Summary for Input Data

elmhurst energy

Plot Reference	Plot 2	**Issued on Date**	22/10/2026
Assessment Reference	00002 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	92 A	**DER**	1.94	**TER**	10.31
Environmental	98 A	**% DER < TER**			81.18
CO_2 Emissions (t/year)	0.17	**DFEE**	36.28	**TFEE**	36.61
Compliance Check	See BREL	**% DFEE < TFEE**			0.91
% DPER < TPER	60.89	**DPER**	21.04	**TPER**	53.80

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

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

Orientation	North	
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	73.56	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	122.64	0.00	None	18.36	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	North	4.21	
Front	Window	External Wall 1	North	1.44	
Front	Window	External Wall 1	North	1.45	
Front	External Door	External Wall 1	North	1.95	
Rear	Window	External Wall 1	South	1.33	
Rear	Window	External Wall 1	South	1.44	
Rear	Window	External Wall 1	South	2.11	
Rear	Window	External Wall 1	South	3.76	
Side	Window	External Wall 1	East	0.66	

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	

Summary for Input Data

Model Name	aroTHERM 5kW	
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
3.00	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

Summary for Input Data

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			A 92	A 99
Photovoltaic			0	0
Wind turbine			0	0

Full SAP Calculation Printout

Plot Reference	Plot 2	**Issued on Date**	22/10/2026
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Compliance Check	See BREL	**% DFEE < TFEE**			0.91
% DPER < TPER	60.89	**DPER**	21.04	**TPER**	53.80

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			16.4000	1.1450	18.7786			(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	18.3500	122.6500	0.1500	18.3975	9.0000	1103.8500	(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) =		47.6061			(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) =		7796.8500	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							73.5552	(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) =		67.3661	(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													
	116.6054	116.2894	115.9797	114.5248	114.2526	112.9855	112.9855	112.7508	113.4736	114.2526	114.8033	115.3790	(39)
Average = Sum(39)m / 12 =												114.5235	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1001	1.0971	1.0941	1.0804	1.0779	1.0659	1.0659	1.0637	1.0705	1.0779	1.0830	1.0885	(40)
HLP (average)												1.0804	
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	-20.6335	-41.9476	-79.1913	-113.8037	-146.2853	-145.5640	-144.6745	-124.7127	-95.2320	-58.9138	-27.2778	-16.4521	(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													
	227.4658	177.3614	153.7288	91.0398	52.2761	33.3681	32.0156	59.0424	90.5762	148.2480	192.9348	228.9633	(64)
										Total per year (kWh/year) = Sum(64)m =		1487.0202	(64)
12Total per year (kWh/year)												1487	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month													
	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													
	140.7505	155.8309	140.7505	145.4422	140.7505	145.4422	140.7505	140.7505	145.4422	140.7505	145.4422	140.7505	(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													
	613.5826	629.0545	602.6085	583.0140	553.7934	534.8312	514.7495	515.1500	530.4746	547.3481	579.8226	600.6607	(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	
North	7.1000	10.6334	0.7600	0.7000	0.7700	27.8340	(74)
East	0.6600	19.6403	0.7600	0.7000	0.7700	4.7790	(76)
South	8.6400	46.7521	0.7600	0.7000	0.7700	148.9222	(78)

Solar gains	181.5351	306.4370	416.4629	518.7743	589.0001	589.6743	566.3493	512.2472	451.1224	337.4762	216.8192	155.8163	(83)
Total gains	795.1177	935.4915	1019.0714	1101.7883	1142.7935	1124.5055	1081.0988	1027.3972	981.5969	884.8243	796.6418	756.4769	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	18.5737	18.6241	18.6739	18.9111	18.9562	19.1688	19.1688	19.2087	19.0863	18.9562	18.8652	18.7711	
alpha	2.2382	2.2416	2.2449	2.2607	2.2637	2.2779	2.2779	2.2806	2.2724	2.2637	2.2577	2.2514	
util living area													
	0.9157	0.8819	0.8407	0.7683	0.6680	0.5333	0.4139	0.4460	0.6130	0.7880	0.8835	0.9231	(86)

Living	18.1521	18.5508	19.0681	19.7299	20.2946	20.7075	20.8823	20.8566	20.5712	19.8424	18.9017	18.0893	
Non living	16.6761	17.1748	17.8209	18.6396	19.3138	19.7818	19.9532	19.9340	19.6420	18.7935	17.6297	16.6017	
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	19.5431	18.5508	19.0681	19.7299	20.2946	20.7075	20.8823	20.8566	20.5712	19.8424	18.9017	18.4964	(87)
Th 2	20.0008	20.0032	20.0056	20.0169	20.0190	20.0288	20.0288	20.0306	20.0250	20.0190	20.0147	20.0103	(88)
util rest of house	0.9062	0.8691	0.8230	0.7417	0.6276	0.4732	0.3353	0.3675	0.5563	0.7582	0.8688	0.9144	(89)
MIT 2	18.6742	17.1748	17.8209	18.6396	19.3138	19.7818	19.9532	19.9340	19.6420	18.7935	17.6297	17.2156	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.0267	17.7330	18.3268	19.0819	19.7117	20.1573	20.3301	20.3083	20.0190	19.2190	18.1457	17.7352	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0267	17.7330	18.3268	19.0819	19.7117	20.1573	20.3301	20.3083	20.0190	19.2190	18.1457	17.7352	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8955	0.8321	0.7868	0.7127	0.6138	0.4816	0.3607	0.3910	0.5560	0.7298	0.8331	0.8886	(94)
Useful gains	712.0584	778.3906	801.7749	785.2836	701.4469	541.5887	389.9344	401.7293	545.7292	645.7402	663.7093	672.2220	(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	1717.2101	1492.3394	1371.6724	1166.0803	915.3524	627.8974	421.4497	440.6596	671.6459	984.7422	1268.0793	1561.6776	(97)
Space heating kWh	747.8328	479.7736	424.0038	274.1736	159.1457	0.0000	0.0000	0.0000	0.0000	252.2175	435.1464	661.7549	(98a)
Space heating requirement - total per year (kWh/year)												3434.0483	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	747.8328	479.7736	424.0038	274.1736	159.1457	0.0000	0.0000	0.0000	0.0000	252.2175	435.1464	661.7549	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3434.0483	
Space heating per m2											(98c) / (4) =	32.3967	(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	747.8328	479.7736	424.0038	274.1736	159.1457	0.0000	0.0000	0.0000	0.0000	252.2175	435.1464	661.7549	(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)	327.8602	210.3394	185.8891	120.2015	69.7717	0.0000	0.0000	0.0000	0.0000	110.5757	190.7742	290.1225	(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	227.4658	177.3614	153.7288	91.0398	52.2761	33.3681	32.0156	59.0424	90.5762	148.2480	192.9348	228.9633	(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	139.0208	108.3983	93.9548	55.6410	31.9497	20.3937	19.5670	36.0851	55.3576	90.6051	117.9164	139.9360	(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	23.5455	18.8890	17.0075	12.4604	9.6248	7.8635	8.7801	11.4126	14.8239	19.4498	21.9685	24.1999	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-60.7254	-84.5223	-118.9452	-127.2779	-128.2696	-105.5525	-104.1164	-102.3293	-95.9767	-92.8520	-65.6083	-52.1834	(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	-0.2937	-4.1810	-12.2022	-25.7607	-43.7752	-57.6765	-57.4596	-47.5420	-34.0885	-11.4597	-2.6812	-0.4586	(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												1505.5342	(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												908.8255	(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)												190.0254	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1435.9377	(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												1168.4474	(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	1505.5342	0.1548	233.0704	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	908.8255	0.1484	134.9048	(264)
Space and water heating			367.9752	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	190.0254	0.1443	27.4265	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1138.3588	0.1363	-155.1866	
PV Unit electricity exported	-297.5789	0.1152	-34.2718	
Total			-189.4584	(269)
Total CO2, kg/year			205.9434	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			1.9400	(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	1505.5342	1.5731	2368.3241	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	908.8255	1.5492	1407.9702	(278)
Space and water heating			3776.2943	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	190.0254	1.5338	291.4673	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1138.3588	1.5040	-1712.0401	
PV Unit electricity exported	-297.5789	0.4220	-125.5817	
Total			-1837.6218	(283)
Total Primary energy kWh/year			2230.1398	(286)
Dwelling Primary energy Rate (DPER)			21.0400	(287)

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

1. Overall dwelling characteristics

Main dwelling	Area (m2)		Storey height (m)		Volume (m3)	
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			16.4000	1.1450	18.7786	(27)
Heatloss Floor 1			53.0000	0.1300	6.8900	(28a)
External Wall 1	141.0000	18.3500	122.6500	0.1800	22.0770	(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) =		55.5256	(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.5552 (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) =		66.2153	(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	115.4546	115.1386	114.8289	113.3740	113.1018	111.8347	111.8347	111.6000	112.3228	113.1018	113.6525	114.2282	(39)
Average = Sum(39)m / 12 =												113.3727	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0892	1.0862	1.0833	1.0696	1.0670	1.0550	1.0550	1.0528	1.0596	1.0670	1.0722	1.0776	(40)
HLP (average)												1.0696	
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	140.7505	155.8309	140.7505	145.4422	140.7505	145.4422	140.7505	140.7505	145.4422	140.7505	145.4422	140.7505	(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	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	618.4108	633.8826	607.4366	587.8421	558.6216	536.6594	516.5777	516.9782	532.3027	552.1763	584.6507	605.4888	(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	
North	7.1000	10.6334	0.6300	0.7000	0.7700	23.0729	(74)
East	0.6600	19.6403	0.6300	0.7000	0.7700	3.9615	(76)
South	8.6400	46.7521	0.6300	0.7000	0.7700	123.4487	(78)

