU loss):													
Store volume												210.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6000	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8640	(55)
Total storage loss	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(56)
If cylinder contains dedicated solar storage	26.7840	24.1920	26.7840	25.9200	26.7840	25.9200	26.7840	26.7840	25.9200	26.7840	25.9200	26.7840	(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	248.0993	219.3089	232.9201	204.8435	198.5614	178.9321	176.6901	183.7551	185.8082	207.1619	220.2126	245.4153	(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	-38.8790	-66.4008	-123.6354	-181.5479	-198.5614	-178.9321	-176.6901	-183.7551	-156.4476	-96.0813	-49.9946	-29.6753	(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	209.2203	152.9082	109.2847	23.2956	0.0000	0.0000	0.0000	0.0000	29.3606	111.0805	170.2180	215.7401	(64)
									Total per year (kWh/year) = Sum(64)m =			1021.1079	(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	105.8897	94.0527	100.8426	90.7524	89.4184	82.1369	82.1461	84.4953	84.4232	92.2780	95.8626	104.9973	(65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	167.3137	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	27.1307	24.0972	19.5972	14.8363	11.0903	9.3629	10.1170	13.1504	17.6505	22.4113	26.1573	27.8847	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	396.5355	400.6503	390.2812	368.2065	340.3411	314.1516	296.6554	292.5406	302.9098	324.9845	352.8498	379.0393	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	54.5199	(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)	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	-111.5425	(71)
Water heating gains (Table 5)	142.3249	139.9594	135.5412	126.0450	120.1860	114.0790	110.4115	113.5689	117.2544	124.0296	133.1426	141.1254	(72)
Total internal gains	676.2823	674.9981	655.7107	619.3790	581.9086	547.8847	527.4750	529.5511	548.1058	581.7165	622.4409	658.3406	(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	
East	7.1000	23.7652	0.7600	0.7000	0.7700	62.2079	(76)
West	8.6400	23.7652	0.7600	0.7000	0.7700	75.7008	(80)

Solar gains	137.9087	239.7244	392.2040	582.3237	663.8160	746.3988	684.4726	602.5239	476.4575	292.0934	169.3920	109.6734	(83)
Total gains	814.1910	914.7226	1047.9147	1201.7027	1245.7246	1294.2835	1211.9476	1132.0750	1024.5633	873.8100	791.8329	768.0140	(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	18.7442	18.8441	18.8441	19.0347	19.0803	19.2542	19.2542	19.2955	19.2542	19.0803	19.0803	18.9410	
alpha	2.2496	2.2563	2.2563	2.2690	2.2720	2.2836	2.2836	2.2864	2.2836	2.2720	2.2720	2.2627	
util living area	0.9080	0.8818	0.8277	0.7346	0.6234	0.4578	0.3684	0.3970	0.5840	0.7793	0.8768	0.9173	(86)
Living	18.3151	18.6253	19.2004	19.8853	20.4193	20.8032	20.9108	20.8936	20.6301	19.9249	19.0436	18.2393	
Non living	16.8847	17.2740	17.9876	18.8249	19.4546	19.8746	19.9767	19.9658	19.7081	18.8972	17.8125	16.7946	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	19.6265	18.6253	19.2004	19.8853	20.4193	20.8032	20.9108	20.8936	20.6301	19.9249	19.0436	18.6255	(87)
Th 2	20.0083	20.0130	20.0130	20.0219	20.0240	20.0320	20.0320	20.0339	20.0320	20.0240	20.0240	20.0176	(88)
util rest of house	0.8977	0.8689	0.8088	0.7059	0.5809	0.3977	0.2945	0.3210	0.5259	0.7477	0.8609	0.9079	(89)
MIT 2	18.7622	17.2740	17.9876	18.8249	19.4546	19.8746	19.9767	19.9658	19.7081	18.8972	17.8125	17.3752	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.1128	17.8222	18.4796	19.2550	19.8460	20.2513	20.3556	20.3422	20.0821	19.3141	18.3119	17.8824	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1128	17.8222	18.4796	19.2550	19.8460	20.2513	20.3556	20.3422	20.0821	19.3141	18.3119	17.8824	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8869	0.8323	0.7736	0.6806	0.5725	0.4119	0.3199	0.3461	0.5291	0.7209	0.8257	0.8817	(94)
Useful gains	722.0960	761.2949	810.6399	817.9193	713.2262	533.0683	387.7609	391.8178	542.1327	629.9234	653.7995	677.1324	(95)
Ext temp.	4.7000	5.2000	6.8000	9.1000	12.0000	15.0000	16.7000	16.6000	14.3000	11.0000	7.6000	4.6000	(96)
Heat loss rate W	1666.5916	1451.7934	1343.3792	1156.3361	891.2679	591.1402	411.5115	420.3535	650.8910	944.4474	1216.8323	1519.9196	(97)
Space heating kWh	702.7047	464.0150	396.3580	243.6601	132.4630	0.0000	0.0000	0.0000	0.0000	234.0059	405.3836	627.0337	(98a)
Space heating requirement - total per year (kWh/year)												3205.6240	
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	702.7047	464.0150	396.3580	243.6601	132.4630	0.0000	0.0000	0.0000	0.0000	234.0059	405.3836	627.0337	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3205.6240	
Space heating per m2											(98c) / (4) =	30.2417	(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 %)												228.0950	(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	702.7047	464.0150	396.3580	243.6601	132.4630	0.0000	0.0000	0.0000	0.0000	234.0059	405.3836	627.0337	(98)
Space heating efficiency (main heating system 1)	228.0950	228.0950	228.0950	228.0950	228.0950	0.0000	0.0000	0.0000	0.0000	228.0950	228.0950	228.0950	(210)
Space heating fuel (main heating system)	308.0755	203.4306	173.7688	106.8239	58.0736	0.0000	0.0000	0.0000	0.0000	102.5914	177.7258	274.9002	(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	209.2203	152.9082	109.2847	23.2956	0.0000	0.0000	0.0000	0.0000	29.3606	111.0805	170.2180	215.7401	(64)
Efficiency of water heater												163.6200	(216)
(217)m	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	163.6200	(217)
Fuel for water heating, kWh/month	127.8696	93.4532	66.7918	14.2376	0.0000	0.0000	0.0000	0.0000	17.9444	67.8893	104.0325	131.8544	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.7473	19.0510	17.1533	12.5672	9.7073	7.9310	8.8553	11.5105	14.9510	19.6165	22.1568	24.4073	(232)

Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-87.0460	-107.1457	-144.4105	-146.0567	-136.9457	-114.9154	-112.1462	-109.0155	-107.2960	-115.1388	-90.6762	-73.2897 (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	-1.7403	-8.2952	-23.6994	-51.1705	-88.8818	-163.6080	-147.1461	-102.9462	-63.0738	-22.1306	-6.5070	-1.5701 (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	1405.3899	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	163.6200	
Water heating fuel used	624.0728	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	191.6546	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-2024.8515	(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	196.2658	(238)

10a. Fuel costs - using BEDF prices (599)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1405.3899	26.0000	365.4014	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	624.0728	26.0000	162.2589	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0000	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	191.6546	26.0000	49.8302	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1344.0824	26.0000	-349.4614	
PV Unit electricity exported	-680.7691	5.8100	-39.5527	
Total			-389.0141	(252)
Total energy cost			188.4764	(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	1405.3899	0.1550	217.8911	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	624.0728	0.1549	96.6737	(264)
Space and water heating			314.5648	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	191.6546	0.1443	27.6617	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1344.0824	0.1378	-185.2247	
PV Unit electricity exported	-680.7691	0.1134	-77.2145	
Total			-262.4391	(269)
Total CO2, kg/year			79.7874	(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	1405.3899	1.5739	2212.0017	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	624.0728	1.5734	981.9152	(278)
Space and water heating			3193.9168	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	191.6546	1.5338	293.9662	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1344.0824	1.5095	-2028.9004	
PV Unit electricity exported	-680.7691	0.4152	-282.6822	
Total			-2311.5825	(283)
Total Primary energy kWh/year			1176.3005	(286)

