Summary for Input Data

elmhurst energy

Plot Reference	Plot 3	**Issued on Date**	22/10/2026
Assessment Reference	00003 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**	1.96	**TER**	10.40
Environmental	98 A	**% DER < TER**			81.15
CO_2 Emissions (t/year)	0.17	**DFEE**	37.10	**TFEE**	37.41
Compliance Check	See BREL	**% DFEE < TFEE**			0.85
% DPER < TPER	60.80	**DPER**	21.25	**TPER**	54.21

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	73.29	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	119.52	0.00	None	21.48	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	West	3.78	

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

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Compliance Check	See BREL	**% DFEE < TFEE**			0.85
% DPER < TPER	60.80	**DPER**	21.25	**TPER**	54.21

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

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			19.5200	1.1450	22.3511			(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	21.4700	119.5300	0.1500	17.9295	9.0000	1075.7700	(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) =		50.7106			(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) =	7768.7700 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		73.2903 (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) =	70.4706 (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													
	119.7100	119.3940	119.0842	117.6294	117.3572	116.0900	116.0900	115.8554	116.5781	117.3572	117.9078	118.4835	(39)
Average = Sum(39)m / 12 =												117.6280	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1293	1.1264	1.1234	1.1097	1.1071	1.0952	1.0952	1.0930	1.0998	1.1071	1.1123	1.1178	(40)
HLP (average)												1.1097	
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	-20.6462	-41.9689	-79.2229	-113.8379	-146.3188	-145.5937	-144.7079	-124.7510	-95.2716	-58.9455	-27.2950	-16.4630	(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													
	227.4531	177.3400	153.6972	91.0056	52.2426	33.3384	31.9822	59.0041	90.5365	148.2164	192.9176	228.9524	(64)
										Total per year (kWh/year) = Sum(64)m =		1486.6860	(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)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	105.8897	94.0527	100.8426	90.7524	89.4184	82.1369	82.1461	84.4953	84.4232	92.2780	95.8626	104.9973	(65)

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

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	136.3843	150.9969	136.3843	140.9304	136.3843	140.9304	136.3843	136.3843	140.9304	136.3843	140.9304	136.3843	(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													
	609.2164	624.2205	598.2423	578.5022	549.4272	530.3195	510.3833	510.7838	525.9628	542.9819	575.3108	596.2945	(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)
South	8.6400	46.7521	0.7600	0.7000	0.7700	148.9222	(78)
West	3.7800	19.6403	0.7600	0.7000	0.7700	27.3706	(80)

Solar gains	204.1267	350.6310	489.2440	624.9212	719.0871	722.8415	693.1299	621.1499	535.7698	389.9161	244.9882	174.3945	(83)
Total gains	813.3431	974.8514	1087.4863	1203.4235	1268.5143	1253.1610	1203.5132	1131.9337	1061.7327	932.8980	820.2991	770.6890	(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	18.0268	18.0745	18.1216	18.3457	18.3882	18.5890	18.5890	18.6266	18.5111	18.3882	18.3024	18.2134	
alpha	2.2018	2.2050	2.2081	2.2230	2.2259	2.2393	2.2393	2.2418	2.2341	2.2259	2.2202	2.2142	
util living area													
	0.9132	0.8756	0.8275	0.7453	0.6368	0.5011	0.3862	0.4204	0.5909	0.7765	0.8796	0.9213	(86)

Living	18.0955	18.5264	19.0838	19.7732	20.3381	20.7304	20.8921	20.8660	20.5857	19.8424	18.8641	18.0255	
Non living	16.5954	17.1329	17.8259	18.6730	19.3409	19.7808	19.9370	19.9181	19.6356	18.7772	17.5711	16.5118	
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	19.5142	18.5264	19.0838	19.7732	20.3381	20.7304	20.8921	20.8660	20.5857	19.8424	18.8641	18.4416	(87)
Th 2	19.9769	19.9794	19.9817	19.9929	19.9950	20.0048	20.0048	20.0066	20.0010	19.9950	19.9908	19.9863	(88)
util rest of house													
	0.9035	0.8622	0.8087	0.7171	0.5950	0.4413	0.3097	0.3432	0.5332	0.7454	0.8643	0.9124	(89)
MIT 2	18.6266	17.1329	17.8259	18.6730	19.3409	19.7808	19.9370	19.9181	19.6356	18.7772	17.5711	17.1372	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	18.9866	17.6982	18.3362	19.1193	19.7454	20.1660	20.3244	20.3027	20.0210	19.2093	18.0956	17.6663	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.9866	17.6982	18.3362	19.1193	19.7454	20.1660	20.3244	20.3027	20.0210	19.2093	18.0956	17.6663	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8924	0.8239	0.7719	0.6894	0.5838	0.4514	0.3351	0.3671	0.5345	0.7170	0.8276	0.8858	(94)
Useful gains	725.8643	803.1990	839.4179	829.5832	740.4970	565.7341	403.3275	415.5721	567.4654	668.9336	678.8561	682.6598	(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													
	1758.1364	1528.0228	1409.5043	1202.0921	944.1866	646.1607	432.3697	452.1434	690.2616	1010.3668	1296.4690	1595.5376	(97)
Space heating kWh													
	768.0105	487.0816	424.1443	268.2064	151.5451	0.0000	0.0000	0.0000	0.0000	254.0263	444.6814	679.1811	(98a)
Space heating requirement - total per year (kWh/year)												3476.8766	
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													
	768.0105	487.0816	424.1443	268.2064	151.5451	0.0000	0.0000	0.0000	0.0000	254.0263	444.6814	679.1811	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3476.8766	
Space heating per m2											(98c) / (4) =	32.8007	(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													
	768.0105	487.0816	424.1443	268.2064	151.5451	0.0000	0.0000	0.0000	0.0000	254.0263	444.6814	679.1811	(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)													
	336.7064	213.5433	185.9507	117.5854	66.4395	0.0000	0.0000	0.0000	0.0000	111.3686	194.9544	297.7624	(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													
	227.4531	177.3400	153.6972	91.0056	52.2426	33.3384	31.9822	59.0041	90.5365	148.2164	192.9176	228.9524	(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													
	139.0130	108.3853	93.9355	55.6201	31.9292	20.3755	19.5466	36.0617	55.3334	90.5857	117.9059	139.9293	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.8151	18.3031	16.4799	12.0739	9.3262	7.6196	8.5077	11.0586	14.3640	18.8464	21.2870	23.4492	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-60.8261	-84.6070	-118.9154	-126.9484	-127.6674	-105.4940	-104.0505	-102.2571	-95.9068	-92.8621	-65.6871	-52.2576	(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	-0.1789	-4.0726	-12.1969	-26.0521	-44.3401	-57.7019	-57.4884	-47.5716	-34.1143	-11.4144	-2.5833	-0.3723	(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												1524.3107	(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												908.6212	(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)												184.1307	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1435.5664	(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												1181.4962	(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	1524.3107	0.1550	236.2048	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	908.6212	0.1484	134.8775	(264)
Space and water heating			371.0822	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	184.1307	0.1443	26.5757	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1137.4796	0.1363	-155.0798	
PV Unit electricity exported	-298.0868	0.1151	-34.3163	
Total			-189.3962	(269)
Total CO2, kg/year			208.2618	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			1.9600	(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	1524.3107	1.5736	2398.6983	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	908.6212	1.5492	1407.6649	(278)
Space and water heating			3806.3632	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	184.1307	1.5338	282.4258	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1137.4796	1.5040	-1710.7668	
PV Unit electricity exported	-298.0868	0.4219	-125.7495	
Total			-1836.5163	(283)
Total Primary energy kWh/year			2252.2727	(286)
Dwelling Primary energy Rate (DPER)			21.2500	(287)

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

1. Overall dwelling characteristics

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

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	4 * 10 =	40.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.1606 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.4106 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3490 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101	(22b)
Effective ac	0.5990	0.5952	0.5914	0.5737	0.5704	0.5550	0.5550	0.5521	0.5609	0.5704	0.5771	0.5841	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			1.9500	1.0000	1.9500			(26)

TER Opening Type			19.5200	1.1450	22.3511	(27)
Heatloss Floor 1			53.0000	0.1300	6.8900	(28a)
External Wall 1	141.0000	21.4700	119.5300	0.1800	21.5154	(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) =		58.5365	(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.2903 (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) =		69.2262	(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	118.4656	118.1496	117.8398	116.3850	116.1128	114.8456	114.8456	114.6110	115.3337	116.1128	116.6634	117.2391	(39)
Average = Sum(39)m / 12 =												116.3836	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1176	1.1146	1.1117	1.0980	1.0954	1.0834	1.0834	1.0812	1.0881	1.0954	1.1006	1.1060	(40)
HLP (average)												1.0980	
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	136.3843	150.9969	136.3843	140.9304	136.3843	140.9304	136.3843	136.3843	140.9304	136.3843	140.9304	136.3843	(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	614.0446	629.0486	603.0704	583.3304	554.2554	532.1476	512.2115	512.6120	527.7910	547.8101	580.1390	601.1226	(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)
South	8.6400	46.7521	0.6300	0.7000	0.7700	123.4487	(78)
West	3.7800	19.6403	0.6300	0.7000	0.7700	22.6888	(80)