Solar gains	150.4831	254.0202	345.2258	430.0366	488.2500	488.8089	469.4737	424.6260	373.9567	279.7500	179.7317	129.1635	(83)
Total gains	768.8938	887.9028	952.6625	1017.8787	1046.8716	1025.4683	986.0514	941.6042	906.2594	831.9263	764.3824	734.6523	(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	18.7588	18.8103	18.8610	19.1031	19.1490	19.3660	19.3660	19.4067	19.2819	19.1490	19.0563	18.9602	
alpha	2.2506	2.2540	2.2574	2.2735	2.2766	2.2911	2.2911	2.2938	2.2855	2.2766	2.2704	2.2640	
util living area	0.9200	0.8909	0.8552	0.7900	0.6965	0.5646	0.4424	0.4739	0.6397	0.8039	0.8905	0.9266	(86)
MIT	18.1357	18.5032	18.9998	19.6568	20.2355	20.6745	20.8671	20.8399	20.5359	19.7979	18.8750	18.0801	(87)
Th 2	20.0097	20.0121	20.0145	20.0258	20.0279	20.0377	20.0377	20.0395	20.0339	20.0279	20.0236	20.0191	(88)
util rest of house	0.9110	0.8790	0.8388	0.7650	0.6574	0.5042	0.3611	0.3933	0.5838	0.7756	0.8766	0.9183	(89)
MIT 2	16.6599	17.1210	17.7434	18.5608	19.2569	19.7595	19.9510	19.9300	19.6149	18.7484	17.6020	16.5945	(90)
Living area fraction									fLA = Living area / (4) =			0.4057	(91)
MIT	17.2585	17.6817	18.2531	19.0054	19.6539	20.1307	20.3226	20.2991	19.9885	19.1741	18.1184	17.1971	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.2585	17.6817	18.2531	19.0054	19.6539	20.1307	20.3226	20.2991	19.9885	19.1741	18.1184	17.1971	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8772	0.8426	0.8025	0.7345	0.6407	0.5104	0.3863	0.4162	0.5809	0.7461	0.8414	0.8858	(94)
Useful gains	674.5047	748.1453	764.5225	747.5918	670.7046	523.4361	380.8827	391.8981	526.4666	620.7001	643.1685	650.7392	(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	1496.1233	1471.6696	1349.5936	1145.6899	899.5971	618.5244	416.3202	435.1431	661.4141	969.7507	1252.2729	1484.6394	(97)
Space heating kWh	611.2843	486.2083	435.2929	286.6306	170.2960	0.0000	0.0000	0.0000	0.0000	259.6936	438.5552	620.4218	(98a)
Space heating requirement - total per year (kWh/year)												3308.3827	
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	611.2843	486.2083	435.2929	286.6306	170.2960	0.0000	0.0000	0.0000	0.0000	259.6936	438.5552	620.4218	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3308.3827	
Space heating per m2											(98c) / (4) =	31.2112	(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	611.2843	486.2083	435.2929	286.6306	170.2960	0.0000	0.0000	0.0000	0.0000	259.6936	438.5552	620.4218	(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)	662.2798	526.7696	471.6066	310.5424	184.5027	0.0000	0.0000	0.0000	0.0000	281.3582	475.1411	672.1796	(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	85.9867	85.7783	85.4258	84.7954	83.6985	79.8000	79.8000	79.8000	79.8000	84.5494	85.5584	86.0360	(217)
Fuel for water heating, kWh/month	290.5095	257.4598	274.6482	243.5141	239.2655	226.2876	223.5467	232.4001	234.9042	247.0296	259.3059	287.2233	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	29.2452	23.4616	21.1245	15.4767	11.9547	9.7671	10.9055	14.1753	18.4124	24.1580	27.2864	30.0580	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-48.2223	-67.2903	-95.7282	-106.4591	-113.7729	-105.7768	-104.4147	-99.0425	-89.4515	-76.3443	-52.7466	-41.7683	(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	-29.3802	-61.5550	-121.9105	-182.4985	-240.7624	-241.7619	-238.9664	-202.6219	-148.8675	-87.8855	-39.1743	-23.2563	(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												3584.3800	(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	3016.0943	(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)	236.0253	(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	4302.8418	(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	3584.3800	0.2100	752.7198	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3016.0943	0.2100	633.3798	(264)
Space and water heating			1386.0996	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	236.0253	0.1443	34.0657	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1001.0175	0.1348	-134.9597	
PV Unit electricity exported	-1618.6403	0.1260	-203.9300	
Total			-338.8897	(269)
Total CO2, kg/year			1093.2050	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.3100	(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	3584.3800	1.1300	4050.3494	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3016.0943	1.1300	3408.1866	(278)
Space and water heating			7458.5359	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	236.0253	1.5338	362.0235	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1001.0175	1.4983	-1499.8189	
PV Unit electricity exported	-1618.6403	0.4625	-748.5695	
Total			-2248.3883	(283)
Total Primary energy kWh/year			5702.2719	(286)
Target Primary Energy Rate (TPER)			53.8000	(287)

Full SAP Calculation Printout

Plot Reference	Plot 2	**Issued on Date**	22/10/2026
Assessment Reference	00002 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	92 A	**DER**	1.94	**TER**	10.31
Environmental	98 A	**% DER < TER**			81.18
CO_2 Emissions (t/year)	0.17	**DFEE**	36.28	**TFEE**	36.61
Compliance Check	See BREL	**% DFEE < TFEE**			0.91
% DPER < TPER	60.89	**DPER**	21.04	**TPER**	53.80

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			16.4000	1.1450	18.7786			(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	18.3500	122.6500	0.1500	18.3975	9.0000	1103.8500	(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) =		47.6061			(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) =		7796.8500	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							73.5552	(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) =		67.3661	(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	116.6054	116.2894	115.9797	114.5248	114.2526	112.9855	112.9855	112.7508	113.4736	114.2526	114.8033	115.3790	(39)
Average = Sum(39)m / 12 =												114.5235	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1001	1.0971	1.0941	1.0804	1.0779	1.0659	1.0659	1.0637	1.0705	1.0779	1.0830	1.0885	(40)
HLP (average)												1.0804	
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

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

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	140.7505	155.8309	140.7505	145.4422	140.7505	145.4422	140.7505	140.7505	145.4422	140.7505	145.4422	140.7505	(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	523.7549	540.2700	516.2011	502.2997	476.4302	461.0005	443.3225	442.1087	455.4827	468.4103	495.4478	511.6066	(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	
North	7.1000	10.6334	0.7600	0.7000	0.7700	27.8340	(74)
East	0.6600	19.6403	0.7600	0.7000	0.7700	4.7790	(76)
South	8.6400	46.7521	0.7600	0.7000	0.7700	148.9222	(78)

Solar gains	181.5351	306.4370	416.4629	518.7743	589.0001	589.6743	566.3493	512.2472	451.1224	337.4762	216.8192	155.8163	(83)
Total gains	705.2900	846.7070	932.6640	1021.0740	1065.4303	1050.6747	1009.6718	954.3559	906.6051	805.8866	712.2670	667.4228	(84)

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7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	18.5737	18.6241	18.6739	18.9111	18.9562	19.1688	19.1688	19.2087	19.0863	18.9562	18.8652	18.7711	
alpha	2.2382	2.2416	2.2449	2.2607	2.2637	2.2779	2.2779	2.2806	2.2724	2.2637	2.2577	2.2514	
util living area	0.9318	0.8999	0.8609	0.7908	0.6927	0.5585	0.4372	0.4720	0.6421	0.8140	0.9034	0.9386	(86)
MIT	17.9865	18.4032	18.9422	19.6379	20.2347	20.6770	20.8680	20.8383	20.5251	19.7451	18.7596	17.9207	(87)
Th 2	20.0008	20.0032	20.0056	20.0169	20.0190	20.0288	20.0288	20.0306	20.0250	20.0190	20.0147	20.0103	(88)

util rest of house													
	0.9238	0.8886	0.8448	0.7656	0.6532	0.4977	0.3558	0.3910	0.5859	0.7864	0.8907	0.9315	(89)
MIT 2	17.2464	17.6553	18.1828	18.8595	19.4187	19.8145	19.9621	19.9448	19.6912	18.9759	18.0191	17.1878	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	17.5466	17.9587	18.4909	19.1753	19.7497	20.1644	20.3296	20.3073	20.0295	19.2879	18.3195	17.4851	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5466	17.9587	18.4909	19.1753	19.7497	20.1644	20.3296	20.3073	20.0295	19.2879	18.3195	17.4851	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8979	0.8594	0.8151	0.7409	0.6412	0.5068	0.3821	0.4153	0.5862	0.7622	0.8627	0.9069	(94)
Useful gains	633.3141	727.6602	760.2186	756.4883	683.1882	532.4310	385.8134	396.3623	531.4525	614.2139	614.4963	605.2967	(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													
	1544.6281	1518.5899	1390.6977	1176.7722	919.7050	628.6958	421.3860	440.5483	672.8376	992.6178	1288.0381	1532.8183	(97)
Space heating kWh													
	678.0176	531.5048	469.0765	302.6045	175.9685	0.0000	0.0000	0.0000	0.0000	281.5325	484.9501	690.0761	(98a)
Space heating requirement - total per year (kWh/year)												3613.7306	
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													
	678.0176	531.5048	469.0765	302.6045	175.9685	0.0000	0.0000	0.0000	0.0000	281.5325	484.9501	690.0761	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3613.7306	
Space heating per m2											(98c) / (4) =	34.0918	(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	1062.0637	836.0927	856.9064	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7267	0.7890	0.7650	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	771.8435	659.7072	655.5223	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1166.2358	1121.2047	1059.3866	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	283.9625	343.3541	300.4750	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	70.9906	85.8385	75.1188	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												231.9479	(107)
Energy for space heating												34.0918	(99)
Energy for space cooling												2.1882	(108)
Total												36.2800	(109)
Fabric Energy Efficiency (DFEE)												36.3	(109)

