

Summary for Input Data

Property Reference	Flat 2B	Issued on Date	01/02/2024
Assessment Reference	Baseline	Prop Type Ref	Conversion
Property			

SAP Rating	73 C	DER	6.72	TER	6.59
Environmental	94 A	% DER < TER			-1.97
CO ₂ Emissions (t/year)	0.44	DFEE	59.95	TFEE	26.32
Compliance Check	See BREL	% DFEE < TFEE			-127.75
% DPER < TPER	-98.48	DPER	70.22	TPER	35.38

Assessor Details	Mr. Matthew Ray	Assessor ID	T806-0001
Client			

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

Orientation	Southeast
Property Tenture	ND
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, Semi-Detached
Position of Flat	Top-floor flat
Which Floor	1
2.0 Number of Storeys	1
3.0 Date Built	2023
3.0 Property Age Band	L
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	N/A
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	11.40 m	75.20 m ²	2.60 m
1st Storey:	0.00 m	0.00 m ²	0.00 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	35.50	m ²
-----------------	-------	----------------

9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Existing Ext Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.55	190.00	15.34	11.49	0.00	None	3.85	Enter Gross Area
	New Ext Wall	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18	9.00	14.30	8.09	0.00	None	6.21	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall	Filled Cavity with Edge Sealing	Steel frame	0.00	20.00	36.40	0.00	None
	Party Wall to Adjacent	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	33.02	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall	Plasterboard on timber frame	9.00	153.66

Summary for Input Data



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
Flat Roof	External Flat Roof	Plasterboard, insulated flat roof	0.16	9.00	75.20	75.20	None	0.00	Calculate Wall Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	Lowest occupied	Timber I-joists, carpeted	20.00	75.20

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Entrance Door	Manufacturer	Solid Door			None	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05	≥ 16 mm	Argon Filled	0.63	Metal 32 mm break	0.80	1.60
Patio Doors	Manufacturer	Window	Double Low-E Soft 0.05	≥ 16 mm	Argon Filled	0.63	Metal 32 mm break	0.80	1.60

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Front Elevation	Windows	Existing Ext Wall	North West	3.85	0
Entrance Door	Entrance Door	New Ext Wall	South East	1.89	0
Patio Doors	Patio Doors	New Ext Wall	South East	4.32	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

18.0 Pressure Testing

Designed AP₅₀

 m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀

 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Low energy Lighting	75.00	5	375	15

24.0 Main Heating 1

Percentage of Heat

 %

Database Ref. No.

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

PCDF Controls

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Summary for Input Data

FI Case	0.00
FI Water	0.00
Flue Type	None or Unknown
Smoke Control Area	Unknown
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Underfloor
Underfloor Heating	Yes - Pipes in Wood
Flow Temperature	Enter value
Flow Temperature Value	35.00
Boiler Interlock	Yes
Electric CPSU Temperature	0.00

25.0 Main Heating 2	None
---------------------	------

26.0 Heat Networks	None
--------------------	------

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None			0.00	0.00	0.00	0.00	0.00		
Heat source 2	None			0.00	0.00	0.00	0.00	0.00		
Heat source 3	None			0.00	0.00	0.00	0.00	0.00		
Heat source 4	None			0.00	0.00	0.00	0.00	0.00		
Heat source 5	None			0.00	0.00	0.00	0.00	0.00		

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
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Baths connected to WWHRS	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

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

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Insulation Thickness	0
Cylinder Volume	210.00 L

Summary for Input Data



Loss	1.94	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store	None
Thermal Store Pipework	within a single casing

34.0 Small-scale Hydro	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout



Property Reference	Flat 2B			Issued on Date	01/02/2024
Assessment Reference	Baseline	Prop Type Ref	Conversion		
Property					
SAP Rating	73 C	DER	6.72	TER	6.59
Environmental	94 A	% DER < TER			-1.97
CO ₂ Emissions (t/year)	0.44	DFEE	59.95	TFEE	26.32
Compliance Check	See BREL	% DFEE < TFEE			-127.75
% DPER < TPER	-98.48	DPER	70.22	TPER	35.38
Assessor Details	Mr. Matthew Ray			Assessor ID	T806-0001
Client					