Solar gains	169.2103	290.6546	405.5575	518.0268	596.0854	599.1976	574.5682	514.9006	444.1250	323.2199	203.0824	144.5638	(83)
Total gains	783.2549	919.7032	1008.6280	1101.3572	1150.3408	1131.3452	1086.7797	1027.5126	971.9160	871.0300	783.2213	745.6865	(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	18.2162	18.2649	18.3129	18.5418	18.5853	18.7904	18.7904	18.8288	18.7109	18.5853	18.4976	18.4068	
alpha	2.2144	2.2177	2.2209	2.2361	2.2390	2.2527	2.2527	2.2553	2.2474	2.2390	2.2332	2.2271	
util living area	0.9182	0.8859	0.8444	0.7707	0.6691	0.5354	0.4166	0.4505	0.6206	0.7946	0.8875	0.9253	(86)
MIT	18.0748	18.4706	19.0043	19.6897	20.2728	20.6954	20.8762	20.8483	20.5468	19.7913	18.8322	18.0128	(87)
Th 2	19.9865	19.9889	19.9913	20.0025	20.0046	20.0144	20.0144	20.0162	20.0106	20.0046	20.0003	19.9959	(88)
util rest of house	0.9089	0.8734	0.8270	0.7441	0.6284	0.4746	0.3367	0.3706	0.5634	0.7651	0.8731	0.9168	(89)
MIT 2	16.5738	17.0692	17.7357	18.5833	19.2790	19.7580	19.9353	19.9144	19.6061	18.7251	17.5373	16.5003	(90)
Living area fraction									fLA = Living area / (4) =			0.4057	(91)
MIT	17.1827	17.6377	18.2503	19.0321	19.6821	20.1383	20.3170	20.2932	19.9877	19.1576	18.0626	17.1138	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.1827	17.6377	18.2503	19.0321	19.6821	20.1383	20.3170	20.2932	19.9877	19.1576	18.0626	17.1138	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8741	0.8359	0.7899	0.7142	0.6139	0.4827	0.3623	0.3942	0.5620	0.7354	0.8369	0.8833	(94)
Useful gains	684.6610	768.7600	796.7525	786.6308	706.2492	546.1388	393.7115	405.0015	546.1761	640.5630	655.5078	658.6775	(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	1526.1550	1504.9534	1384.6549	1179.2233	926.8279	636.0441	426.8791	446.2034	679.0487	993.6498	1278.9340	1514.0064	(97)
Space heating kWh	626.0715	494.7219	437.3994	282.6666	164.1106	0.0000	0.0000	0.0000	0.0000	262.6966	448.8669	636.3647	(98a)
Space heating requirement - total per year (kWh/year)												3352.8982	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	626.0715	494.7219	437.3994	282.6666	164.1106	0.0000	0.0000	0.0000	0.0000	262.6966	448.8669	636.3647	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3352.8982	
Space heating per m2											(98c) / (4) =	31.6311	(99)

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

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	92.3000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	626.0715	494.7219	437.3994	282.6666	164.1106	0.0000	0.0000	0.0000	0.0000	262.6966	448.8669	636.3647	(98)
Space heating efficiency (main heating system 1)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000	(210)
Space heating fuel (main heating system)	678.3007	535.9934	473.8888	306.2477	177.8013	0.0000	0.0000	0.0000	0.0000	284.6117	486.3130	689.4526	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	249.7995	220.8446	234.6203	206.4888	200.2616	180.5775	178.3903	185.4553	187.4535	208.8620	221.8579	247.1155	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.0327	85.8130	85.4359	84.7644	83.6169	79.8000	79.8000	79.8000	79.8000	84.5752	85.6064	86.0844	(217)
Fuel for water heating, kWh/month	290.3541	257.3555	274.6155	243.6031	239.4988	226.2876	223.5467	232.4001	234.9042	246.9543	259.1604	287.0620	(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	28.3380	22.7338	20.4692	14.9966	11.5838	9.4641	10.5672	13.7356	17.8412	23.4086	26.4400	29.1256	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-48.1918	-67.2388	-95.6500	-106.3736	-113.6886	-105.7020	-104.3311	-98.9462	-89.3535	-76.2674	-52.7051	-41.7422	(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	-29.4106	-61.6066	-121.9887	-182.5840	-240.8467	-241.8366	-239.0499	-202.7182	-148.9655	-87.9624	-39.2157	-23.2825	(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												3632.6091	(211)

Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	79.8000	
Water heating fuel used	3015.7422	(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)	228.7036	(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	4343.3971	(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	3632.6091	0.2100	762.8479	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3015.7422	0.2100	633.3059	(264)
Space and water heating			1396.1538	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	228.7036	0.1443	33.0090	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1000.1904	0.1348	-134.8492	
PV Unit electricity exported	-1619.4674	0.1260	-204.0415	
Total			-338.8907	(269)
Total CO2, kg/year			1102.2013	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.4000	(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	3632.6091	1.1300	4104.8483	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3015.7422	1.1300	3407.7886	(278)
Space and water heating			7512.6369	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	228.7036	1.5338	350.7932	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1000.1904	1.4983	-1498.5834	
PV Unit electricity exported	-1619.4674	0.4625	-748.9791	
Total			-2247.5625	(283)
Total Primary energy kWh/year			5745.9684	(286)
Target Primary Energy Rate (TPER)			54.2100	(287)

Full SAP Calculation Printout

Plot Reference	Plot 3	**Issued on Date**	22/10/2026
Assessment Reference	00003 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**	1.96	**TER**	10.40
Environmental	98 A	**% DER < TER**			81.15
CO_2 Emissions (t/year)	0.17	**DFEE**	37.10	**TFEE**	37.41
Compliance Check	See BREL	**% DFEE < TFEE**			0.85
% DPER < TPER	60.80	**DPER**	21.25	**TPER**	54.21

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)
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			19.5200	1.1450	22.3511			(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	21.4700	119.5300	0.1500	17.9295	9.0000	1075.7700	(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) =		50.7106			(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) =		7768.7700	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							73.2903	(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) =		70.4706	(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	119.7100	119.3940	119.0842	117.6294	117.3572	116.0900	116.0900	115.8554	116.5781	117.3572	117.9078	118.4835	(39)
Average = Sum(39)m / 12 =												117.6280	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1293	1.1264	1.1234	1.1097	1.1071	1.0952	1.0952	1.0930	1.0998	1.1071	1.1123	1.1178	(40)
HLP (average)												1.1097	
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	136.3843	150.9969	136.3843	140.9304	136.3843	140.9304	136.3843	136.3843	140.9304	136.3843	140.9304	136.3843	(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	519.3887	535.4360	511.8349	497.7880	472.0640	456.4887	438.9563	437.7425	450.9710	464.0441	490.9360	507.2404	(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)
South	8.6400	46.7521	0.7600	0.7000	0.7700	148.9222	(78)
West	3.7800	19.6403	0.7600	0.7000	0.7700	27.3706	(80)

Solar gains	204.1267	350.6310	489.2440	624.9212	719.0871	722.8415	693.1299	621.1499	535.7698	389.9161	244.9882	174.3945	(83)
Total gains	723.5154	886.0669	1001.0789	1122.7092	1191.1511	1179.3303	1132.0863	1058.8924	986.7408	853.9602	735.9243	681.6349	(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	18.0268	18.0745	18.1216	18.3457	18.3882	18.5890	18.5890	18.6266	18.5111	18.3882	18.3024	18.2134	
alpha	2.2018	2.2050	2.2081	2.2230	2.2259	2.2393	2.2393	2.2418	2.2341	2.2259	2.2202	2.2142	
util living area	0.9292	0.8934	0.8473	0.7668	0.6593	0.5233	0.4061	0.4432	0.6178	0.8017	0.8992	0.9367	(86)
MIT	17.9326	18.3829	18.9642	19.6891	20.2859	20.7048	20.8803	20.8505	20.5442	19.7496	18.7249	17.8593	(87)
Th 2	19.9769	19.9794	19.9817	19.9929	19.9950	20.0048	20.0048	20.0066	20.0010	19.9950	19.9908	19.9863	(88)

util rest of house	0.9209	0.8814	0.8300	0.7398	0.6181	0.4624	0.3269	0.3634	0.5602	0.7726	0.8859	0.9292	(89)
MIT 2	17.1788	17.6198	18.1866	18.8874	19.4414	19.8122	19.9456	19.9289	19.6847	18.9618	17.9699	17.1128	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	17.4846	17.9294	18.5021	19.2127	19.7840	20.1743	20.3248	20.3028	20.0333	19.2814	18.2762	17.4156	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4846	17.9294	18.5021	19.2127	19.7840	20.1743	20.3248	20.3028	20.0333	19.2814	18.2762	17.4156	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8940	0.8511	0.7996	0.7160	0.6086	0.4733	0.3533	0.3882	0.5622	0.7484	0.8570	0.9038	(94)
Useful gains	646.8557	754.0879	800.4387	803.8381	724.9846	558.2342	400.0061	411.1002	554.7760	639.0870	630.6514	616.0723	(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	1578.3237	1555.6281	1429.2552	1213.0710	948.7119	647.1238	432.4102	452.1587	691.6986	1018.8218	1317.7574	1565.8316	(97)
Space heating kWh	693.0122	538.6350	467.8395	294.6477	166.4531	0.0000	0.0000	0.0000	0.0000	282.5227	494.7163	706.6209	(98a)
Space heating requirement - total per year (kWh/year)												3644.4475	
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	693.0122	538.6350	467.8395	294.6477	166.4531	0.0000	0.0000	0.0000	0.0000	282.5227	494.7163	706.6209	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3644.4475	
Space heating per m2											(98c) / (4) =	34.3816	(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	1091.2462	859.0662	880.5008	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7544	0.8120	0.7867	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	823.2617	697.5885	692.6779	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1321.5038	1268.9770	1186.1390	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	358.7343	425.1130	367.1350	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	89.6836	106.2783	91.7838	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												287.7456	(107)
Energy for space heating												34.3816	(99)
Energy for space cooling												2.7146	(108)
Total												37.0962	(109)
Fabric Energy Efficiency (DFEE)												37.1	(109)