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

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1. Overall dwelling characteristics

	Area		Storey height			Volume	
Main dwelling	(m2)		(m)			(m3)	
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)
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)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
TER Opaque door			1.9500	1.0000	1.9500			(26)
TER Opening Type			16.4000	1.1450	18.7786			(27)
Heatloss Floor 1			53.0000	0.1300	6.8900			(28a)
External Wall 1	141.0000	18.3500	122.6500	0.1800	22.0770			(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) =	55.5256			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.5552 (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) = 66.2153 (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	115.4546	115.1386	114.8289	113.3740	113.1018	111.8347	111.8347	111.6000	112.3228	113.1018	113.6525	114.2282	(39)
Average = Sum(39)m / 12 =												113.3727	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0892	1.0862	1.0833	1.0696	1.0670	1.0550	1.0550	1.0528	1.0596	1.0670	1.0722	1.0776	(40)
HLP (average)												1.0696	
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)

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													
	140.7505	155.8309	140.7505	145.4422	140.7505	145.4422	140.7505	140.7505	145.4422	140.7505	145.4422	140.7505	(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													
	523.7549	540.2700	516.2011	502.2997	476.4302	461.0005	443.3225	442.1087	455.4827	468.4103	495.4478	511.6066	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
North	7.1000	10.6334	0.6300	0.7000	0.7700	23.0729	(74)
East	0.6600	19.6403	0.6300	0.7000	0.7700	3.9615	(76)
South	8.6400	46.7521	0.6300	0.7000	0.7700	123.4487	(78)

Solar gains	150.4831	254.0202	345.2258	430.0366	488.2500	488.8089	469.4737	424.6260	373.9567	279.7500	179.7317	129.1635	(83)
Total gains	674.2380	794.2901	861.4269	932.3363	964.6802	949.8094	912.7963	866.7346	829.4394	748.1604	675.1795	640.7701	(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	18.7588	18.8103	18.8610	19.1031	19.1490	19.3660	19.3660	19.4067	19.2819	19.1490	19.0563	18.9602	
alpha	2.2506	2.2540	2.2574	2.2735	2.2766	2.2911	2.2911	2.2938	2.2855	2.2766	2.2704	2.2640	
util living area													
	0.9368	0.9097	0.8765	0.8144	0.7243	0.5933	0.4697	0.5039	0.6717	0.8319	0.9114	0.9428	(86)
MIT	17.9579	18.3423	18.8595	19.5508	20.1635	20.6375	20.8492	20.8175	20.4823	19.6881	18.7206	17.8994	(87)
Th 2	20.0097	20.0121	20.0145	20.0258	20.0279	20.0377	20.0377	20.0395	20.0339	20.0279	20.0236	20.0191	(88)
util rest of house													
	0.9294	0.8994	0.8619	0.7911	0.6865	0.5325	0.3855	0.4209	0.6167	0.8061	0.8996	0.9361	(89)
MIT 2	17.2241	17.6024	18.1105	18.7865	19.3654	19.7940	19.9601	19.9410	19.6657	18.9307	17.9876	17.1726	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	17.5218	17.9026	18.4143	19.0965	19.6891	20.1362	20.3208	20.2966	19.9969	19.2379	18.2850	17.4675	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5218	17.9026	18.4143	19.0965	19.6891	20.1362	20.3208	20.2966	19.9969	19.2379	18.2850	17.4675	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9045	0.8711	0.8325	0.7652	0.6718	0.5392	0.4115	0.4444	0.6144	0.7811	0.8724	0.9125	(94)
Useful gains	609.8800	691.9249	717.1765	713.4119	648.0520	512.0984	375.6246	385.1953	509.6244	584.4025	589.0420	584.7202	(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													
	1526.5146	1497.0959	1368.1077	1156.0220	903.5853	619.1388	416.1121	434.8555	662.3607	976.9644	1271.1993	1515.5169	(97)
Space heating kWh													
	681.9762	541.0750	484.2928	318.6792	190.1168	0.0000	0.0000	0.0000	0.0000	292.0661	491.1533	692.5128	(98a)
Space heating requirement - total per year (kWh/year)												3691.8721	
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													
	681.9762	541.0750	484.2928	318.6792	190.1168	0.0000	0.0000	0.0000	0.0000	292.0661	491.1533	692.5128	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3691.8721	
Space heating per m2											(98c) / (4) =	34.8290	(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	1051.2462	827.5768	848.1604	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6952	0.7614	0.7372	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	730.8090	630.1184	625.2816	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1048.3413	1007.9735	956.9722	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	228.6233	281.1242	246.7778	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	57.1558	70.2811	61.6945	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												189.1313	(107)
Energy for space heating												34.8290	(99)
Energy for space cooling												1.7843	(108)
Total												36.6132	(109)
Fabric Energy Efficiency (TFEE)												36.6	(109)

Full SAP Calculation Printout

Plot Reference	Plot 2	**Issued on Date**	22/10/2026
Assessment Reference	00002 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	92 A	**DER**	1.94	**TER**	10.31
Environmental	98 A	**% DER < TER**			81.18
CO_2 Emissions (t/year)	0.17	**DFEE**	36.28	**TFEE**	36.61
Compliance Check	See BREL	**% DFEE < TFEE**			0.91
% DPER < TPER	60.89	**DPER**	21.04	**TPER**	53.80

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			16.4000	1.1450	18.7786			(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	18.3500	122.6500	0.1500	18.3975	9.0000	1103.8500	(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) =		47.6061			(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) =		7796.8500	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							73.5552	(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) =		67.3661	(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													
	116.6054	116.2894	115.9797	114.5248	114.2526	112.9855	112.9855	112.7508	113.4736	114.2526	114.8033	115.3790	(39)
Average = Sum(39)m / 12 =												114.5235	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1001	1.0971	1.0941	1.0804	1.0779	1.0659	1.0659	1.0637	1.0705	1.0779	1.0830	1.0885	(40)
HLP (average)												1.0804	
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	-20.6335	-41.9476	-79.1913	-113.8037	-146.2853	-145.5640	-144.6745	-124.7127	-95.2320	-58.9138	-27.2778	-16.4521	(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													
	227.4658	177.3614	153.7288	91.0398	52.2761	33.3681	32.0156	59.0424	90.5762	148.2480	192.9348	228.9633	(64)
										Total per year (kWh/year) = Sum(64)m =		1487.0202	(64)
12Total per year (kWh/year)												1487	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month													
	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													
	140.7505	155.8309	140.7505	145.4422	140.7505	145.4422	140.7505	140.7505	145.4422	140.7505	145.4422	140.7505	(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													
	613.5826	629.0545	602.6085	583.0140	553.7934	534.8312	514.7495	515.1500	530.4746	547.3481	579.8226	600.6607	(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	
North	7.1000	10.6334	0.7600	0.7000	0.7700	27.8340	(74)
East	0.6600	19.6403	0.7600	0.7000	0.7700	4.7790	(76)
South	8.6400	46.7521	0.7600	0.7000	0.7700	148.9222	(78)

Solar gains	181.5351	306.4370	416.4629	518.7743	589.0001	589.6743	566.3493	512.2472	451.1224	337.4762	216.8192	155.8163	(83)
Total gains	795.1177	935.4915	1019.0714	1101.7883	1142.7935	1124.5055	1081.0988	1027.3972	981.5969	884.8243	796.6418	756.4769	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	18.5737	18.6241	18.6739	18.9111	18.9562	19.1688	19.1688	19.2087	19.0863	18.9562	18.8652	18.7711	
alpha	2.2382	2.2416	2.2449	2.2607	2.2637	2.2779	2.2779	2.2806	2.2724	2.2637	2.2577	2.2514	
util living area													
	0.9157	0.8819	0.8407	0.7683	0.6680	0.5333	0.4139	0.4460	0.6130	0.7880	0.8835	0.9231	(86)