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	75.2000 (1b)	2.6000 (2b)	195.5200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	75.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	195.5200 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1534 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9034 (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) = 0.7679 (21)

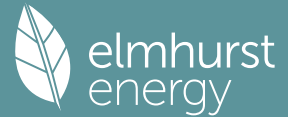
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.9791	0.9599	0.9407	0.8447	0.8255	0.7295	0.7295	0.7103	0.7679	0.8255	0.8639	0.9023 (22b)
Effective ac	0.9793	0.9607	0.9425	0.8568	0.8407	0.7661	0.7661	0.7523	0.7949	0.8407	0.8732	0.9071 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Entrance Door			1.8900	1.0000	1.8900		(26)
Windows (Uw = 1.60)			3.8500	1.5038	5.7895		(27)
Patio Doors (Uw = 1.60)			4.3200	1.5038	6.4962		(27)
Existing Ext Wall	15.3400	3.8500	11.4900	0.5500	6.3195	190.0000	2183.1000 (29a)
New Ext Wall	14.3000	6.2100	8.0900	0.1800	1.4562	9.0000	72.8100 (29a)
Flat Roof	75.2000		75.2000	0.1600	12.0320	9.0000	676.8000 (30)
Total net area of external elements Aum(A, m ²)			104.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.9834		(33)
Party Wall			36.4000	0.0000	0.0000	20.0000	728.0000 (32)
Party Wall to Adjacent			33.0200	0.0000	0.0000	180.0000	5943.6000 (32)
Party Floor			75.2000			30.0000	2256.0000 (32d)
Internal Wall			153.6600			9.0000	1382.9400 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		13243.2500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							176.1070 (35)
Thermal bridges (Default value 0.200 * total exposed area)							20.9680 (36)
Point Thermal Bridges						(36a) =	0.0000
Total fabric heat loss					(33) + (36) + (36a) =		54.9514 (37)

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

Full SAP Calculation Printout



(38)m	Jan 63.1872	Feb 61.9863	Mar 60.8091	Apr 55.2802	May 54.2458	Jun 49.4302	Jul 49.4302	Aug 48.5385	Sep 51.2851	Oct 54.2458	Nov 56.3384	Dec 58.5262	(38)
Heat transfer coeff	118.1386	116.9377	115.7606	110.2316	109.1972	104.3816	104.3816	103.4899	106.2365	109.1972	111.2898	113.4776	(39)
Average = Sum(39)m / 12 =												110.2267	
HLP	Jan 1.5710	Feb 1.5550	Mar 1.5394	Apr 1.4658	May 1.4521	Jun 1.3881	Jul 1.3881	Aug 1.3762	Sep 1.4127	Oct 1.4521	Nov 1.4799	Dec 1.5090	(40)
HLP (average)												1.4658	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3655	(42)
Hot water usage for mixer showers	63.8811	62.9211	61.5222	58.8456	56.8704	54.6676	53.4155	54.8038	56.3257	58.6908	61.4249	63.6364	(42a)	
Hot water usage for baths	27.5942	27.1844	26.6073	25.5432	24.7464	23.8630	23.3857	23.9588	24.5828	25.5281	26.6141	27.5009	(42b)	
Hot water usage for other uses	38.8550	37.4420	36.0291	34.6162	33.2033	31.7904	31.7904	33.2033	34.6162	36.0291	37.4420	38.8550	(42c)	
Average daily hot water use (litres/day)												119.8031	(43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
130.3303	127.5475	124.1586	119.0051	114.8201	110.3210	108.5917	111.9660	115.5247	120.2481	125.4811	129.9922	(44)		
206.4113	181.6260	190.8272	162.9120	154.5700	135.6525	131.3322	138.6373	142.4535	163.1755	178.7708	203.5364	(45)		
Energy content (annual)										Total = Sum(45)m =	1989.9047			
Distribution loss (46)m = 0.15 x (45)m	30.9617	27.2439	28.6241	24.4368	23.1855	20.3479	19.6998	20.7956	21.3680	24.4763	26.8156	30.5305	(46)	
Water storage loss:														
Store volume													210.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.9400	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													1.0476	(55)
Total storage loss	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	(56)	
If cylinder contains dedicated solar storage	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	(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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744	(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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744	(64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =	2646.1747	(64)		
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)	
												0.0000	(64a)	
Heat gains from water heating, kWh/month	113.2222	100.6658	108.0404	97.3202	95.9849	88.2564	88.2584	90.6873	90.5178	98.8463	102.5933	112.2663	(65)	