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

1. Overall dwelling characteristics

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

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	4 * 10 =	40.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.1606	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.4106	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3490	(21)

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

Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate													
	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101	(22b)

If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a) 0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) = 0.0000 (23c)

Effective ac	0.5990	0.5952	0.5914	0.5737	0.5704	0.5550	0.5550	0.5521	0.5609	0.5704	0.5771	0.5841	(25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
Main dwelling								
TER Opaque door			1.9500	1.0000	1.9500			(26)
TER Opening Type			19.5200	1.1450	22.3511			(27)
Heatloss Floor 1			53.0000	0.1300	6.8900			(28a)
External Wall 1	141.0000	21.4700	119.5300	0.1800	21.5154			(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) =	58.5365			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.2903 (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) = 69.2262 (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	118.4656	118.1496	117.8398	116.3850	116.1128	114.8456	114.8456	114.6110	115.3337	116.1128	116.6634	117.2391	(39)

Average = Sum(39)m / 12 = 116.3836

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1176	1.1146	1.1117	1.0980	1.0954	1.0834	1.0834	1.0812	1.0881	1.0954	1.1006	1.1060	(40)
HLP (average)												1.0980	
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	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	136.3843	150.9969	136.3843	140.9304	136.3843	140.9304	136.3843	136.3843	140.9304	136.3843	140.9304	136.3843	(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													
	519.3887	535.4360	511.8349	497.7880	472.0640	456.4887	438.9563	437.7425	450.9710	464.0441	490.9360	507.2404	(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)
South	8.6400	46.7521	0.6300	0.7000	0.7700	123.4487	(78)
West	3.7800	19.6403	0.6300	0.7000	0.7700	22.6888	(80)

Solar gains	169.2103	290.6546	405.5575	518.0268	596.0854	599.1976	574.5682	514.9006	444.1250	323.2199	203.0824	144.5638	(83)
Total gains	688.5990	826.0906	917.3924	1015.8148	1068.1494	1055.6863	1013.5246	952.6431	895.0960	787.2640	694.0184	651.8042	(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	18.2162	18.2649	18.3129	18.5418	18.5853	18.7904	18.7904	18.8288	18.7109	18.5853	18.4976	18.4068	
alpha	2.2144	2.2177	2.2209	2.2361	2.2390	2.2527	2.2527	2.2553	2.2474	2.2390	2.2332	2.2271	
util living area													
	0.9348	0.9045	0.8655	0.7943	0.6950	0.5610	0.4404	0.4772	0.6505	0.8219	0.9081	0.9413	(86)
MIT	17.8994	18.3134	18.8698	19.5913	20.2087	20.6636	20.8611	20.8288	20.4977	19.6856	18.6804	17.8344	(87)
Th 2	19.9865	19.9889	19.9913	20.0025	20.0046	20.0144	20.0144	20.0162	20.0106	20.0046	20.0003	19.9959	(88)
util rest of house													
	0.9271	0.8936	0.8497	0.7692	0.6552	0.4996	0.3576	0.3948	0.5939	0.7947	0.8958	0.9344	(89)
MIT 2	17.1526	17.5592	18.1042	18.8060	19.3846	19.7918	19.9445	19.9256	19.6575	18.9111	17.9336	17.0946	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	17.4555	17.8652	18.4148	19.1245	19.7189	20.1455	20.3163	20.2920	19.9983	19.2253	18.2366	17.3947	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4555	17.8652	18.4148	19.1245	19.7189	20.1455	20.3163	20.2920	19.9983	19.2253	18.2366	17.3947	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9014	0.8642	0.8195	0.7436	0.6426	0.5083	0.3841	0.4191	0.5931	0.7695	0.8677	0.9100	(94)
Useful gains	620.7043	713.9482	751.7614	755.3993	686.4254	536.5563	389.3396	399.2578	530.8908	605.8024	602.2293	593.1735	(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													
	1558.4770	1531.8280	1404.0336	1189.9836	931.0977	636.8708	426.7997	446.0656	680.2762	1001.5065	1299.2316	1546.9350	(97)
Space heating kWh													
	697.7029	549.6152	485.2905	312.9007	182.0362	0.0000	0.0000	0.0000	0.0000	294.4039	501.8416	709.5986	(98a)
Space heating requirement - total per year (kWh/year)												3733.3895	
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													
	697.7029	549.6152	485.2905	312.9007	182.0362	0.0000	0.0000	0.0000	0.0000	294.4039	501.8416	709.5986	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3733.3895	
Space heating per m2											(98c) / (4) =	35.2207	(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	1079.5488	849.8576	871.0433	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7219	0.7841	0.7581	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	779.3315	666.3861	660.3692	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1176.9849	1130.3984	1061.9514	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	286.3104	345.2252	298.7772	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	71.5776	86.3063	74.6943	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												232.5782	(107)
Energy for space heating												35.2207	(99)
Energy for space cooling												2.1941	(108)
Total												37.4148	(109)
Fabric Energy Efficiency (TFEE)												37.4	(109)

Full SAP Calculation Printout

Plot Reference	Plot 3	**Issued on Date**	22/10/2026
Assessment Reference	00003 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**	1.96	**TER**	10.40
Environmental	98 A	**% DER < TER**			81.15
CO_2 Emissions (t/year)	0.17	**DFEE**	37.10	**TFEE**	37.41
Compliance Check	See BREL	**% DFEE < TFEE**			0.85
% DPER < TPER	60.80	**DPER**	21.25	**TPER**	54.21

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

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			19.5200	1.1450	22.3511			(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	21.4700	119.5300	0.1500	17.9295	9.0000	1075.7700	(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) =		50.7106			(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) =	7768.7700 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		73.2903 (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) =	70.4706 (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													
	119.7100	119.3940	119.0842	117.6294	117.3572	116.0900	116.0900	115.8554	116.5781	117.3572	117.9078	118.4835	(39)
Average = Sum(39)m / 12 =												117.6280	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1293	1.1264	1.1234	1.1097	1.1071	1.0952	1.0952	1.0930	1.0998	1.1071	1.1123	1.1178	(40)
HLP (average)												1.1097	
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	-20.6462	-41.9689	-79.2229	-113.8379	-146.3188	-145.5937	-144.7079	-124.7510	-95.2716	-58.9455	-27.2950	-16.4630	(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													
	227.4531	177.3400	153.6972	91.0056	52.2426	33.3384	31.9822	59.0041	90.5365	148.2164	192.9176	228.9524	(64)
										Total per year (kWh/year) = Sum(64)m =		1486.6860	(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)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	105.8897	94.0527	100.8426	90.7524	89.4184	82.1369	82.1461	84.4953	84.4232	92.2780	95.8626	104.9973	(65)

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

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	139.4281	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	136.3843	150.9969	136.3843	140.9304	136.3843	140.9304	136.3843	136.3843	140.9304	136.3843	140.9304	136.3843	(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													
	609.2164	624.2205	598.2423	578.5022	549.4272	530.3195	510.3833	510.7838	525.9628	542.9819	575.3108	596.2945	(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)
South	8.6400	46.7521	0.7600	0.7000	0.7700	148.9222	(78)
West	3.7800	19.6403	0.7600	0.7000	0.7700	27.3706	(80)

Solar gains	204.1267	350.6310	489.2440	624.9212	719.0871	722.8415	693.1299	621.1499	535.7698	389.9161	244.9882	174.3945	(83)
Total gains	813.3431	974.8514	1087.4863	1203.4235	1268.5143	1253.1610	1203.5132	1131.9337	1061.7327	932.8980	820.2991	770.6890	(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	18.0268	18.0745	18.1216	18.3457	18.3882	18.5890	18.5890	18.6266	18.5111	18.3882	18.3024	18.2134	
alpha	2.2018	2.2050	2.2081	2.2230	2.2259	2.2393	2.2393	2.2418	2.2341	2.2259	2.2202	2.2142	
util living area													
	0.9132	0.8756	0.8275	0.7453	0.6368	0.5011	0.3862	0.4204	0.5909	0.7765	0.8796	0.9213	(86)