Living	18.1521	18.5508	19.0681	19.7299	20.2946	20.7075	20.8823	20.8566	20.5712	19.8424	18.9017	18.0893	
Non living	16.6761	17.1748	17.8209	18.6396	19.3138	19.7818	19.9532	19.9340	19.6420	18.7935	17.6297	16.6017	
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	19.5431	18.5508	19.0681	19.7299	20.2946	20.7075	20.8823	20.8566	20.5712	19.8424	18.9017	18.4964	(87)
Th 2	20.0008	20.0032	20.0056	20.0169	20.0190	20.0288	20.0288	20.0306	20.0250	20.0190	20.0147	20.0103	(88)
util rest of house	0.9062	0.8691	0.8230	0.7417	0.6276	0.4732	0.3353	0.3675	0.5563	0.7582	0.8688	0.9144	(89)
MIT 2	18.6742	17.1748	17.8209	18.6396	19.3138	19.7818	19.9532	19.9340	19.6420	18.7935	17.6297	17.2156	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.0267	17.7330	18.3268	19.0819	19.7117	20.1573	20.3301	20.3083	20.0190	19.2190	18.1457	17.7352	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0267	17.7330	18.3268	19.0819	19.7117	20.1573	20.3301	20.3083	20.0190	19.2190	18.1457	17.7352	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8955	0.8321	0.7868	0.7127	0.6138	0.4816	0.3607	0.3910	0.5560	0.7298	0.8331	0.8886	(94)
Useful gains	712.0584	778.3906	801.7749	785.2836	701.4469	541.5887	389.9344	401.7293	545.7292	645.7402	663.7093	672.2220	(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	1717.2101	1492.3394	1371.6724	1166.0803	915.3524	627.8974	421.4497	440.6596	671.6459	984.7422	1268.0793	1561.6776	(97)
Space heating kWh	747.8328	479.7736	424.0038	274.1736	159.1457	0.0000	0.0000	0.0000	0.0000	252.2175	435.1464	661.7549	(98a)
Space heating requirement - total per year (kWh/year)												3434.0483	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	747.8328	479.7736	424.0038	274.1736	159.1457	0.0000	0.0000	0.0000	0.0000	252.2175	435.1464	661.7549	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3434.0483	
Space heating per m2											(98c) / (4) =	32.3967	(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	747.8328	479.7736	424.0038	274.1736	159.1457	0.0000	0.0000	0.0000	0.0000	252.2175	435.1464	661.7549	(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)	327.8602	210.3394	185.8891	120.2015	69.7717	0.0000	0.0000	0.0000	0.0000	110.5757	190.7742	290.1225	(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	227.4658	177.3614	153.7288	91.0398	52.2761	33.3681	32.0156	59.0424	90.5762	148.2480	192.9348	228.9633	(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	139.0208	108.3983	93.9548	55.6410	31.9497	20.3937	19.5670	36.0851	55.3576	90.6051	117.9164	139.9360	(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	23.5455	18.8890	17.0075	12.4604	9.6248	7.8635	8.7801	11.4126	14.8239	19.4498	21.9685	24.1999	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-60.7254	-84.5223	-118.9452	-127.2779	-128.2696	-105.5525	-104.1164	-102.3293	-95.9767	-92.8520	-65.6083	-52.1834	(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	-0.2937	-4.1810	-12.2022	-25.7607	-43.7752	-57.6765	-57.4596	-47.5420	-34.0885	-11.4597	-2.6812	-0.4586	(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												1505.5342	(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												908.8255	(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)												190.0254	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1435.9377	(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												1168.4474	(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	1505.5342	0.1548	233.0704	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	908.8255	0.1484	134.9048	(264)
Space and water heating			367.9752	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	190.0254	0.1443	27.4265	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1138.3588	0.1363	-155.1866	
PV Unit electricity exported	-297.5789	0.1152	-34.2718	
Total			-189.4584	(269)
Total CO2, kg/year			205.9434	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			1.9400	(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	1505.5342	1.5731	2368.3241	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	908.8255	1.5492	1407.9702	(278)
Space and water heating			3776.2943	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	190.0254	1.5338	291.4673	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1138.3588	1.5040	-1712.0401	
PV Unit electricity exported	-297.5789	0.4220	-125.5817	
Total			-1837.6218	(283)
Total Primary energy kWh/year			2230.1398	(286)
Dwelling Primary energy Rate (DPER)			21.0400	(287)

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

1. Overall dwelling characteristics

Main dwelling	Area (m2)		Storey height (m)		Volume (m3)	
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			16.4000	1.1450	18.7786	(27)
Heatloss Floor 1			53.0000	0.1300	6.8900	(28a)
External Wall 1	141.0000	18.3500	122.6500	0.1800	22.0770	(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) =		55.5256	(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.5552 (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) =		66.2153	(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	115.4546	115.1386	114.8289	113.3740	113.1018	111.8347	111.8347	111.6000	112.3228	113.1018	113.6525	114.2282	(39)
Average = Sum(39)m / 12 =												113.3727	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0892	1.0862	1.0833	1.0696	1.0670	1.0550	1.0550	1.0528	1.0596	1.0670	1.0722	1.0776	(40)
HLP (average)												1.0696	
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	140.7505	155.8309	140.7505	145.4422	140.7505	145.4422	140.7505	140.7505	145.4422	140.7505	145.4422	140.7505	(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	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	618.4108	633.8826	607.4366	587.8421	558.6216	536.6594	516.5777	516.9782	532.3027	552.1763	584.6507	605.4888	(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	
North	7.1000	10.6334	0.6300	0.7000	0.7700	23.0729	(74)
East	0.6600	19.6403	0.6300	0.7000	0.7700	3.9615	(76)
South	8.6400	46.7521	0.6300	0.7000	0.7700	123.4487	(78)

Solar gains	150.4831	254.0202	345.2258	430.0366	488.2500	488.8089	469.4737	424.6260	373.9567	279.7500	179.7317	129.1635	(83)
Total gains	768.8938	887.9028	952.6625	1017.8787	1046.8716	1025.4683	986.0514	941.6042	906.2594	831.9263	764.3824	734.6523	(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	18.7588	18.8103	18.8610	19.1031	19.1490	19.3660	19.3660	19.4067	19.2819	19.1490	19.0563	18.9602	
alpha	2.2506	2.2540	2.2574	2.2735	2.2766	2.2911	2.2911	2.2938	2.2855	2.2766	2.2704	2.2640	
util living area	0.9200	0.8909	0.8552	0.7900	0.6965	0.5646	0.4424	0.4739	0.6397	0.8039	0.8905	0.9266	(86)
MIT	18.1357	18.5032	18.9998	19.6568	20.2355	20.6745	20.8671	20.8399	20.5359	19.7979	18.8750	18.0801	(87)
Th 2	20.0097	20.0121	20.0145	20.0258	20.0279	20.0377	20.0377	20.0395	20.0339	20.0279	20.0236	20.0191	(88)
util rest of house	0.9110	0.8790	0.8388	0.7650	0.6574	0.5042	0.3611	0.3933	0.5838	0.7756	0.8766	0.9183	(89)
MIT 2	16.6599	17.1210	17.7434	18.5608	19.2569	19.7595	19.9510	19.9300	19.6149	18.7484	17.6020	16.5945	(90)
Living area fraction									fLA = Living area / (4) =			0.4057	(91)
MIT	17.2585	17.6817	18.2531	19.0054	19.6539	20.1307	20.3226	20.2991	19.9885	19.1741	18.1184	17.1971	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.2585	17.6817	18.2531	19.0054	19.6539	20.1307	20.3226	20.2991	19.9885	19.1741	18.1184	17.1971	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8772	0.8426	0.8025	0.7345	0.6407	0.5104	0.3863	0.4162	0.5809	0.7461	0.8414	0.8858	(94)
Useful gains	674.5047	748.1453	764.5225	747.5918	670.7046	523.4361	380.8827	391.8981	526.4666	620.7001	643.1685	650.7392	(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	1496.1233	1471.6696	1349.5936	1145.6899	899.5971	618.5244	416.3202	435.1431	661.4141	969.7507	1252.2729	1484.6394	(97)
Space heating kWh	611.2843	486.2083	435.2929	286.6306	170.2960	0.0000	0.0000	0.0000	0.0000	259.6936	438.5552	620.4218	(98a)
Space heating requirement - total per year (kWh/year)												3308.3827	
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	611.2843	486.2083	435.2929	286.6306	170.2960	0.0000	0.0000	0.0000	0.0000	259.6936	438.5552	620.4218	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3308.3827	
Space heating per m2											(98c) / (4) =	31.2112	(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	611.2843	486.2083	435.2929	286.6306	170.2960	0.0000	0.0000	0.0000	0.0000	259.6936	438.5552	620.4218	(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)	662.2798	526.7696	471.6066	310.5424	184.5027	0.0000	0.0000	0.0000	0.0000	281.3582	475.1411	672.1796	(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	85.9867	85.7783	85.4258	84.7954	83.6985	79.8000	79.8000	79.8000	79.8000	84.5494	85.5584	86.0360	(217)
Fuel for water heating, kWh/month	290.5095	257.4598	274.6482	243.5141	239.2655	226.2876	223.5467	232.4001	234.9042	247.0296	259.3059	287.2233	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	29.2452	23.4616	21.1245	15.4767	11.9547	9.7671	10.9055	14.1753	18.4124	24.1580	27.2864	30.0580	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-48.2223	-67.2903	-95.7282	-106.4591	-113.7729	-105.7768	-104.4147	-99.0425	-89.4515	-76.3443	-52.7466	-41.7683	(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	-29.3802	-61.5550	-121.9105	-182.4985	-240.7624	-241.7619	-238.9664	-202.6219	-148.8675	-87.8855	-39.1743	-23.2563	(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												3584.3800	(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	3016.0943	(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)	236.0253	(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	4302.8418	(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	3584.3800	0.2100	752.7198	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3016.0943	0.2100	633.3798	(264)
Space and water heating			1386.0996	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	236.0253	0.1443	34.0657	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1001.0175	0.1348	-134.9597	
PV Unit electricity exported	-1618.6403	0.1260	-203.9300	
Total			-338.8897	(269)
Total CO2, kg/year			1093.2050	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.3100	(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	3584.3800	1.1300	4050.3494	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3016.0943	1.1300	3408.1866	(278)
Space and water heating			7458.5359	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	236.0253	1.5338	362.0235	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1001.0175	1.4983	-1499.8189	
PV Unit electricity exported	-1618.6403	0.4625	-748.5695	
Total			-2248.3883	(283)
Total Primary energy kWh/year			5702.2719	(286)
Target Primary Energy Rate (TPER)			53.8000	(287)