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

Metabolic gains (Table 5), Watts													
(66)m	Jan 118.2744	Feb 118.2744	Mar 118.2744	Apr 118.2744	May 118.2744	Jun 118.2744	Jul 118.2744	Aug 118.2744	Sep 118.2744	Oct 118.2744	Nov 118.2744	Dec 118.2744	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	116.1924	128.6416	116.1924	120.0655	116.1924	120.0655	116.1924	116.1924	120.0655	116.1924	120.0655	116.1924	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	209.1177	211.2877	205.8194	194.1780	179.4829	165.6715	156.4447	154.2747	159.7430	171.3844	186.0795	199.8908	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	(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)	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	(71)
Water heating gains (Table 5)	152.1803	149.8004	145.2156	135.1670	129.0120	122.5784	118.6268	121.8915	125.7192	132.8579	142.4907	150.8955	(72)
Total internal gains	538.9727	551.2119	528.7097	510.8928	486.1696	466.7978	449.7463	450.8410	464.0100	481.9170	510.1180	528.4611	(73)

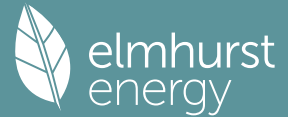
6. Solar gains

[Jan]				Area	Solar flux	g			FF	Access		Gains	
				m2	Table 6a	Specific data			Specific data	factor		W	
					W/m2	or Table 6b			or Table 6c	Table 6d			
Northwest				3.8500	11.2829	0.6300			0.8000	0.7700		15.1721 (81)	
Southeast				4.3200	36.7938	0.6300			0.8000	0.7700		55.5166 (77)	
Solar gains	70.6887	125.4486	185.0302	251.6984	302.4026	309.2240	294.3762	255.1713	207.9007	142.2566	85.5865	59.9009	(83)
Total gains	609.6614	676.6605	713.7399	762.5912	788.5722	776.0218	744.1224	706.0123	671.9107	624.1736	595.7045	588.3620	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)														
tau	Jan 31.1387	Feb 31.4585	Mar 31.7784	Apr 33.3723	May 33.6884	Jun 35.2426	Jul 35.2426	Aug 35.5463	Sep 34.6273	Oct 33.6884	Nov 33.0550	Dec 32.4177		
alpha	3.0759	3.0972	3.1186	3.2248	3.2459	3.3495	3.3495	3.3698	3.3085	3.2459	3.2037	3.1612		
util living area	0.9812	0.9727	0.9589	0.9221	0.8506	0.7094	0.5637	0.6034	0.8001	0.9299	0.9706	0.9831	(86)	

Full SAP Calculation Printout



MIT	18.6754	18.9222	19.3074	19.9088	20.4017	20.7931	20.9299	20.9117	20.6579	20.0364	19.3290	18.7239 (87)
Th 2	19.6347	19.6465	19.6581	19.7132	19.7236	19.7725	19.7725	19.7816	19.7536	19.7236	19.7026	19.6807 (88)
util rest of house												
	0.9764	0.9657	0.9477	0.8994	0.8030	0.6166	0.4281	0.4711	0.7231	0.9051	0.9619	0.9788 (89)
MIT 2	16.9955	17.3147	17.8082	18.5897	19.1827	19.6338	19.7441	19.7422	19.4958	18.7630	17.8666	17.0839 (90)
Living area fraction									fLA = Living area / (4) =			0.4721 (91)
MIT	17.7886	18.0736	18.5159	19.2124	19.7581	20.1811	20.3039	20.2943	20.0444	19.3642	18.5570	17.8581 (92)
Temperature adjustment												0.0000
adjusted MIT	17.7886	18.0736	18.5159	19.2124	19.7581	20.1811	20.3039	20.2943	20.0444	19.3642	18.5570	17.8581 (93)