Living	18.0955	18.5264	19.0838	19.7732	20.3381	20.7304	20.8921	20.8660	20.5857	19.8424	18.8641	18.0255	
Non living	16.5954	17.1329	17.8259	18.6730	19.3409	19.7808	19.9370	19.9181	19.6356	18.7772	17.5711	16.5118	
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	19.5142	18.5264	19.0838	19.7732	20.3381	20.7304	20.8921	20.8660	20.5857	19.8424	18.8641	18.4416	(87)
Th 2	19.9769	19.9794	19.9817	19.9929	19.9950	20.0048	20.0048	20.0066	20.0010	19.9950	19.9908	19.9863	(88)
util rest of house													
	0.9035	0.8622	0.8087	0.7171	0.5950	0.4413	0.3097	0.3432	0.5332	0.7454	0.8643	0.9124	(89)
MIT 2	18.6266	17.1329	17.8259	18.6730	19.3409	19.7808	19.9370	19.9181	19.6356	18.7772	17.5711	17.1372	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	18.9866	17.6982	18.3362	19.1193	19.7454	20.1660	20.3244	20.3027	20.0210	19.2093	18.0956	17.6663	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.9866	17.6982	18.3362	19.1193	19.7454	20.1660	20.3244	20.3027	20.0210	19.2093	18.0956	17.6663	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8924	0.8239	0.7719	0.6894	0.5838	0.4514	0.3351	0.3671	0.5345	0.7170	0.8276	0.8858	(94)
Useful gains	725.8643	803.1990	839.4179	829.5832	740.4970	565.7341	403.3275	415.5721	567.4654	668.9336	678.8561	682.6598	(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													
	1758.1364	1528.0228	1409.5043	1202.0921	944.1866	646.1607	432.3697	452.1434	690.2616	1010.3668	1296.4690	1595.5376	(97)
Space heating kWh													
	768.0105	487.0816	424.1443	268.2064	151.5451	0.0000	0.0000	0.0000	0.0000	254.0263	444.6814	679.1811	(98a)
Space heating requirement - total per year (kWh/year)												3476.8766	
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													
	768.0105	487.0816	424.1443	268.2064	151.5451	0.0000	0.0000	0.0000	0.0000	254.0263	444.6814	679.1811	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3476.8766	
Space heating per m2											(98c) / (4) =	32.8007	(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													
	768.0105	487.0816	424.1443	268.2064	151.5451	0.0000	0.0000	0.0000	0.0000	254.0263	444.6814	679.1811	(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)													
	336.7064	213.5433	185.9507	117.5854	66.4395	0.0000	0.0000	0.0000	0.0000	111.3686	194.9544	297.7624	(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													
	227.4531	177.3400	153.6972	91.0056	52.2426	33.3384	31.9822	59.0041	90.5365	148.2164	192.9176	228.9524	(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													
	139.0130	108.3853	93.9355	55.6201	31.9292	20.3755	19.5466	36.0617	55.3334	90.5857	117.9059	139.9293	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.8151	18.3031	16.4799	12.0739	9.3262	7.6196	8.5077	11.0586	14.3640	18.8464	21.2870	23.4492	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-60.8261	-84.6070	-118.9154	-126.9484	-127.6674	-105.4940	-104.0505	-102.2571	-95.9068	-92.8621	-65.6871	-52.2576	(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	-0.1789	-4.0726	-12.1969	-26.0521	-44.3401	-57.7019	-57.4884	-47.5716	-34.1143	-11.4144	-2.5833	-0.3723	(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												1524.3107	(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												908.6212	(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)												184.1307	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1435.5664	(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												1181.4962	(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	1524.3107	0.1550	236.2048	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	908.6212	0.1484	134.8775	(264)
Space and water heating			371.0822	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	184.1307	0.1443	26.5757	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1137.4796	0.1363	-155.0798	
PV Unit electricity exported	-298.0868	0.1151	-34.3163	
Total			-189.3962	(269)
Total CO2, kg/year			208.2618	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			1.9600	(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	1524.3107	1.5736	2398.6983	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	908.6212	1.5492	1407.6649	(278)
Space and water heating			3806.3632	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	184.1307	1.5338	282.4258	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1137.4796	1.5040	-1710.7668	
PV Unit electricity exported	-298.0868	0.4219	-125.7495	
Total			-1836.5163	(283)
Total Primary energy kWh/year			2252.2727	(286)
Dwelling Primary energy Rate (DPER)			21.2500	(287)

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

1. Overall dwelling characteristics

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

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	4 * 10 =	40.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.1606 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.4106 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3490 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.4450	0.4362	0.4275	0.3839	0.3752	0.3315	0.3315	0.3228	0.3490	0.3752	0.3926	0.4101	(22b)
Effective ac	0.5990	0.5952	0.5914	0.5737	0.5704	0.5550	0.5550	0.5521	0.5609	0.5704	0.5771	0.5841	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			1.9500	1.0000	1.9500			(26)

TER Opening Type			19.5200	1.1450	22.3511	(27)
Heatloss Floor 1			53.0000	0.1300	6.8900	(28a)
External Wall 1	141.0000	21.4700	119.5300	0.1800	21.5154	(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) =		58.5365	(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 73.2903 (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) =		69.2262	(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	118.4656	118.1496	117.8398	116.3850	116.1128	114.8456	114.8456	114.6110	115.3337	116.1128	116.6634	117.2391	(39)
Average = Sum(39)m / 12 =												116.3836	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1176	1.1146	1.1117	1.0980	1.0954	1.0834	1.0834	1.0812	1.0881	1.0954	1.1006	1.1060	(40)
HLP (average)												1.0980	
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	136.3843	150.9969	136.3843	140.9304	136.3843	140.9304	136.3843	136.3843	140.9304	136.3843	140.9304	136.3843	(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	614.0446	629.0486	603.0704	583.3304	554.2554	532.1476	512.2115	512.6120	527.7910	547.8101	580.1390	601.1226	(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)
South	8.6400	46.7521	0.6300	0.7000	0.7700	123.4487	(78)
West	3.7800	19.6403	0.6300	0.7000	0.7700	22.6888	(80)

Solar gains	169.2103	290.6546	405.5575	518.0268	596.0854	599.1976	574.5682	514.9006	444.1250	323.2199	203.0824	144.5638	(83)
Total gains	783.2549	919.7032	1008.6280	1101.3572	1150.3408	1131.3452	1086.7797	1027.5126	971.9160	871.0300	783.2213	745.6865	(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	18.2162	18.2649	18.3129	18.5418	18.5853	18.7904	18.7904	18.8288	18.7109	18.5853	18.4976	18.4068	
alpha	2.2144	2.2177	2.2209	2.2361	2.2390	2.2527	2.2527	2.2553	2.2474	2.2390	2.2332	2.2271	
util living area	0.9182	0.8859	0.8444	0.7707	0.6691	0.5354	0.4166	0.4505	0.6206	0.7946	0.8875	0.9253	(86)
MIT	18.0748	18.4706	19.0043	19.6897	20.2728	20.6954	20.8762	20.8483	20.5468	19.7913	18.8322	18.0128	(87)
Th 2	19.9865	19.9889	19.9913	20.0025	20.0046	20.0144	20.0144	20.0162	20.0106	20.0046	20.0003	19.9959	(88)
util rest of house	0.9089	0.8734	0.8270	0.7441	0.6284	0.4746	0.3367	0.3706	0.5634	0.7651	0.8731	0.9168	(89)
MIT 2	16.5738	17.0692	17.7357	18.5833	19.2790	19.7580	19.9353	19.9144	19.6061	18.7251	17.5373	16.5003	(90)
Living area fraction									fLA = Living area / (4) =			0.4057	(91)
MIT	17.1827	17.6377	18.2503	19.0321	19.6821	20.1383	20.3170	20.2932	19.9877	19.1576	18.0626	17.1138	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.1827	17.6377	18.2503	19.0321	19.6821	20.1383	20.3170	20.2932	19.9877	19.1576	18.0626	17.1138	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8741	0.8359	0.7899	0.7142	0.6139	0.4827	0.3623	0.3942	0.5620	0.7354	0.8369	0.8833	(94)
Useful gains	684.6610	768.7600	796.7525	786.6308	706.2492	546.1388	393.7115	405.0015	546.1761	640.5630	655.5078	658.6775	(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	1526.1550	1504.9534	1384.6549	1179.2233	926.8279	636.0441	426.8791	446.2034	679.0487	993.6498	1278.9340	1514.0064	(97)
Space heating kWh	626.0715	494.7219	437.3994	282.6666	164.1106	0.0000	0.0000	0.0000	0.0000	262.6966	448.8669	636.3647	(98a)
Space heating requirement - total per year (kWh/year)												3352.8982	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	626.0715	494.7219	437.3994	282.6666	164.1106	0.0000	0.0000	0.0000	0.0000	262.6966	448.8669	636.3647	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3352.8982	
Space heating per m2											(98c) / (4) =	31.6311	(99)

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

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	92.3000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	626.0715	494.7219	437.3994	282.6666	164.1106	0.0000	0.0000	0.0000	0.0000	262.6966	448.8669	636.3647	(98)
Space heating efficiency (main heating system 1)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000	(210)
Space heating fuel (main heating system)	678.3007	535.9934	473.8888	306.2477	177.8013	0.0000	0.0000	0.0000	0.0000	284.6117	486.3130	689.4526	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	249.7995	220.8446	234.6203	206.4888	200.2616	180.5775	178.3903	185.4553	187.4535	208.8620	221.8579	247.1155	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.0327	85.8130	85.4359	84.7644	83.6169	79.8000	79.8000	79.8000	79.8000	84.5752	85.6064	86.0844	(217)
Fuel for water heating, kWh/month	290.3541	257.3555	274.6155	243.6031	239.4988	226.2876	223.5467	232.4001	234.9042	246.9543	259.1604	287.0620	(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	28.3380	22.7338	20.4692	14.9966	11.5838	9.4641	10.5672	13.7356	17.8412	23.4086	26.4400	29.1256	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-48.1918	-67.2388	-95.6500	-106.3736	-113.6886	-105.7020	-104.3311	-98.9462	-89.3535	-76.2674	-52.7051	-41.7422	(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	-29.4106	-61.6066	-121.9887	-182.5840	-240.8467	-241.8366	-239.0499	-202.7182	-148.9655	-87.9624	-39.2157	-23.2825	(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												3632.6091	(211)

Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	79.8000	
Water heating fuel used	3015.7422	(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)	228.7036	(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	4343.3971	(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	3632.6091	0.2100	762.8479	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3015.7422	0.2100	633.3059	(264)
Space and water heating			1396.1538	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	228.7036	0.1443	33.0090	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1000.1904	0.1348	-134.8492	
PV Unit electricity exported	-1619.4674	0.1260	-204.0415	
Total			-338.8907	(269)
Total CO2, kg/year			1102.2013	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.4000	(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	3632.6091	1.1300	4104.8483	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3015.7422	1.1300	3407.7886	(278)
Space and water heating			7512.6369	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	228.7036	1.5338	350.7932	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1000.1904	1.4983	-1498.5834	
PV Unit electricity exported	-1619.4674	0.4625	-748.9791	
Total			-2247.5625	(283)
Total Primary energy kWh/year			5745.9684	(286)
Target Primary Energy Rate (TPER)			54.2100	(287)

Full SAP Calculation Printout

Plot Reference	Plot 3	**Issued on Date**	22/10/2026
Assessment Reference	00003 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**	1.96	**TER**	10.40
Environmental	98 A	**% DER < TER**			81.15
CO_2 Emissions (t/year)	0.17	**DFEE**	37.10	**TFEE**	37.41
Compliance Check	See BREL	**% DFEE < TFEE**			0.85
% DPER < TPER	60.80	**DPER**	21.25	**TPER**	54.21

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			19.5200	1.1450	22.3511			(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	21.4700	119.5300	0.1500	17.9295	9.0000	1075.7700	(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) =		50.7106			(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) =		7768.7700	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							73.2903	(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) =		70.4706	(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													
	119.7100	119.3940	119.0842	117.6294	117.3572	116.0900	116.0900	115.8554	116.5781	117.3572	117.9078	118.4835	(39)
Average = Sum(39)m / 12 =												117.6280	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1293	1.1264	1.1234	1.1097	1.1071	1.0952	1.0952	1.0930	1.0998	1.1071	1.1123	1.1178	(40)
HLP (average)												1.1097	
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	-20.6462	-41.9689	-79.2229	-113.8379	-146.3188	-145.5937	-144.7079	-124.7510	-95.2716	-58.9455	-27.2950	-16.4630	(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													
	227.4531	177.3400	153.6972	91.0056	52.2426	33.3384	31.9822	59.0041	90.5365	148.2164	192.9176	228.9524	(64)
										Total per year (kWh/year) = Sum(64)m =		1486.6860	(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													
	26.0656	23.1512	18.8279	14.2539	10.6550	8.9954	9.7198	12.6342	16.9576	21.5315	25.1305	26.7900	(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													
	675.2172	674.0521	654.9414	618.7965	581.4732	547.5171	527.0778	529.0348	547.4129	580.8367	621.4140	657.2459	(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)
South	8.6400	46.7521	0.7600	0.7000	0.7700	148.9222	(78)
West	3.7800	19.6403	0.7600	0.7000	0.7700	27.3706	(80)

Solar gains	204.1267	350.6310	489.2440	624.9212	719.0871	722.8415	693.1299	621.1499	535.7698	389.9161	244.9882	174.3945	(83)
Total gains	879.3439	1024.6831	1144.1854	1243.7178	1300.5603	1270.3587	1220.2078	1150.1847	1083.1827	970.7528	866.4023	831.6404	(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	18.0268	18.0745	18.1216	18.3457	18.3882	18.5890	18.5890	18.6266	18.5111	18.3882	18.3024	18.2134	
alpha	2.2018	2.2050	2.2081	2.2230	2.2259	2.2393	2.2393	2.2418	2.2341	2.2259	2.2202	2.2142	
util living area													
	0.9010	0.8655	0.8145	0.7348	0.6277	0.4962	0.3818	0.4150	0.5835	0.7646	0.8687	0.9103	(86)
Living	18.2101	18.6034	19.1581	19.8127	20.3582	20.7359	20.8946	20.8696	20.5967	19.8840	18.9364	18.1346	

Non living	16.7374	17.2271	17.9148	18.7184	19.3622	19.7857	19.9387	19.9206	19.6461	18.8246	17.6591	16.6475	
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	19.5728	18.6034	19.1581	19.8127	20.3582	20.7359	20.8946	20.8696	20.5967	19.8840	18.9364	18.5354	(87)
Th 2	19.9769	19.9794	19.9817	19.9929	19.9950	20.0048	20.0048	20.0066	20.0010	19.9950	19.9908	19.9863	(88)
util rest of house	0.8902	0.8512	0.7948	0.7061	0.5858	0.4366	0.3059	0.3385	0.5259	0.7327	0.8524	0.9003	(89)
MIT 2	18.6833	17.2271	17.9148	18.7184	19.3622	19.7857	19.9387	19.9206	19.6461	18.8246	17.6591	17.2485	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.0441	17.7854	18.4192	19.1623	19.7663	20.1712	20.3265	20.3056	20.0317	19.2544	18.1773	17.7706	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0441	17.7854	18.4192	19.1623	19.7663	20.1712	20.3265	20.3056	20.0317	19.2544	18.1773	17.7706	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8788	0.8128	0.7587	0.6794	0.5755	0.4470	0.3313	0.3624	0.5278	0.7055	0.8154	0.8725	(94)
Useful gains	772.7317	832.8608	868.0465	844.9578	748.4834	567.8859	404.2331	416.8490	571.6953	684.8242	706.5040	725.6443	(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	1765.0166	1538.4346	1419.3849	1207.1460	946.6323	646.7593	432.6060	452.4812	691.5058	1015.6532	1306.0994	1607.8881	(97)
Space heating kWh	738.2600	474.1455	410.1957	260.7756	147.4228	0.0000	0.0000	0.0000	0.0000	246.1367	431.7087	656.3893	(98a)
Space heating requirement - total per year (kWh/year)												3365.0344	
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	738.2600	474.1455	410.1957	260.7756	147.4228	0.0000	0.0000	0.0000	0.0000	246.1367	431.7087	656.3893	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3365.0344	
Space heating per m2											(98c) / (4) =	31.7456	(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	738.2600	474.1455	410.1957	260.7756	147.4228	0.0000	0.0000	0.0000	0.0000	246.1367	431.7087	656.3893	(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)	323.6634	207.8720	179.8355	114.3276	64.6322	0.0000	0.0000	0.0000	0.0000	107.9098	189.2671	287.7702	(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	227.4531	177.3400	153.6972	91.0056	52.2426	33.3384	31.9822	59.0041	90.5365	148.2164	192.9176	228.9524	(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	139.0130	108.3853	93.9355	55.6201	31.9292	20.3755	19.5466	36.0617	55.3334	90.5857	117.9059	139.9293	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.8151	18.3031	16.4799	12.0739	9.3262	7.6196	8.5077	11.0586	14.3640	18.8464	21.2870	23.4492	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-60.6634	-84.4220	-118.5377	-126.5908	-127.3672	-105.4940	-104.0505	-102.2571	-95.9068	-92.6553	-65.5583	-52.1496	(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	-0.3415	-4.2576	-12.5746	-26.4098	-44.6403	-57.7019	-57.4884	-47.5716	-34.1143	-11.6212	-2.7120	-0.4803	(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												1475.2776	(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												908.6212	(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)												184.1307	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1435.5664	(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												1132.4631	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1475.2776	16.4900	243.2733	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	908.6212	16.4900	149.8316	(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	184.1307	16.4900	30.3631	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1135.6529	16.4900	-187.2692	
PV Unit electricity exported	-299.9135	5.5900	-16.7652	
Total			-204.0343	(252)
Total energy cost			219.4337	(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] =	0.5232 (257)
SAP value		91.5197
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	1475.2776	0.1549	228.5734	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	908.6212	0.1484	134.8775	(264)
Space and water heating			363.4508	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	184.1307	0.1443	26.5757	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1135.6529	0.1363	-154.8100	
PV Unit electricity exported	-299.9135	0.1154	-34.6145	
Total			-189.4245	(269)
Total CO2, kg/year			200.6021	(272)
CO2 emissions per m2			1.8900	(273)
EI value			98.2198	
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)

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			19.5200	1.1450	22.3511			(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	21.4700	119.5300	0.1500	17.9295	9.0000	1075.7700	(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) =	50.7106			(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) =	7768.7700 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		73.2903 (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) =	70.4706 (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	119.3940	118.7807	118.7807	117.6294	117.3572	116.3309	116.3309	116.0900	116.3309	117.3572	117.3572	118.1925	(39)
Average = Sum(39)m / 12 =												117.4943	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1264	1.1206	1.1206	1.1097	1.1071	1.0975	1.0975	1.0952	1.0975	1.1071	1.1071	1.1150	(40)
HLP (average)												1.1084	
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	-26.0385	-44.8191	-84.1359	-124.5979	-146.4645	-165.0856	-156.1121	-138.3068	-107.3760	-65.2808	-33.6354	-19.8247	(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	222.0608	174.4899	148.7842	80.2456	52.0969	13.8466	20.5780	45.4483	78.4321	141.8810	186.5771	225.5907	(64)
										Total per year (kWh/year) = Sum(64)m =		1390.0312	(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	26.0656	23.1512	18.8279	14.2539	10.6550	8.9954	9.7198	12.6342	16.9576	21.5315	25.1305	26.7900	(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	675.2172	674.0521	654.9414	618.7965	581.4732	547.5171	527.0778	529.0348	547.4129	580.8367	621.4140	657.2459	(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)
South	8.6400	53.8987	0.7600	0.7000	0.7700	171.6869	(78)
West	3.7800	23.7652	0.7600	0.7000	0.7700	33.1191	(80)