Predicted Energy Assessment

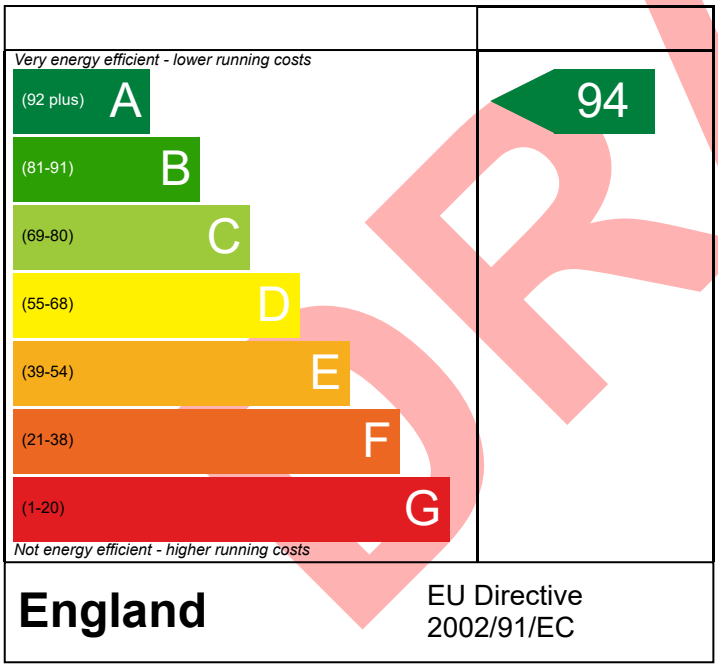
Rock House, Plot 1, Old Frome Road To Underhill,
Somerset, BA3 4TQ

Dwelling type:	House, Detached
Date of assessment:	22/10/2026
SAP Version:	10.2
Produced by:	Chris Law
Total floor area:	106 m²
DRRN:	

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

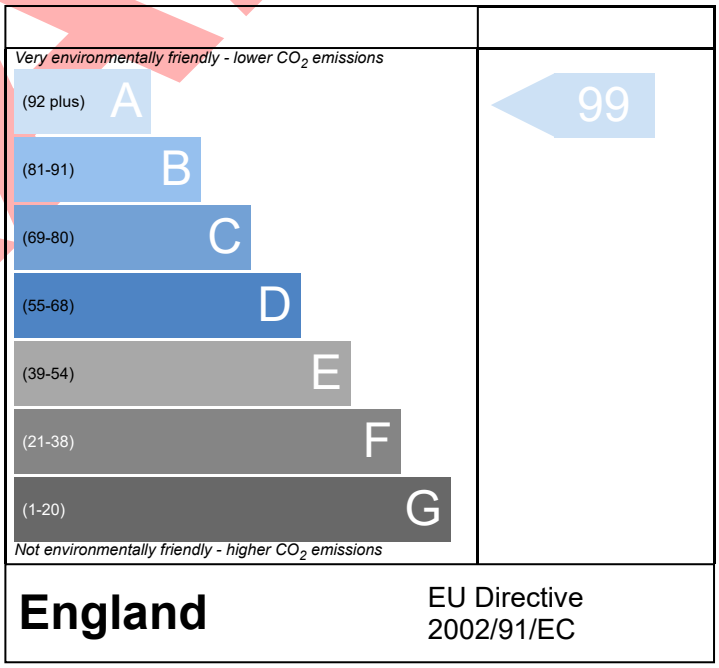
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



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

Environmental Impact (CO_2) Rating



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

DRAFT

Thermal Bridging

Plot Reference	Plot 1	**Issued on Date**	22/10/2026
Assessment Reference	00001 Rev A	**Plot Type Ref**	Detached House
Plot Address	Rock House, Plot 1, Old Frome Road To Underhill, Somerset, BA3 4TQ	**SAP Version**	10.2

SAP Rating	94 A	**DER**	1.21	**TER**	10.45
Environmental	99 A	**% DER < TER**			88.42
CO_2 Emissions (t/year)	0.08	**DFEE**	37.47	**TFEE**	37.56
Compliance Check	See BREL	**% DFEE < TFEE**			0.24
% DPER < TPER	72.62	**DPER**	14.93	**TPER**	54.53

Assessor Details	Mr. Chris Law	**Assessor ID**	AX42-0001
Client	Rock House, Philip Jenkins		

	Junction details	Length (m)	Reference
External wall	E1 Steel lintel with perforated steel base plate	12.87	
External wall	E3 Sill	11.94	
External wall	E4 Jamb	27.20	
External wall	E5 Ground floor (normal)	30.00	
External wall	E6 Intermediate floor within a dwelling	30.00	
External wall	E16 Corner (normal)	23.55	
External wall	E10 Eaves (insulation at ceiling level)	10.87	
External wall	E12 Gable (insulation at ceiling level)	15.69	
External wall	E17 Corner (inverted – internal area greater than external area)	4.71	

Y-Value: 0.08 W/m²K:

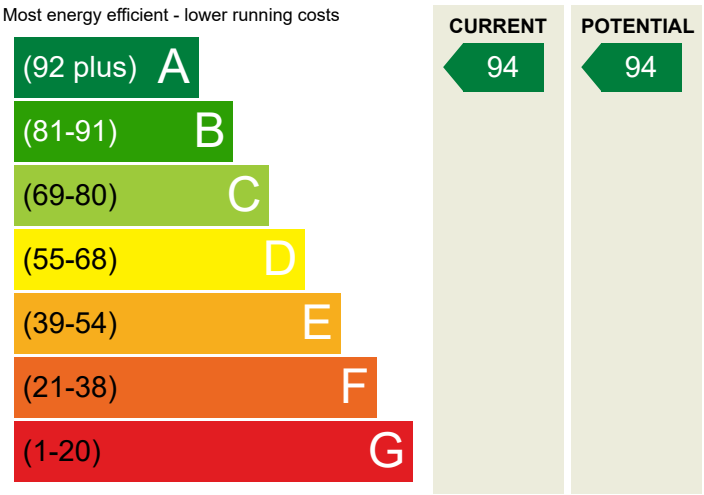
Energy Report

Dwelling Address	Rock House, Plot 1, Old Frome Road To Underhill, Somerset, BA3 4TQ
Reference	Plot 1-00001 Rev A
SAP Version	10.2
Assessment Date	22/10/2026
Submission Date	
Property Type	House, Detached
Total Floor Area	106

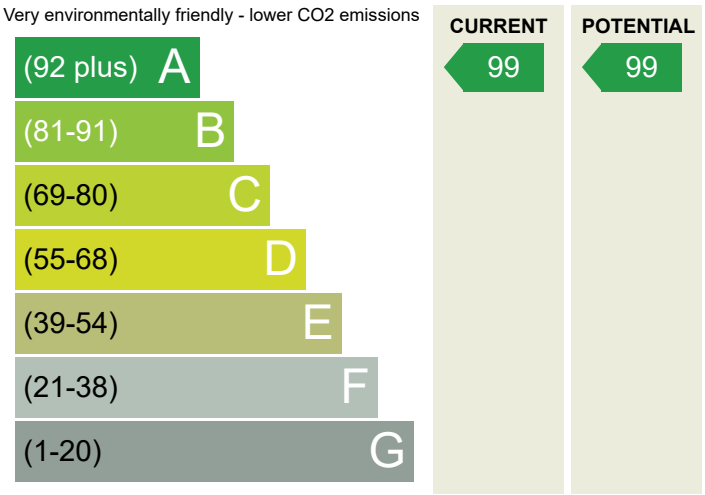
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

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

Energy Efficiency Rating

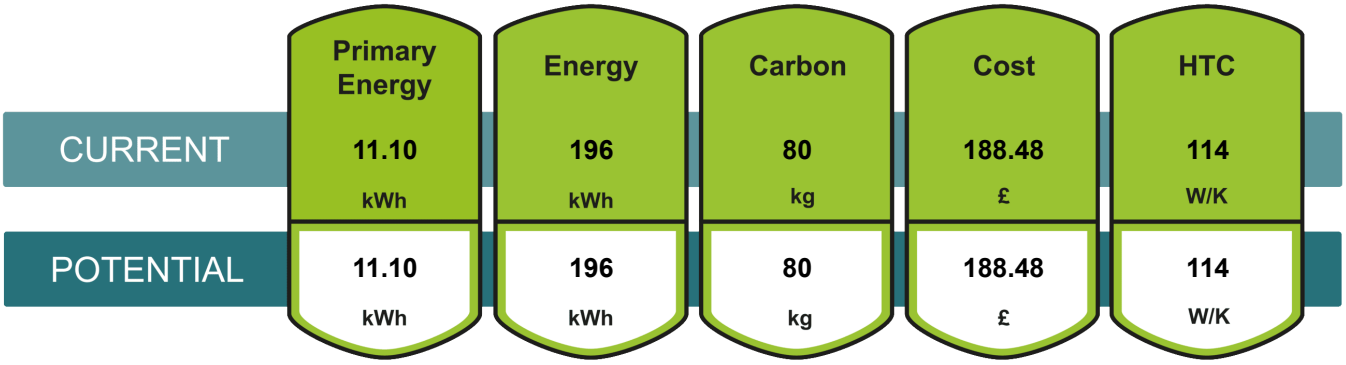


Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home

Energy Report



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.15 W/m²K	Very Good
Roof	Average thermal transmittance 0.07 W/m²K	Very Good
Floor	Average thermal transmittance 0.09 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Air source heat pump, radiators, electric	Average
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 5.0 m³/h.m² (assumed)	Good