8. Space heating requirement

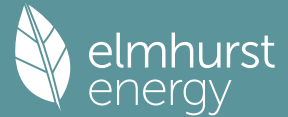
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9672	0.9546	0.9351	0.8885	0.8045	0.6502	0.4900	0.5303	0.7436	0.8962	0.9515	0.9704	(94)
Useful gains	589.6665	645.9191	667.3931	677.5741	634.4317	504.5710	364.6208	374.4015	499.5994	559.4065	566.8048	570.9711	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1593.5202	1540.4879	1390.9679	1136.7538	879.9265	582.5597	386.6187	403.0209	631.5126	957.0227	1275.0435	1549.8867	(97)
Space heating kWh	746.8671	601.1502	538.3396	330.6094	182.6481	0.0000	0.0000	0.0000	0.0000	295.8264	509.9319	728.3133	(98a)
Space heating requirement - total per year (kWh/year)												3933.6861	
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	746.8671	601.1502	538.3396	330.6094	182.6481	0.0000	0.0000	0.0000	0.0000	295.8264	509.9319	728.3133	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3933.6861	
Space heating per m2											(98c) / (4) =	52.3097	(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 %)												219.3000 (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	746.8671	601.1502	538.3396	330.6094	182.6481	0.0000	0.0000	0.0000	0.0000	295.8264	509.9319	728.3133 (98)
Space heating efficiency (main heating system 1)	219.3000	219.3000	219.3000	219.3000	219.3000	0.0000	0.0000	0.0000	0.0000	219.3000	219.3000	219.3000 (210)
Space heating fuel (main heating system)	340.5687	274.1223	245.4809	150.7567	83.2869	0.0000	0.0000	0.0000	0.0000	134.8958	232.5271	332.1082 (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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744 (64)
Efficiency of water heater (217)m	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000 (216)
Fuel for water heating, kWh/month	137.6835	121.8330	129.4985	113.8928	110.4559	99.5759	98.2512	102.0879	103.1479	114.9756	122.2221	136.1735 (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)
(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 (231)
Pumps and Fa	28.0625	22.5128	20.2702	14.8509	11.4712	9.3721	10.4644	13.6021	17.6677	23.1810	26.1829	28.8424 (232)
Lighting	Electricity generated by PVs (Appendix M) (negative quantity)											
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)
(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)	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)
(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)	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)
(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)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)
(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)	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)
(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)	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)
(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												1793.7465 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												190.4000
Water heating fuel used												1389.7976 (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)												226.4803 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												0.0000 (233)
Wind generation												0.0000 (234)
Hydro-electric generation (Appendix N)												0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)												0.0000 (235)
Appendix Q - special features												
Energy saved or generated												-0.0000 (236)
Energy used												0.0000 (237)
Total delivered energy for all uses												3410.0244 (238)

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

Full SAP Calculation Printout



	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1793.7465	0.1545	277.0740 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1389.7976	0.1409	195.7772 (264)
Space and water heating			472.8511 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	226.4803	0.1443	32.6881 (268)
Total CO2, kg/year			505.5392 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.7200 (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	1793.7465	1.5719	2819.5492 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1389.7976	1.5209	2113.7084 (278)
Space and water heating			4933.2576 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	226.4803	1.5338	347.3830 (282)
Total Primary energy kWh/year			5280.6406 (286)
Dwelling Primary energy Rate (DPER)			70.2200 (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)
Ground floor	75.2000 (1b)	x 2.6000 (2b)	= 195.5200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	75.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 195.5200 (5)

2. Ventilation rate

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

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1534 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.4034	(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) =		0.3429 (21)