Solar gains	238.1411	363.9820	507.5752	666.9707	719.9809	797.7013	735.7172	671.1430	582.8560	416.3280	281.5950	196.7549	(83)
Total gains	913.3583	1038.0341	1162.5165	1285.7672	1301.4541	1345.2184	1262.7951	1200.1779	1130.2689	997.1647	903.0090	854.0008	(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	18.0745	18.1679	18.1679	18.3457	18.3882	18.5505	18.5505	18.5890	18.5505	18.3882	18.3882	18.2583	
alpha	2.2050	2.2112	2.2112	2.2230	2.2259	2.2367	2.2367	2.2393	2.2367	2.2259	2.2259	2.2172	
util living area	0.8902	0.8582	0.8043	0.7185	0.6155	0.4535	0.3644	0.3871	0.5564	0.7441	0.8513	0.9021	(86)
Living	18.3773	18.7124	19.2559	19.8906	20.4046	20.7940	20.9061	20.8916	20.6472	19.9929	19.1243	18.2838	
Non living	16.9480	17.3653	18.0362	18.8098	19.4152	19.8398	19.9456	19.9366	19.6987	18.9536	17.8939	16.8362	
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	19.6583	18.7124	19.2559	19.8906	20.4046	20.7940	20.9061	20.8916	20.6472	19.9929	19.1243	18.6637	(87)
Th 2	19.9794	19.9841	19.9841	19.9929	19.9950	20.0029	20.0029	20.0048	20.0029	19.9950	19.9950	19.9886	(88)
util rest of house	0.8781	0.8432	0.7835	0.6885	0.5720	0.3923	0.2892	0.3105	0.4974	0.7094	0.8329	0.8912	(89)
MIT 2	18.7689	17.3653	18.0362	18.8098	19.4152	19.8398	19.9456	19.9366	19.6987	18.9536	17.8939	17.4037	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.1297	17.9118	18.5310	19.2483	19.8166	20.2269	20.3352	20.3240	20.0835	19.3752	18.3930	17.9148	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1297	17.9118	18.5310	19.2483	19.8166	20.2269	20.3352	20.3240	20.0835	19.3752	18.3930	17.9148	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8666	0.8050	0.7483	0.6638	0.5637	0.4066	0.3150	0.3359	0.5024	0.6850	0.7965	0.8629	(94)
Useful gains	791.5139	835.6088	869.9479	853.4411	733.5797	546.9625	397.8166	403.1430	567.8893	683.0758	719.2698	736.8994	(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	1722.8239	1509.9164	1393.4199	1193.7332	917.3326	608.0507	422.8914	432.3215	672.7979	982.8890	1266.6397	1573.7140	(97)
Space heating kWh	692.8946	453.1347	389.4632	245.0104	136.7122	0.0000	0.0000	0.0000	0.0000	223.0611	394.1063	622.5901	(98a)
Space heating requirement - total per year (kWh/year)												3156.9724	
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	692.8946	453.1347	389.4632	245.0104	136.7122	0.0000	0.0000	0.0000	0.0000	223.0611	394.1063	622.5901	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3156.9724	
Space heating per m2											(98c) / (4) =	29.7828	(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	692.8946	453.1347	389.4632	245.0104	136.7122	0.0000	0.0000	0.0000	0.0000	223.0611	394.1063	622.5901	(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)	303.7746	198.6605	170.7460	107.4159	59.9365	0.0000	0.0000	0.0000	0.0000	97.7930	172.7817	272.9521	(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	222.0608	174.4899	148.7842	80.2456	52.0969	13.8466	20.5780	45.4483	78.4321	141.8810	186.5771	225.5907	(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	135.7174	106.6434	90.9328	49.0439	31.8402	8.4626	12.5767	27.7767	47.9355	86.7137	114.0308	137.8748	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.8151	18.3031	16.4799	12.0739	9.3262	7.6196	8.5077	11.0586	14.3640	18.8464	21.2870	23.4492	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-69.1501	-87.1321	-121.3914	-130.1432	-126.6136	-106.8087	-104.9182	-104.2913	-99.4109	-96.6107	-73.1532	-57.9890	(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	-0.9071	-4.9836	-14.2362	-30.6251	-45.4865	-67.7655	-63.3349	-54.1350	-39.4327	-13.8749	-4.0237	-0.8578	(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	1384.0603	(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	849.5485	(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)	184.1307	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1517.2754	(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	900.4641	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1384.0603	26.0000	359.8557	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	849.5485	26.0000	220.8826	(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	184.1307	26.0000	47.8740	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1177.6123	26.0000	-306.1792	
PV Unit electricity exported	-339.6631	5.8100	-19.7344	
Total			-325.9136	(252)
Total energy cost			302.6986	(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	1384.0603	0.1550	214.5783	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	849.5485	0.1497	127.1697	(264)
Space and water heating			341.7480	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	184.1307	0.1443	26.5757	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1177.6123	0.1367	-161.0181	
PV Unit electricity exported	-339.6631	0.1157	-39.3153	
Total			-200.3333	(269)
Total CO2, kg/year			167.9904	(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	1384.0603	1.5739	2178.4045	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	849.5485	1.5539	1320.1317	(278)
Space and water heating			3498.5362	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	184.1307	1.5338	282.4258	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1177.6123	1.5055	-1772.8606	
PV Unit electricity exported	-339.6631	0.4242	-144.0729	
Total			-1916.9335	(283)
Total Primary energy kWh/year			1864.0285	(286)

SAP 10 EPC IMPROVEMENTS

00003 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 (68.9%)

	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	£629	£629	£0
Space heating	£360	£360	£0
Water heating	£221	£221	£0
Lighting	£48	£48	£0
Generated (PV)	-£326	-£326	£0
Total cost of fuels	£303	£303	£0
Total cost of uses	£303	£303	£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	18 kWh/m²	18 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			19.5200	1.1450	22.3511			(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	21.4700	119.5300	0.1500	17.9295	9.0000	1075.7700	(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) =		50.7106			(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) =		7768.7700 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K				73.2903 (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) =		70.4706 (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	119.7100	119.3940	119.0842	117.6294	117.3572	116.0900	116.0900	115.8554	116.5781	117.3572	117.9078	118.4835	(39)
Average = Sum(39)m / 12 =												117.6280	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1293	1.1264	1.1234	1.1097	1.1071	1.0952	1.0952	1.0930	1.0998	1.1071	1.1123	1.1178	(40)
HLP (average)												1.1097	
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	-20.6462	-41.9689	-79.2229	-113.8379	-146.3188	-145.5937	-144.7079	-124.7510	-95.2716	-58.9455	-27.2950	-16.4630	(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	227.4531	177.3400	153.6972	91.0056	52.2426	33.3384	31.9822	59.0041	90.5365	148.2164	192.9176	228.9524	(64)
									Total per year (kWh/year) = Sum(64)m =			1486.6860	(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	26.0656	23.1512	18.8279	14.2539	10.6550	8.9954	9.7198	12.6342	16.9576	21.5315	25.1305	26.7900	(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	675.2172	674.0521	654.9414	618.7965	581.4732	547.5171	527.0778	529.0348	547.4129	580.8367	621.4140	657.2459	(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)
South	8.6400	46.7521	0.7600	0.7000	0.7700	148.9222	(78)
West	3.7800	19.6403	0.7600	0.7000	0.7700	27.3706	(80)