Full SAP Calculation Printout

Plot Reference	Plot 2	**Issued on Date**	22/10/2026
Assessment Reference	00002 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	92 A	**DER**	1.94	**TER**	10.31
Environmental	98 A	**% DER < TER**			81.18
CO_2 Emissions (t/year)	0.17	**DFEE**	36.28	**TFEE**	36.61
Compliance Check	See BREL	**% DFEE < TFEE**			0.91
% DPER < TPER	60.89	**DPER**	21.04	**TPER**	53.80

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

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			16.4000	1.1450	18.7786			(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	18.3500	122.6500	0.1500	18.3975	9.0000	1103.8500	(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) =		47.6061			(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) =		7796.8500	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							73.5552	(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) =		67.3661	(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													
	116.6054	116.2894	115.9797	114.5248	114.2526	112.9855	112.9855	112.7508	113.4736	114.2526	114.8033	115.3790	(39)
Average = Sum(39)m / 12 =												114.5235	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1001	1.0971	1.0941	1.0804	1.0779	1.0659	1.0659	1.0637	1.0705	1.0779	1.0830	1.0885	(40)
HLP (average)												1.0804	
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	-20.6335	-41.9476	-79.1913	-113.8037	-146.2853	-145.5640	-144.6745	-124.7127	-95.2320	-58.9138	-27.2778	-16.4521	(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													
	227.4658	177.3614	153.7288	91.0398	52.2761	33.3681	32.0156	59.0424	90.5762	148.2480	192.9348	228.9633	(64)
									Total per year (kWh/year) = Sum(64)m =			1487.0202	(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													
	26.9001	23.8924	19.4306	14.7102	10.9961	9.2833	10.0310	13.0386	17.5004	22.2208	25.9350	27.6477	(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													
	676.0516	674.7933	655.5441	619.2529	581.8143	547.8051	527.3890	529.4393	547.9558	581.5260	622.2185	658.1036	(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	
North	7.1000	10.6334	0.7600	0.7000	0.7700	27.8340	(74)
East	0.6600	19.6403	0.7600	0.7000	0.7700	4.7790	(76)
South	8.6400	46.7521	0.7600	0.7000	0.7700	148.9222	(78)

Solar gains	181.5351	306.4370	416.4629	518.7743	589.0001	589.6743	566.3493	512.2472	451.1224	337.4762	216.8192	155.8163	(83)
Total gains	857.5868	981.2303	1072.0070	1138.0272	1170.8143	1137.4794	1093.7383	1041.6865	999.0782	919.0023	839.0377	813.9198	(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	18.5737	18.6241	18.6739	18.9111	18.9562	19.1688	19.1688	19.2087	19.0863	18.9562	18.8652	18.7711	
alpha	2.2382	2.2416	2.2449	2.2607	2.2637	2.2779	2.2779	2.2806	2.2724	2.2637	2.2577	2.2514	
util living area													
	0.9040	0.8725	0.8282	0.7583	0.6593	0.5290	0.4100	0.4412	0.6064	0.7769	0.8733	0.9126	(86)
Living	18.2623	18.6235	19.1411	19.7687	20.3148	20.7124	20.8847	20.8599	20.5811	19.8818	18.9696	18.1936	

Non living	16.8129	17.2640	17.9088	18.6847	19.3354	19.7863	19.9548	19.9363	19.6516	18.8386	17.7125	16.7317	
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	19.5995	18.6235	19.1411	19.7687	20.3148	20.7124	20.8847	20.8599	20.5811	19.8818	18.9696	18.5862	(87)
Th 2	20.0008	20.0032	20.0056	20.0169	20.0190	20.0288	20.0288	20.0306	20.0250	20.0190	20.0147	20.0103	(88)
util rest of house													
	0.8935	0.8590	0.8097	0.7312	0.6187	0.4691	0.3320	0.3632	0.5498	0.7463	0.8577	0.9030	(89)
MIT 2	18.7288	17.2640	17.9088	18.6847	19.3354	19.7863	19.9548	19.9363	19.6516	18.8386	17.7125	17.3222	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.0820	17.8155	18.4087	19.1244	19.7327	20.1620	20.3320	20.3110	20.0287	19.2618	18.2225	17.8349	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0820	17.8155	18.4087	19.1244	19.7327	20.1620	20.3320	20.3110	20.0287	19.2618	18.2225	17.8349	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8824	0.8216	0.7739	0.7031	0.6058	0.4778	0.3573	0.3868	0.5500	0.7189	0.8217	0.8760	(94)
Useful gains	756.7457	806.1888	829.6456	800.2013	709.3070	543.4898	390.7560	402.8931	549.5027	660.6306	689.4710	712.9821	(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													
	1723.6608	1501.9361	1381.1649	1170.9531	917.7608	628.4265	421.6631	440.9660	672.7505	989.6334	1276.8982	1573.1865	(97)
Space heating kWh													
	719.3849	467.5422	410.3303	266.9412	155.0896	0.0000	0.0000	0.0000	0.0000	244.7781	422.9475	639.9920	(98a)
Space heating requirement - total per year (kWh/year)												3327.0059	
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													
	719.3849	467.5422	410.3303	266.9412	155.0896	0.0000	0.0000	0.0000	0.0000	244.7781	422.9475	639.9920	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3327.0059	
Space heating per m2											(98c) / (4) =	31.3868	(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													
	719.3849	467.5422	410.3303	266.9412	155.0896	0.0000	0.0000	0.0000	0.0000	244.7781	422.9475	639.9920	(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)													
	315.3883	204.9769	179.8945	117.0307	67.9934	0.0000	0.0000	0.0000	0.0000	107.3141	185.4260	280.5814	(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													
	227.4658	177.3614	153.7288	91.0398	52.2761	33.3681	32.0156	59.0424	90.5762	148.2480	192.9348	228.9633	(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													
	139.0208	108.3983	93.9548	55.6410	31.9497	20.3937	19.5670	36.0851	55.3576	90.6051	117.9164	139.9360	(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	23.5455	18.8890	17.0075	12.4604	9.6248	7.8635	8.7801	11.4126	14.8239	19.4498	21.9685	24.1999	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-60.5678	-84.3465	-118.5754	-126.9323	-127.9770	-105.5525	-104.1164	-102.3293	-95.9767	-92.6570	-65.4863	-52.0791	(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	-0.4512	-4.3568	-12.5720	-26.1063	-44.0677	-57.6765	-57.4596	-47.5420	-34.0885	-11.6548	-2.8032	-0.5629	(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	1458.6053	(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	908.8255	(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)	190.0254	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1435.9377	(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	1121.5185	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1458.6053	16.4900	240.5240	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	908.8255	16.4900	149.8653	(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	190.0254	16.4900	31.3352	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1136.5962	16.4900	-187.4247	
PV Unit electricity exported	-299.3415	5.5900	-16.7332	
Total			-204.1579	(252)
Total energy cost			217.5666	(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] =	0.5187 (257)
SAP value		91.5918
SAP rating (Section 12)		92 (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	1458.6053	0.1548	225.7678	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	908.8255	0.1484	134.9048	(264)
Space and water heating			360.6726	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	190.0254	0.1443	27.4265	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1136.5962	0.1363	-154.9262	
PV Unit electricity exported	-299.3415	0.1155	-34.5595	
Total			-189.4857	(269)
Total CO2, kg/year			198.6134	(272)
CO2 emissions per m2			1.8700	(273)
EI value			98.2375	
EI rating			98	(274)
EI band			A	

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

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	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	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Window			16.4000	1.1450	18.7786			(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	18.3500	122.6500	0.1500	18.3975	9.0000	1103.8500	(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) =	47.6061			(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) =	7796.8500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		73.5552 (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) =	67.3661 (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	116.2894	115.6762	115.6762	114.5248	114.2526	113.2264	113.2264	112.9855	113.2264	114.2526	114.2526	115.0880	(39)
Average = Sum(39)m / 12 =												114.3898	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0971	1.0913	1.0913	1.0804	1.0779	1.0682	1.0682	1.0659	1.0682	1.0779	1.0779	1.0857	(40)
HLP (average)												1.0791	
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	-26.0228	-44.7964	-84.1027	-124.5610	-146.4309	-165.0528	-156.0766	-138.2653	-107.3324	-65.2463	-33.6146	-19.8117	(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	222.0765	174.5125	148.8174	80.2825	52.1305	13.8793	20.6134	45.4898	78.4758	141.9156	186.5980	225.6036	(64)
										Total per year (kWh/year) = Sum(64)m =		1390.3949	(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	26.9001	23.8924	19.4306	14.7102	10.9961	9.2833	10.0310	13.0386	17.5004	22.2208	25.9350	27.6477	(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	676.0516	674.7933	655.5441	619.2529	581.8143	547.8051	527.3890	529.4393	547.9558	581.5260	622.2185	658.1036	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
North	7.1000	12.7350	0.7600	0.7000	0.7700	33.3352	(74)
East	0.6600	23.7652	0.7600	0.7000	0.7700	5.7827	(76)
South	8.6400	53.8987	0.7600	0.7000	0.7700	171.6869	(78)