Recommendations

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

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating
Solar water heating	£-25	A 95			A 100

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

Energy Report

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	£50	£50	
Heating	£365	£365	
Hot Water	£162	£162	
New Technologies e.g. Impact of PV	-(£389)	-(£389)	
TOTAL	£188	£188	

Estimated energy use and potential savings

Space Heating
1405
kWh per year

Water Heating
624
kWh per year

Energy Report

About this document

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

Disclaimer

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

Glossary terms for additional metrics

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

Dwelling Sign Off Report

Plot Reference	Plot 1	**Issued on Date**	22/10/2026
Assessment Reference	00001 Rev A	**Plot Type Ref**	Detached House
Plot Address	Rock House, Plot 1, Old Frome Road To Underhill, Somerset, BA3 4TQ	**SAP Version**	10.2

SAP Rating	94 A	**DER**	1.21	**TER**	10.45
Environmental	99 A	**% DER < TER**			88.42
CO_2 Emissions (t/year)	0.08	**DFEE**	37.47	**TFEE**	37.56
Compliance Check	See BREL	**% DFEE < TFEE**			0.24
% DPER < TPER	72.62	**DPER**	14.93	**TPER**	54.53

Assessor Details	Mr. Chris Law	**Assessor ID**	AX42-0001
Client	Rock House, Philip Jenkins		

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name	Rock House
House Number	Plot 1
Postcode	BA3 4TQ
Street	Old Frome Road To Underhill
Town	Somerset
County	

Dwelling Orientation East (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type House, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted: No

Smart gas meter fitted: No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1	
Type	Timber Frame	
Construction	Timber framed wall (one layer of plasterboard)	
U-value	0.15	W/m²K U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	141.00	m²

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Plasterboard, insulated at ceiling level		
U-value	0.07	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	53.00	m²	

Comments

Heat Loss Floors

Description	Heatloss Floor 1		
Type	Ground Floor - Solid		
Construction	Suspended concrete floor, carpeted		
U-value	0.09	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	53.00	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
Window	Manufacturer	Window	Double glazed	0.76		1.20
External Door	Manufacturer	Solid Door		0.00		1.00

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
Front	Window	External Wall 1	East	4.21
Front	Window	External Wall 1	East	1.44
Front	Window	External Wall 1	East	1.45
Front	External Door	External Wall 1	East	1.95
Rear	Window	External Wall 1	West	1.33
Rear	Window	External Wall 1	West	1.44
Rear	Window	External Wall 1	West	2.11
Rear	Window	External Wall 1	West	3.76

Comments

Thermal Bridging User Input

List of Bridges

Bridge Type	Source Type	Length (m)	Psi (W/mK)	Reference

E1 Steel lintel with perforated steel base plate	12.87
E3 Sill	11.94
E4 Jamb	27.20
E5 Ground floor (normal)	30.00
E6 Intermediate floor within a dwelling	30.00
E16 Corner (normal)	23.55
E10 Eaves (insulation at ceiling level)	10.87
E12 Gable (insulation at ceiling level)	15.69
E17 Corner (inverted – internal area greater than external area)	4.71

Y-value: 0.080

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing: Yes

Designed AP_{50}: 5.00 $m^3/(h.m^2)$ @ 50 Pa

Property Tested?: Yes

Test Method: Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	4
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System: No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	775.90	8.30	6440.00	24

Comments

Main Heating 1: Database

Fuel Type	Electricity	
Winter Efficiency	228.09	%
Summer Efficiency	163.62	%
Model Name	aroTHERM 5kW	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Heat Emitter	Radiators	
Flow Temperature	Enter value	
Flow Temperature Value	55.00	

Comments

Heating Controls

Description	Time and temperature zone control by arrangement
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2:

Secondary Heating: None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains

Number of baths	1	

Comments

Hot Water Cylinder

	Hot Water Cylinder	
Independent Time Control	Yes	
Cylinder Stat	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	210.00	L
Measured Loss	1.60	kWh/day
Pipes insulation	Fully insulated primary pipework	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit	One Dwelling
Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	Yes
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.00	South	45°	None Or Little	No	1.00		

Comments

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....