Solar gains	204.1267	350.6310	489.2440	624.9212	719.0871	722.8415	693.1299	621.1499	535.7698	389.9161	244.9882	174.3945	(83)
Total gains	879.3439	1024.6831	1144.1854	1243.7178	1300.5603	1270.3587	1220.2078	1150.1847	1083.1827	970.7528	866.4023	831.6404	(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	18.0268	18.0745	18.1216	18.3457	18.3882	18.5890	18.5890	18.6266	18.5111	18.3882	18.3024	18.2134	
alpha	2.2018	2.2050	2.2081	2.2230	2.2259	2.2393	2.2393	2.2418	2.2341	2.2259	2.2202	2.2142	
util living area	0.9010	0.8655	0.8145	0.7348	0.6277	0.4962	0.3818	0.4150	0.5835	0.7646	0.8687	0.9103	(86)
Living	18.2101	18.6034	19.1581	19.8127	20.3582	20.7359	20.8946	20.8696	20.5967	19.8840	18.9364	18.1346	
Non living	16.7374	17.2271	17.9148	18.7184	19.3622	19.7857	19.9387	19.9206	19.6461	18.8246	17.6591	16.6475	
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	19.5728	18.6034	19.1581	19.8127	20.3582	20.7359	20.8946	20.8696	20.5967	19.8840	18.9364	18.5354	(87)
Th 2	19.9769	19.9794	19.9817	19.9929	19.9950	20.0048	20.0048	20.0066	20.0010	19.9950	19.9908	19.9863	(88)
util rest of house	0.8902	0.8512	0.7948	0.7061	0.5858	0.4366	0.3059	0.3385	0.5259	0.7327	0.8524	0.9003	(89)
MIT 2	18.6833	17.2271	17.9148	18.7184	19.3622	19.7857	19.9387	19.9206	19.6461	18.8246	17.6591	17.2485	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.0441	17.7854	18.4192	19.1623	19.7663	20.1712	20.3265	20.3056	20.0317	19.2544	18.1773	17.7706	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0441	17.7854	18.4192	19.1623	19.7663	20.1712	20.3265	20.3056	20.0317	19.2544	18.1773	17.7706	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8788	0.8128	0.7587	0.6794	0.5755	0.4470	0.3313	0.3624	0.5278	0.7055	0.8154	0.8725	(94)
Useful gains	772.7317	832.8608	868.0465	844.9578	748.4834	567.8859	404.2331	416.8490	571.6953	684.8242	706.5040	725.6443	(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	1765.0166	1538.4346	1419.3849	1207.1460	946.6323	646.7593	432.6060	452.4812	691.5058	1015.6532	1306.0994	1607.8881	(97)
Space heating kWh	738.2600	474.1455	410.1957	260.7756	147.4228	0.0000	0.0000	0.0000	0.0000	246.1367	431.7087	656.3893	(98a)
Space heating requirement - total per year (kWh/year)												3365.0344	
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	738.2600	474.1455	410.1957	260.7756	147.4228	0.0000	0.0000	0.0000	0.0000	246.1367	431.7087	656.3893	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3365.0344	
Space heating per m2											(98c) / (4) =	31.7456	(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	738.2600	474.1455	410.1957	260.7756	147.4228	0.0000	0.0000	0.0000	0.0000	246.1367	431.7087	656.3893	(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)	323.6634	207.8720	179.8355	114.3276	64.6322	0.0000	0.0000	0.0000	0.0000	107.9098	189.2671	287.7702	(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	227.4531	177.3400	153.6972	91.0056	52.2426	33.3384	31.9822	59.0041	90.5365	148.2164	192.9176	228.9524	(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	139.0130	108.3853	93.9355	55.6201	31.9292	20.3755	19.5466	36.0617	55.3334	90.5857	117.9059	139.9293	(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	22.8151	18.3031	16.4799	12.0739	9.3262	7.6196	8.5077	11.0586	14.3640	18.8464	21.2870	23.4492	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-60.6634	-84.4220	-118.5377	-126.5908	-127.3672	-105.4940	-104.0505	-102.2571	-95.9068	-92.6553	-65.5583	-52.1496	(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	-0.3415	-4.2576	-12.5746	-26.4098	-44.6403	-57.7019	-57.4884	-47.5716	-34.1143	-11.6212	-2.7120	-0.4803	(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 1475.2776 (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 908.6212 (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) 184.1307 (232)

Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1435.5664	(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	1132.4631	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1475.2776	16.4900	243.2733	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	908.6212	16.4900	149.8316	(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	184.1307	16.4900	30.3631	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1135.6529	16.4900	-187.2692	
PV Unit electricity exported	-299.9135	5.5900	-16.7652	
Total			-204.0343	(252)
Total energy cost			219.4337	(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] =	0.5232	(257)
SAP value		91.5197	
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	1475.2776	0.1549	228.5734	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	908.6212	0.1484	134.8775	(264)
Space and water heating			363.4508	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	184.1307	0.1443	26.5757	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1135.6529	0.1363	-154.8100	
PV Unit electricity exported	-299.9135	0.1154	-34.6145	
Total			-189.4245	(269)
Total CO2, kg/year			200.6021	(272)
CO2 emissions per m2			1.8900	(273)
EI value			98.2198	
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			19.5200	1.1450	22.3511			(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	21.4700	119.5300	0.1500	17.9295	9.0000	1075.7700	(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) =		50.7106			(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) =							7768.7700	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							73.2903	(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) =							70.4706	(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	119.3940	118.7807	118.7807	117.6294	117.3572	116.3309	116.3309	116.0900	116.3309	117.3572	117.3572	118.1925	(39)
Average = Sum(39)m / 12 =												117.4943	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1264	1.1206	1.1206	1.1097	1.1071	1.0975	1.0975	1.0952	1.0975	1.1071	1.1071	1.1150	(40)
HLP (average)												1.1084	
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

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

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)
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)
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)
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)
-26.0385	-44.8191	-84.1359	-124.5979	-146.4645	-165.0856	-156.1121	-138.3068	-107.3760	-65.2808	-33.6354	-19.8247	(63b)
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)
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

222.0608	174.4899	148.7842	80.2456	52.0969	13.8466	20.5780	45.4483	78.4321	141.8810	186.5771	225.5907	(64)

Total per year (kWh/year) = Sum(64)m =	1390.0312	(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	26.0656	23.1512	18.8279	14.2539	10.6550	8.9954	9.7198	12.6342	16.9576	21.5315	25.1305	26.7900	(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													
	675.2172	674.0521	654.9414	618.7965	581.4732	547.5171	527.0778	529.0348	547.4129	580.8367	621.4140	657.2459	(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)
South	8.6400	53.8987	0.7600	0.7000	0.7700	171.6869	(78)
West	3.7800	23.7652	0.7600	0.7000	0.7700	33.1191	(80)

Solar gains	238.1411	363.9820	507.5752	666.9707	719.9809	797.7013	735.7172	671.1430	582.8560	416.3280	281.5950	196.7549	(83)
Total gains	913.3583	1038.0341	1162.5165	1285.7672	1301.4541	1345.2184	1262.7951	1200.1779	1130.2689	997.1647	903.0090	854.0008	(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	18.0745	18.1679	18.1679	18.3457	18.3882	18.5505	18.5505	18.5890	18.5505	18.3882	18.3882	18.2583	
alpha	2.2050	2.2112	2.2112	2.2230	2.2259	2.2367	2.2367	2.2393	2.2367	2.2259	2.2259	2.2172	
util living area													
	0.8902	0.8582	0.8043	0.7185	0.6155	0.4535	0.3644	0.3871	0.5564	0.7441	0.8513	0.9021	(86)
Living	18.3773	18.7124	19.2559	19.8906	20.4046	20.7940	20.9061	20.8916	20.6472	19.9929	19.1243	18.2838	
Non living	16.9480	17.3653	18.0362	18.8098	19.4152	19.8398	19.9456	19.9366	19.6987	18.9536	17.8939	16.8362	
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	19.6583	18.7124	19.2559	19.8906	20.4046	20.7940	20.9061	20.8916	20.6472	19.9929	19.1243	18.6637	(87)
Th 2	19.9794	19.9841	19.9841	19.9929	19.9950	20.0029	20.0029	20.0048	20.0029	19.9950	19.9950	19.9886	(88)
util rest of house													
	0.8781	0.8432	0.7835	0.6885	0.5720	0.3923	0.2892	0.3105	0.4974	0.7094	0.8329	0.8912	(89)
MIT 2	18.7689	17.3653	18.0362	18.8098	19.4152	19.8398	19.9456	19.9366	19.6987	18.9536	17.8939	17.4037	(90)
Living area fraction										fLA = Living area / (4) =		0.4057	(91)
MIT	19.1297	17.9118	18.5310	19.2483	19.8166	20.2269	20.3352	20.3240	20.0835	19.3752	18.3930	17.9148	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1297	17.9118	18.5310	19.2483	19.8166	20.2269	20.3352	20.3240	20.0835	19.3752	18.3930	17.9148	(93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8666	0.8050	0.7483	0.6638	0.5637	0.4066	0.3150	0.3359	0.5024	0.6850	0.7965	0.8629	(94)
Useful gains	791.5139	835.6088	869.9479	853.4411	733.5797	546.9625	397.8166	403.1430	567.8893	683.0758	719.2698	736.8994	(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													
	1722.8239	1509.9164	1393.4199	1193.7332	917.3326	608.0507	422.8914	432.3215	672.7979	982.8890	1266.6397	1573.7140	(97)
Space heating kWh													
	692.8946	453.1347	389.4632	245.0104	136.7122	0.0000	0.0000	0.0000	0.0000	223.0611	394.1063	622.5901	(98a)
Space heating requirement - total per year (kWh/year)												3156.9724	
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													
	692.8946	453.1347	389.4632	245.0104	136.7122	0.0000	0.0000	0.0000	0.0000	223.0611	394.1063	622.5901	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3156.9724	
Space heating per m2											(98c) / (4) =	29.7828	(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													
	692.8946	453.1347	389.4632	245.0104	136.7122	0.0000	0.0000	0.0000	0.0000	223.0611	394.1063	622.5901	(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)													
	303.7746	198.6605	170.7460	107.4159	59.9365	0.0000	0.0000	0.0000	0.0000	97.7930	172.7817	272.9521	(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													
	222.0608	174.4899	148.7842	80.2456	52.0969	13.8466	20.5780	45.4483	78.4321	141.8810	186.5771	225.5907	(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													
	135.7174	106.6434	90.9328	49.0439	31.8402	8.4626	12.5767	27.7767	47.9355	86.7137	114.0308	137.8748	(219)

Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.8151	18.3031	16.4799	12.0739	9.3262	7.6196	8.5077	11.0586	14.3640	18.8464	21.2870	23.4492	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-69.1501	-87.1321	-121.3914	-130.1432	-126.6136	-106.8087	-104.9182	-104.2913	-99.4109	-96.6107	-73.1532	-57.9890	(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	-0.9071	-4.9836	-14.2362	-30.6251	-45.4865	-67.7655	-63.3349	-54.1350	-39.4327	-13.8749	-4.0237	-0.8578	(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	1384.0603	(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	849.5485	(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)	184.1307	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1517.2754	(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	900.4641	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1384.0603	26.0000	359.8557	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	849.5485	26.0000	220.8826	(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	184.1307	26.0000	47.8740	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1177.6123	26.0000	-306.1792	
PV Unit electricity exported	-339.6631	5.8100	-19.7344	
Total			-325.9136	(252)
Total energy cost			302.6986	(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	1384.0603	0.1550	214.5783	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	849.5485	0.1497	127.1697	(264)
Space and water heating			341.7480	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	184.1307	0.1443	26.5757	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1177.6123	0.1367	-161.0181	
PV Unit electricity exported	-339.6631	0.1157	-39.3153	
Total			-200.3333	(269)
Total CO2, kg/year			167.9904	(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	1384.0603	1.5739	2178.4045	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	849.5485	1.5539	1320.1317	(278)
Space and water heating			3498.5362	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	184.1307	1.5338	282.4258	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1177.6123	1.5055	-1772.8606	
PV Unit electricity exported	-339.6631	0.4242	-144.0729	
Total			-1916.9335	(283)
Total Primary energy kWh/year			1864.0285	(286)