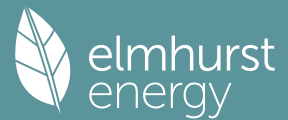
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.4372	0.4287	0.4201	0.3772	0.3686	0.3258	0.3258	0.3172	0.3429	0.3686	0.3858	0.4029 (22b)
Effective ac	0.5956	0.5919	0.5882	0.5711	0.5679	0.5531	0.5531	0.5503	0.5588	0.5679	0.5744	0.5812 (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
TER Opaque door			1.8900	1.0000	1.8900		(26)
TER Opening Type (Uw = 1.20)			8.1700	1.1450	9.3550		(27)
Existing Ext Wall	15.3400	3.8500	11.4900	0.1800	2.0682		(29a)
New Ext Wall	14.3000	6.2100	8.0900	0.1800	1.4562		(29a)
Flat Roof	75.2000		75.2000	0.1100	8.2720		(30)
Total net area of external elements Aum(A, m2)			104.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.0414		(33)
Party Wall			36.4000	0.0000	0.0000		(32)
Party Wall to Adjacent			33.0200	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							176.1070 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							5.2420 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	28.2834 (37)

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

Full SAP Calculation Printout



(38)m	38.4280	38.1885	37.9537	36.8512	36.6449	35.6846	35.6846	35.5068	36.0545	36.6449	37.0622	37.4985 (38)
Heat transfer coeff	66.7113	66.4718	66.2371	65.1346	64.9283	63.9680	63.9680	63.7902	64.3379	64.9283	65.3456	65.7819 (39)
Average = Sum(39)m / 12 =												65.1336
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.8871	0.8839	0.8808	0.8662	0.8634	0.8506	0.8506	0.8483	0.8556	0.8634	0.8690	0.8748 (40)
HLP (average)												0.8661
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3655 (42)
Hot water usage for mixer showers	63.8811	62.9211	61.5222	58.8456	56.8704	54.6676	53.4155	54.8038	56.3257	58.6908	61.4249	63.6364 (42a)
Hot water usage for baths	27.5942	27.1844	26.6073	25.5432	24.7464	23.8630	23.3857	23.9588	24.5828	25.5281	26.6141	27.5009 (42b)
Hot water usage for other uses	38.8550	37.4420	36.0291	34.6162	33.2033	31.7904	31.7904	33.2033	34.6162	36.0291	37.4420	38.8550 (42c)
Average daily hot water use (litres/day)												119.8031 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	130.3303	127.5475	124.1586	119.0051	114.8201	110.3210	108.5917	111.9660	115.5247	120.2481	125.4811	129.9922 (44)
Energy conte	206.4113	181.6260	190.8272	162.9120	154.5700	135.6525	131.3322	138.6373	142.4535	163.1755	178.7708	203.5364 (45)
Energy content (annual)										Total = Sum(45)m =		1989.9047
Distribution loss (46)m = 0.15 x (45)m	30.9617	27.2439	28.6241	24.4368	23.1855	20.3479	19.6998	20.7956	21.3680	24.4763	26.8156	30.5305 (46)
Water storage 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	258.1579	228.3649	242.5738	212.9893	206.3165	185.7298	183.0788	190.3839	192.5309	214.9221	228.8481	255.2830 (62)
WWHRS	-29.2038	-25.8281	-27.0457	-22.3949	-20.8712	-17.8596	-16.7406	-17.8019	-18.4783	-21.7839	-24.6785	-28.6630 (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	228.9541	202.5368	215.5281	190.5944	185.4453	167.8702	166.3382	172.5819	174.0526	193.1383	204.1697	226.6200 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2327.8297 (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	110.0290	97.7817	104.8473	94.2301	92.7918	85.1663	85.0652	87.4942	87.4277	95.6531	99.5032	109.0731 (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	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	119.6566	132.4770	119.6566	123.6452	119.6566	123.6452	119.6566	119.6566	123.6452	119.6566	123.6452	119.6566 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	209.1177	211.2877	205.8194	194.1780	179.4829	165.6715	156.4447	154.2747	159.7430	171.3844	186.0795	199.8908 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274 (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)	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195 (71)
Water heating gains (Table 5)	147.8885	145.5085	140.9238	130.8751	124.7201	118.2866	114.3350	117.5997	121.4273	128.5661	138.1988	146.6037 (72)
Total internal gains	538.1451	550.7555	527.8821	510.1807	485.3420	466.0856	448.9187	450.0134	463.2979	481.0894	509.4059	527.6335 (73)