Solar gains	210.8047	316.4636	429.8321	551.5418	588.3985	649.7493	600.0403	551.7101	488.4121	358.4289	248.0180	175.0153	(83)
Total gains	886.8564	991.2569	1085.3762	1170.7947	1170.2128	1197.5544	1127.4293	1081.1494	1036.3679	939.9549	870.2365	833.1189	(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	18.6241	18.7229	18.7229	18.9111	18.9562	19.1280	19.1280	19.1688	19.1280	18.9562	18.9562	18.8186	
alpha	2.2416	2.2482	2.2482	2.2607	2.2637	2.2752	2.2752	2.2779	2.2752	2.2637	2.2637	2.2546	
util living area	0.8940	0.8660	0.8193	0.7441	0.6477	0.4872	0.3930	0.4139	0.5813	0.7581	0.8573	0.9050	(86)
Living	18.4212	18.7276	19.2339	19.8420	20.3626	20.7729	20.8964	20.8824	20.6302	19.9862	19.1492	18.3364	
Non living	17.0136	17.3966	18.0246	18.7716	19.3907	19.8439	19.9622	19.9532	19.7037	18.9631	17.9377	16.9127	
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	19.6808	18.7276	19.2339	19.8420	20.3626	20.7729	20.8964	20.8824	20.6302	19.9862	19.1492	18.7090	(87)
Th 2	20.0032	20.0080	20.0080	20.0169	20.0190	20.0269	20.0269	20.0288	20.0269	20.0190	20.0190	20.0125	(88)
util rest of house	0.8824	0.8517	0.7998	0.7158	0.6054	0.4250	0.3152	0.3353	0.5230	0.7248	0.8396	0.8945	(89)
MIT 2	18.8104	17.3966	18.0246	18.7716	19.3907	19.8439	19.9622	19.9532	19.7037	18.9631	17.9377	17.4710	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.1635	17.9366	18.5152	19.2058	19.7849	20.2208	20.3412	20.3301	20.0795	19.3781	18.4292	17.9732	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1635	17.9366	18.5152	19.2058	19.7849	20.2208	20.3412	20.3301	20.0795	19.3781	18.4292	17.9732	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8712	0.8146	0.7648	0.6893	0.5944	0.4380	0.3413	0.3607	0.5264	0.6999	0.8041	0.8670	(94)
Useful gains	772.6559	807.4619	830.0560	807.0430	695.5842	524.4724	384.7459	389.9377	545.5052	657.8669	699.7966	722.3103	(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	1681.9484	1473.3162	1355.1649	1157.3646	889.4490	591.1306	412.2807	421.4506	654.3956	957.2224	1237.2606	1539.0970	(97)
Space heating kWh	676.5136	447.4541	390.6810	252.2316	144.2355	0.0000	0.0000	0.0000	0.0000	222.7205	386.9741	607.6893	(98a)
Space heating requirement - total per year (kWh/year)												3128.4996	
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	676.5136	447.4541	390.6810	252.2316	144.2355	0.0000	0.0000	0.0000	0.0000	222.7205	386.9741	607.6893	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3128.4996	
Space heating per m2											(98c) / (4) =	29.5141	(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	676.5136	447.4541	390.6810	252.2316	144.2355	0.0000	0.0000	0.0000	0.0000	222.7205	386.9741	607.6893	(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)	296.5929	196.1701	171.2800	110.5818	63.2348	0.0000	0.0000	0.0000	0.0000	97.6437	169.6548	266.4194	(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	222.0765	174.5125	148.8174	80.2825	52.1305	13.8793	20.6134	45.4898	78.4758	141.9156	186.5980	225.6036	(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	135.7270	106.6572	90.9531	49.0664	31.8607	8.4826	12.5984	27.8021	47.9622	86.7349	114.0435	137.8827	(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	23.5455	18.8890	17.0075	12.4604	9.6248	7.8635	8.7801	11.4126	14.8239	19.4498	21.9685	24.1999	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-69.0443	-87.0646	-121.4639	-130.5797	-127.2214	-106.8757	-104.9897	-104.3719	-99.4900	-96.6430	-73.0826	-57.9111	(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	-1.0304	-5.0762	-14.2005	-30.2295	-44.9161	-67.7349	-63.3028	-54.1006	-39.4022	-13.8810	-4.1173	-0.9501	(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	1371.5775	(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	849.7707	(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)	190.0254	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1517.6795	(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	893.6941	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1371.5775	26.0000	356.6101	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	849.7707	26.0000	220.9404	(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	190.0254	26.0000	49.4066	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1178.7379	26.0000	-306.4719	
PV Unit electricity exported	-338.9415	5.8100	-19.6925	
Total			-326.1644	(252)
Total energy cost			300.7928	(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	1371.5775	0.1549	212.4217	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	849.7707	0.1497	127.1995	(264)
Space and water heating			339.6212	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	190.0254	0.1443	27.4265	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1178.7379	0.1367	-161.1595	
PV Unit electricity exported	-338.9415	0.1158	-39.2387	
Total			-200.3982	(269)
Total CO2, kg/year			166.6495	(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	1371.5775	1.5733	2157.9431	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	849.7707	1.5539	1320.4640	(278)
Space and water heating			3478.4071	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	190.0254	1.5338	291.4673	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1178.7379	1.5054	-1774.5085	
PV Unit electricity exported	-338.9415	0.4242	-143.7869	
Total			-1918.2954	(283)
Total Primary energy kWh/year			1851.5791	(286)

SAP 10 EPC IMPROVEMENTS

00002 Rev A

Current energy efficiency rating:	A 92
Current environmental impact rating:	A 98

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

Recommended measures:	SAP change	Cost change	CO2 change

(none)

Measures omitted - SAP change or cost saving too small:
N Solar water heating + 0.7 -£ -0 -116 kg (69.4%)

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

Potential energy efficiency rating: A 92
Potential environmental impact rating: A 98

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	£627	£627	£0
Space heating	£357	£357	£0
Water heating	£221	£221	£0
Lighting	£49	£49	£0
Generated (PV)	-£326	-£326	£0
Total cost of fuels	£301	£301	£0
Total cost of uses	£301	£301	£0
Delivered energy	8 kWh/m²	8 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.2 tonnes	0.2 tonnes	0.0 tonnes
CO2 emissions per m²	2 kg/m²	2 kg/m²	0 kg/m²
Primary energy	17 kWh/m²	17 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			16.4000	1.1450	18.7786			(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	18.3500	122.6500	0.1500	18.3975	9.0000	1103.8500	(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) =		47.6061			(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) =		7796.8500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K				73.5552 (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) =		67.3661 (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	116.6054	116.2894	115.9797	114.5248	114.2526	112.9855	112.9855	112.7508	113.4736	114.2526	114.8033	115.3790	(39)
Average = Sum(39)m / 12 =												114.5235	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1001	1.0971	1.0941	1.0804	1.0779	1.0659	1.0659	1.0637	1.0705	1.0779	1.0830	1.0885	(40)
HLP (average)												1.0804	
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	-20.6335	-41.9476	-79.1913	-113.8037	-146.2853	-145.5640	-144.6745	-124.7127	-95.2320	-58.9138	-27.2778	-16.4521	(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	227.4658	177.3614	153.7288	91.0398	52.2761	33.3681	32.0156	59.0424	90.5762	148.2480	192.9348	228.9633	(64)
									Total per year (kWh/year) = Sum(64)m =			1487.0202	(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	26.9001	23.8924	19.4306	14.7102	10.9961	9.2833	10.0310	13.0386	17.5004	22.2208	25.9350	27.6477	(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	676.0516	674.7933	655.5441	619.2529	581.8143	547.8051	527.3890	529.4393	547.9558	581.5260	622.2185	658.1036	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
North	7.1000	10.6334	0.7600	0.7000	0.7700	27.8340	(74)
East	0.6600	19.6403	0.7600	0.7000	0.7700	4.7790	(76)
South	8.6400	46.7521	0.7600	0.7000	0.7700	148.9222	(78)

Solar gains	181.5351	306.4370	416.4629	518.7743	589.0001	589.6743	566.3493	512.2472	451.1224	337.4762	216.8192	155.8163	(83)
Total gains	857.5868	981.2303	1072.0070	1138.0272	1170.8143	1137.4794	1093.7383	1041.6865	999.0782	919.0023	839.0377	813.9198	(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	18.5737	18.6241	18.6739	18.9111	18.9562	19.1688	19.1688	19.2087	19.0863	18.9562	18.8652	18.7711	
alpha	2.2382	2.2416	2.2449	2.2607	2.2637	2.2779	2.2779	2.2806	2.2724	2.2637	2.2577	2.2514	
util living area	0.9040	0.8725	0.8282	0.7583	0.6593	0.5290	0.4100	0.4412	0.6064	0.7769	0.8733	0.9126	(86)
Living	18.2623	18.6235	19.1411	19.7687	20.3148	20.7124	20.8847	20.8599	20.5811	19.8818	18.9696	18.1936	
Non living	16.8129	17.2640	17.9088	18.6847	19.3354	19.7863	19.9548	19.9363	19.6516	18.8386	17.7125	16.7317	
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	19.5995	18.6235	19.1411	19.7687	20.3148	20.7124	20.8847	20.8599	20.5811	19.8818	18.9696	18.5862	(87)
Th 2	20.0008	20.0032	20.0056	20.0169	20.0190	20.0288	20.0288	20.0306	20.0250	20.0190	20.0147	20.0103	(88)
util rest of house	0.8935	0.8590	0.8097	0.7312	0.6187	0.4691	0.3320	0.3632	0.5498	0.7463	0.8577	0.9030	(89)
MIT 2	18.7288	17.2640	17.9088	18.6847	19.3354	19.7863	19.9548	19.9363	19.6516	18.8386	17.7125	17.3222	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.0820	17.8155	18.4087	19.1244	19.7327	20.1620	20.3320	20.3110	20.0287	19.2618	18.2225	17.8349	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0820	17.8155	18.4087	19.1244	19.7327	20.1620	20.3320	20.3110	20.0287	19.2618	18.2225	17.8349	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8824	0.8216	0.7739	0.7031	0.6058	0.4778	0.3573	0.3868	0.5500	0.7189	0.8217	0.8760	(94)
Useful gains	756.7457	806.1888	829.6456	800.2013	709.3070	543.4898	390.7560	402.8931	549.5027	660.6306	689.4710	712.9821	(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	1723.6608	1501.9361	1381.1649	1170.9531	917.7608	628.4265	421.6631	440.9660	672.7505	989.6334	1276.8982	1573.1865	(97)
Space heating kWh	719.3849	467.5422	410.3303	266.9412	155.0896	0.0000	0.0000	0.0000	0.0000	244.7781	422.9475	639.9920	(98a)
Space heating requirement - total per year (kWh/year)												3327.0059	
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	719.3849	467.5422	410.3303	266.9412	155.0896	0.0000	0.0000	0.0000	0.0000	244.7781	422.9475	639.9920	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3327.0059	
Space heating per m2											(98c) / (4) =	31.3868	(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	719.3849	467.5422	410.3303	266.9412	155.0896	0.0000	0.0000	0.0000	0.0000	244.7781	422.9475	639.9920	(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)	315.3883	204.9769	179.8945	117.0307	67.9934	0.0000	0.0000	0.0000	0.0000	107.3141	185.4260	280.5814	(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	227.4658	177.3614	153.7288	91.0398	52.2761	33.3681	32.0156	59.0424	90.5762	148.2480	192.9348	228.9633	(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	139.0208	108.3983	93.9548	55.6410	31.9497	20.3937	19.5670	36.0851	55.3576	90.6051	117.9164	139.9360	(219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	23.5455	18.8890	17.0075	12.4604	9.6248	7.8635	8.7801	11.4126	14.8239	19.4498	21.9685	24.1999	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-60.5678	-84.3465	-118.5754	-126.9323	-127.9770	-105.5525	-104.1164	-102.3293	-95.9767	-92.6570	-65.4863	-52.0791	(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	-0.4512	-4.3568	-12.5720	-26.1063	-44.0677	-57.6765	-57.4596	-47.5420	-34.0885	-11.6548	-2.8032	-0.5629	(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	1458.6053	(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	908.8255	(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)	190.0254	(232)

Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1435.9377	(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	1121.5185	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1458.6053	16.4900	240.5240	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	908.8255	16.4900	149.8653	(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	190.0254	16.4900	31.3352	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1136.5962	16.4900	-187.4247	
PV Unit electricity exported	-299.3415	5.5900	-16.7332	
Total			-204.1579	(252)
Total energy cost			217.5666	(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] =	0.5187	(257)
SAP value		91.5918	
SAP rating (Section 12)		92	(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	1458.6053	0.1548	225.7678	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	908.8255	0.1484	134.9048	(264)
Space and water heating			360.6726	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	190.0254	0.1443	27.4265	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1136.5962	0.1363	-154.9262	
PV Unit electricity exported	-299.3415	0.1155	-34.5595	
Total			-189.4857	(269)
Total CO2, kg/year			198.6134	(272)
CO2 emissions per m2			1.8700	(273)
EI value			98.2375	
EI rating			98	(274)
EI band			A	

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	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 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			16.4000	1.1450	18.7786			(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	18.3500	122.6500	0.1500	18.3975	9.0000	1103.8500	(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) =		47.6061			(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) =							7796.8500	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							73.5552	(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) =							67.3661	(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	116.2894	115.6762	115.6762	114.5248	114.2526	113.2264	113.2264	112.9855	113.2264	114.2526	114.2526	115.0880	(39)
Average = Sum(39)m / 12 =												114.3898	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0971	1.0913	1.0913	1.0804	1.0779	1.0682	1.0682	1.0659	1.0682	1.0779	1.0779	1.0857	(40)
HLP (average)												1.0791	
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)

	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	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	-26.0228	-44.7964	-84.1027	-124.5610	-146.4309	-165.0528	-156.0766	-138.2653	-107.3324	-65.2463	-33.6146	-19.8117	(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	222.0765	174.5125	148.8174	80.2825	52.1305	13.8793	20.6134	45.4898	78.4758	141.9156	186.5980	225.6036	(64)
Total per year (kWh/year) = Sum(64)m =												1390.3949	(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	26.9001	23.8924	19.4306	14.7102	10.9961	9.2833	10.0310	13.0386	17.5004	22.2208	25.9350	27.6477	(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												
	676.0516	674.7933	655.5441	619.2529	581.8143	547.8051	527.3890	529.4393	547.9558	581.5260	622.2185	658.1036 (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	
North	7.1000	12.7350	0.7600	0.7000	0.7700	33.3352	(74)
East	0.6600	23.7652	0.7600	0.7000	0.7700	5.7827	(76)
South	8.6400	53.8987	0.7600	0.7000	0.7700	171.6869	(78)

Solar gains	210.8047	316.4636	429.8321	551.5418	588.3985	649.7493	600.0403	551.7101	488.4121	358.4289	248.0180	175.0153	(83)
Total gains	886.8564	991.2569	1085.3762	1170.7947	1170.2128	1197.5544	1127.4293	1081.1494	1036.3679	939.9549	870.2365	833.1189	(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	18.6241	18.7229	18.7229	18.9111	18.9562	19.1280	19.1280	19.1688	19.1280	18.9562	18.9562	18.8186	
alpha	2.2416	2.2482	2.2482	2.2607	2.2637	2.2752	2.2752	2.2779	2.2752	2.2637	2.2637	2.2546	
util living area													
	0.8940	0.8660	0.8193	0.7441	0.6477	0.4872	0.3930	0.4139	0.5813	0.7581	0.8573	0.9050	(86)
Living	18.4212	18.7276	19.2339	19.8420	20.3626	20.7729	20.8964	20.8824	20.6302	19.9862	19.1492	18.3364	
Non living	17.0136	17.3966	18.0246	18.7716	19.3907	19.8439	19.9622	19.9532	19.7037	18.9631	17.9377	16.9127	
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	19.6808	18.7276	19.2339	19.8420	20.3626	20.7729	20.8964	20.8824	20.6302	19.9862	19.1492	18.7090	(87)
Th 2	20.0032	20.0080	20.0080	20.0169	20.0190	20.0269	20.0269	20.0288	20.0269	20.0190	20.0190	20.0125	(88)
util rest of house													
	0.8824	0.8517	0.7998	0.7158	0.6054	0.4250	0.3152	0.3353	0.5230	0.7248	0.8396	0.8945	(89)
MIT 2	18.8104	17.3966	18.0246	18.7716	19.3907	19.8439	19.9622	19.9532	19.7037	18.9631	17.9377	17.4710	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.1635	17.9366	18.5152	19.2058	19.7849	20.2208	20.3412	20.3301	20.0795	19.3781	18.4292	17.9732	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1635	17.9366	18.5152	19.2058	19.7849	20.2208	20.3412	20.3301	20.0795	19.3781	18.4292	17.9732	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8712	0.8146	0.7648	0.6893	0.5944	0.4380	0.3413	0.3607	0.5264	0.6999	0.8041	0.8670	(94)
Useful gains	772.6559	807.4619	830.0560	807.0430	695.5842	524.4724	384.7459	389.9377	545.5052	657.8669	699.7966	722.3103	(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													
	1681.9484	1473.3162	1355.1649	1157.3646	889.4490	591.1306	412.2807	421.4506	654.3956	957.2224	1237.2606	1539.0970	(97)
Space heating kWh													
	676.5136	447.4541	390.6810	252.2316	144.2355	0.0000	0.0000	0.0000	0.0000	222.7205	386.9741	607.6893	(98a)
Space heating requirement - total per year (kWh/year)												3128.4996	
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													
	676.5136	447.4541	390.6810	252.2316	144.2355	0.0000	0.0000	0.0000	0.0000	222.7205	386.9741	607.6893	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3128.4996	
Space heating per m2											(98c) / (4) =	29.5141	(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													
	676.5136	447.4541	390.6810	252.2316	144.2355	0.0000	0.0000	0.0000	0.0000	222.7205	386.9741	607.6893	(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)													
	296.5929	196.1701	171.2800	110.5818	63.2348	0.0000	0.0000	0.0000	0.0000	97.6437	169.6548	266.4194	(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													
	222.0765	174.5125	148.8174	80.2825	52.1305	13.8793	20.6134	45.4898	78.4758	141.9156	186.5980	225.6036	(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													
	135.7270	106.6572	90.9531	49.0664	31.8607	8.4826	12.5984	27.8021	47.9622	86.7349	114.0435	137.8827	(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	23.5455	18.8890	17.0075	12.4604	9.6248	7.8635	8.7801	11.4126	14.8239	19.4498	21.9685	24.1999	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-69.0443	-87.0646	-121.4639	-130.5797	-127.2214	-106.8757	-104.9897	-104.3719	-99.4900	-96.6430	-73.0826	-57.9111	(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	-1.0304	-5.0762	-14.2005	-30.2295	-44.9161	-67.7349	-63.3028	-54.1006	-39.4022	-13.8810	-4.1173	-0.9501	(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	1371.5775	(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	849.7707	(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)	190.0254	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1517.6795	(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	893.6941	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1371.5775	26.0000	356.6101	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	849.7707	26.0000	220.9404	(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	190.0254	26.0000	49.4066	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1178.7379	26.0000	-306.4719	
PV Unit electricity exported	-338.9415	5.8100	-19.6925	
Total			-326.1644	(252)
Total energy cost			300.7928	(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	1371.5775	0.1549	212.4217	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	849.7707	0.1497	127.1995	(264)
Space and water heating			339.6212	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	190.0254	0.1443	27.4265	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1178.7379	0.1367	-161.1595	
PV Unit electricity exported	-338.9415	0.1158	-39.2387	
Total			-200.3982	(269)
Total CO2, kg/year			166.6495	(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	1371.5775	1.5733	2157.9431	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	849.7707	1.5539	1320.4640	(278)
Space and water heating			3478.4071	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	190.0254	1.5338	291.4673	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1178.7379	1.5054	-1774.5085	
PV Unit electricity exported	-338.9415	0.4242	-143.7869	
Total			-1918.2954	(283)
Total Primary energy kWh/year			1851.5791	(286)