Predicted Energy Assessment

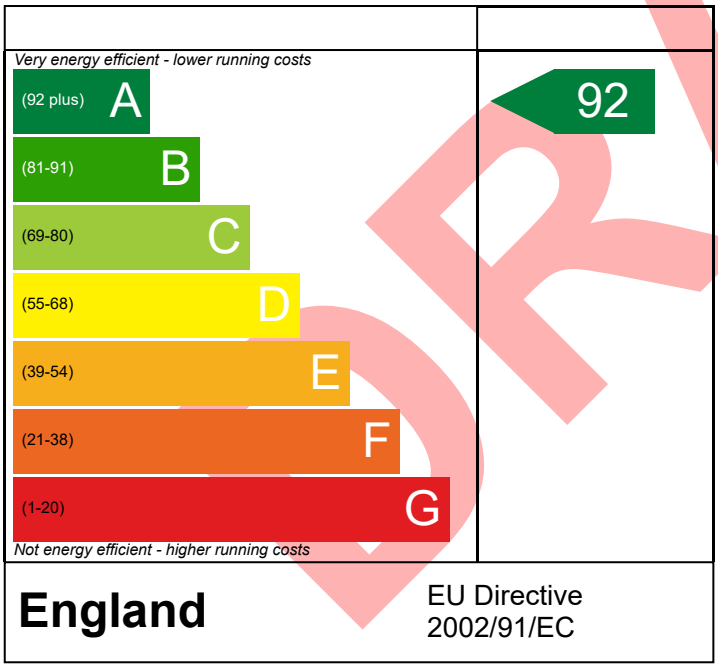
Rock House, Plot 1, Old Frome Road To Underhill,
Somerset, BA3 4TQ

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.

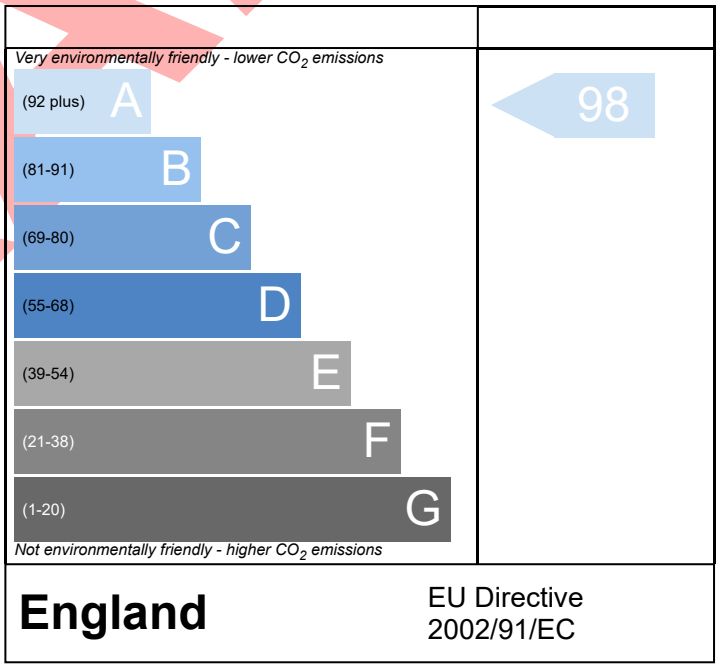
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

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 3	**Issued on Date**	22/10/2026
Assessment Reference	00003 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**	1.96	**TER**	10.40
Environmental	98 A	**% DER < TER**			81.15
CO_2 Emissions (t/year)	0.17	**DFEE**	37.10	**TFEE**	37.41
Compliance Check	See BREL	**% DFEE < TFEE**			0.85
% DPER < TPER	60.80	**DPER**	21.25	**TPER**	54.21

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:

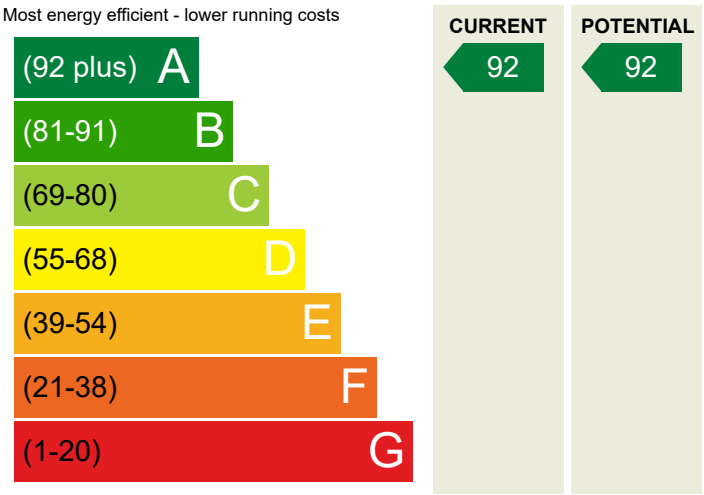
Energy Report

Dwelling Address	Rock House, Plot 1, Old Frome Road To Underhill, Somerset, BA3 4TQ
Reference	Plot 3-00003 Rev A
SAP Version	10.2
Assessment Date	22/10/2026
Submission Date	
Property Type	House, Detached
Total Floor Area	106

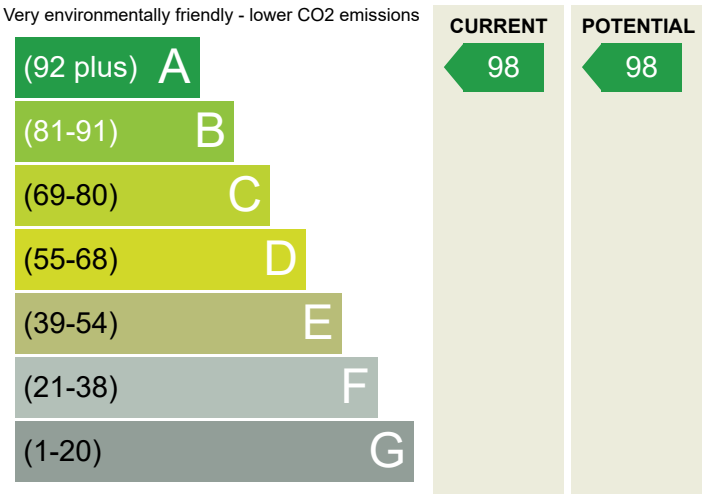
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

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

Energy Efficiency Rating

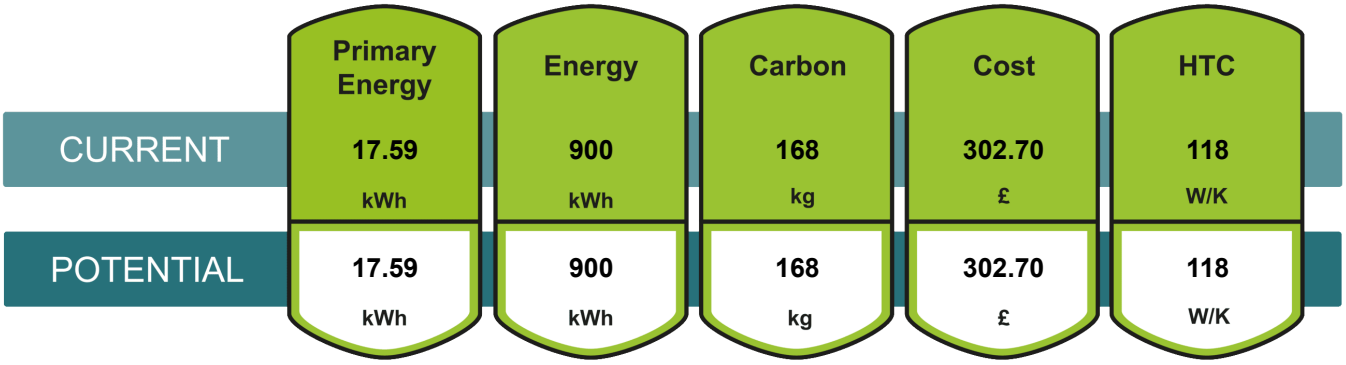


Carbon Dioxide (CO2) Emissions Rating



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	£48	£48	
Heating	£360	£360	
Hot Water	£221	£221	
New Technologies e.g. Impact of PV	-(£326)	-(£326)	
TOTAL	£303	£303	

Estimated energy use and potential savings

Space Heating
1384
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 3	**Issued on Date**	22/10/2026
Assessment Reference	00003 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**	1.96	**TER**	10.40
Environmental	98 A	**% DER < TER**			81.15
CO_2 Emissions (t/year)	0.17	**DFEE**	37.10	**TFEE**	37.41
Compliance Check	See BREL	**% DFEE < TFEE**			0.85
% DPER < TPER	60.80	**DPER**	21.25	**TPER**	54.21

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	West	3.78

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 .....