Predicted Energy Assessment

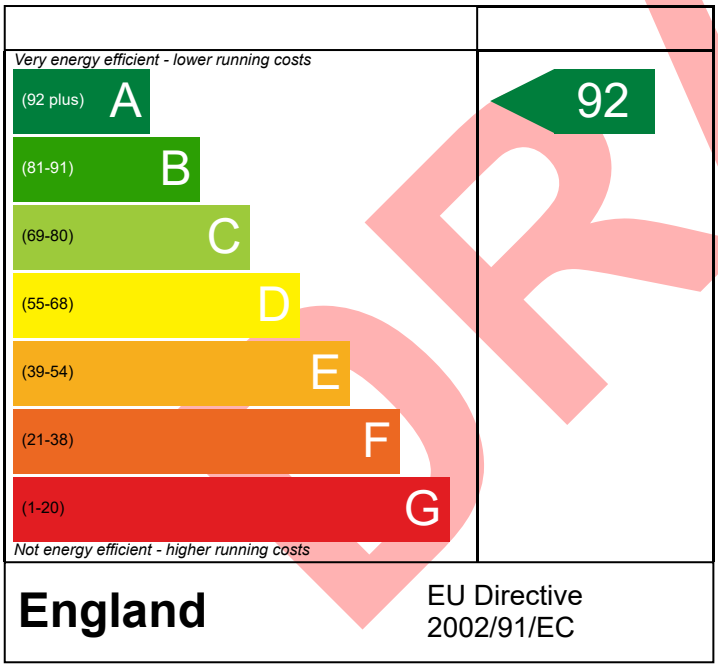
Rock House, Plot 1, Old Frome Road To Underhill,
Somerset, BA3 4TQ

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.

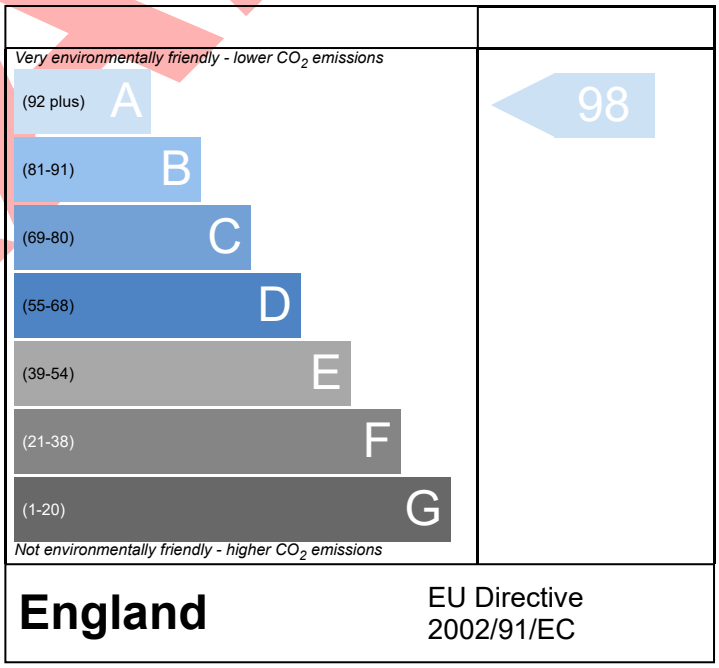
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

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 2	**Issued on Date**	22/10/2026
Assessment Reference	00002 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	92 A	**DER**	1.94	**TER**	10.31
Environmental	98 A	**% DER < TER**			81.18
CO_2 Emissions (t/year)	0.17	**DFEE**	36.28	**TFEE**	36.61
Compliance Check	See BREL	**% DFEE < TFEE**			0.91
% DPER < TPER	60.89	**DPER**	21.04	**TPER**	53.80

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:

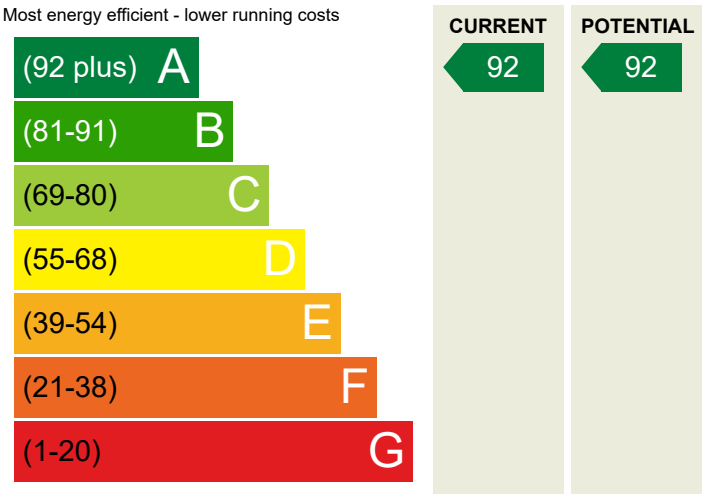
Energy Report

Dwelling Address	Rock House, Plot 1, Old Frome Road To Underhill, Somerset, BA3 4TQ
Reference	Plot 2-00002 Rev A
SAP Version	10.2
Assessment Date	22/10/2026
Submission Date	
Property Type	House, Detached
Total Floor Area	106

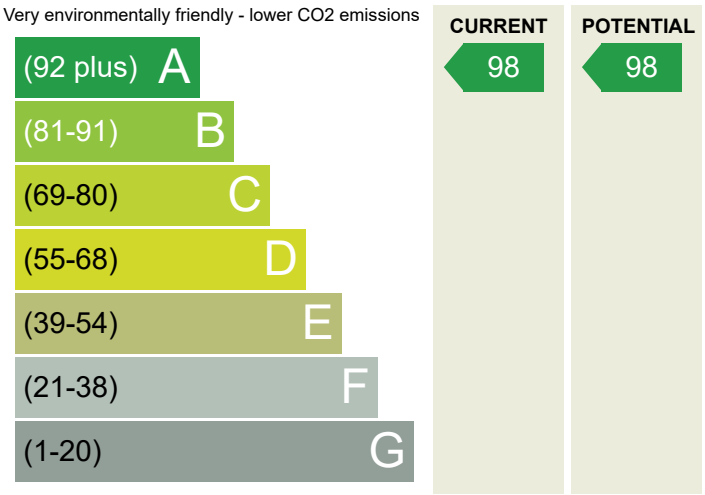
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

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

Energy Efficiency Rating

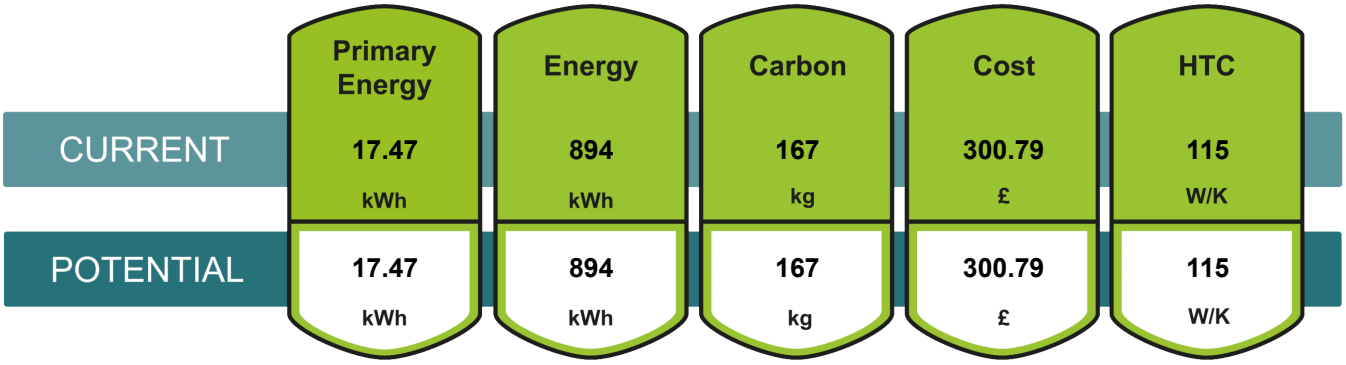


Carbon Dioxide (CO2) Emissions Rating



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	£0	A 92			A 99

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	£49	£49	
Heating	£357	£357	
Hot Water	£221	£221	
New Technologies e.g. Impact of PV	-(£326)	-(£326)	
TOTAL	£301	£301	

Estimated energy use and potential savings

Space Heating
1372
kWh per year

Water Heating
850
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 2	**Issued on Date**	22/10/2026
Assessment Reference	00002 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	92 A	**DER**	1.94	**TER**	10.31
Environmental	98 A	**% DER < TER**			81.18
CO_2 Emissions (t/year)	0.17	**DFEE**	36.28	**TFEE**	36.61
Compliance Check	See BREL	**% DFEE < TFEE**			0.91
% DPER < TPER	60.89	**DPER**	21.04	**TPER**	53.80

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 North (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	North	4.21
Front	Window	External Wall 1	North	1.44
Front	Window	External Wall 1	North	1.45
Front	External Door	External Wall 1	North	1.95
Rear	Window	External Wall 1	South	1.33
Rear	Window	External Wall 1	South	1.44
Rear	Window	External Wall 1	South	2.11
Rear	Window	External Wall 1	South	3.76
Side	Window	External Wall 1	East	0.66

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
3.00	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 .....