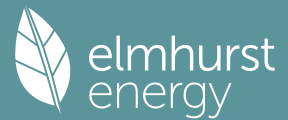
6. Solar gains

[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
Southeast				4.3200	36.7938		0.6300		0.7000		0.7700		48.5770 (77)
Northwest				3.8500	11.2829		0.6300		0.7000		0.7700		13.2756 (81)
Solar gains	61.8526	109.7675	161.9014	220.2361	264.6023	270.5710	257.5791	223.2749	181.9131	124.4745	74.8882		52.4133 (83)
Total gains	599.9977	660.5230	689.7836	730.4168	749.9443	736.6566	706.4978	673.2883	645.2110	605.5639	584.2941		580.0468 (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	55.1433	55.3419	55.5381	56.4782	56.6576	57.5081	57.5081	57.6685	57.1775	56.6576	56.2958	55.9224
alpha	4.6762	4.6895	4.7025	4.7652	4.7772	4.8339	4.8339	4.8446	4.8118	4.7772	4.7531	4.7282
util living area	0.9737	0.9574	0.9300	0.8564	0.7271	0.5408	0.3956	0.4314	0.6480	0.8687	0.9524	0.9769 (86)
MIT	19.9487	20.1307	20.3661	20.6757	20.8832	20.9780	20.9960	20.9940	20.9483	20.7021	20.2987	19.9282 (87)

Full SAP Calculation Printout



Th 2	20.1785	20.1812	20.1838	20.1964	20.1987	20.2097	20.2097	20.2117	20.2054	20.1987	20.1940	20.1890 (88)
util rest of house	0.9684	0.9491	0.9162	0.8296	0.6817	0.4793	0.3258	0.3595	0.5856	0.8386	0.9418	0.9722 (89)
MIT 2	18.9608	19.1904	19.4841	19.8640	20.0948	20.1948	20.2079	20.2088	20.1671	19.9031	19.4129	18.9430 (90)
Living area fraction									fLA = Living area / (4) =			0.4721 (91)
MIT	19.4272	19.6343	19.9005	20.2472	20.4670	20.5645	20.5799	20.5795	20.5359	20.2803	19.8311	19.4081 (92)
Temperature adjustment												0.0000
adjusted MIT	19.4272	19.6343	19.9005	20.2472	20.4670	20.5645	20.5799	20.5795	20.5359	20.2803	19.8311	19.4081 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9624	0.9426	0.9107	0.8314	0.6975	0.5073	0.3587	0.3933	0.6123	0.8419	0.9361	0.9666	(94)
Useful gains	577.4308	622.5810	628.1921	607.2605	523.1003	373.7243	253.4128	264.7913	395.0745	509.8385	546.9728	560.6717	(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	1009.1526	979.4144	887.6083	739.0922	569.2261	381.5395	254.5882	266.6101	414.0703	628.5253	831.9211	1000.4157	(97)
Space heating kWh	321.2011	239.7921	193.0057	94.9188	34.3176	0.0000	0.0000	0.0000	0.0000	88.3030	205.1628	327.1696	(98a)
Space heating requirement - total per year (kWh/year)												1503.8705	
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	321.2011	239.7921	193.0057	94.9188	34.3176	0.0000	0.0000	0.0000	0.0000	88.3030	205.1628	327.1696	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1503.8705	
Space heating per m2										(98c) / (4) =		19.9983	(99)

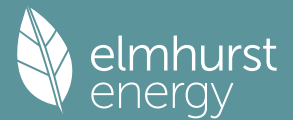
9a. Energy requirements - Individual heating systems, including micro-CHP

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	321.2011	239.7921	193.0057	94.9188	34.3176	0.0000	0.0000	0.0000	0.0000	88.3030	205.1628	327.1696	(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)	347.9968	259.7964	209.1069	102.8373	37.1805	0.0000	0.0000	0.0000	0.0000	95.6695	222.2782	354.4632	(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	228.9541	202.5368	215.5281	190.5944	185.4453	167.8702	166.3382	172.5819	174.0526	193.1383	204.1697	226.6200	(64)
Efficiency of water heater	84.8190	84.4394	83.8131	82.5826	81.0833	79.8000	79.8000	79.8000	79.8000	82.4209	84.0707	79.8000	(216)
(217)m	84.8190	84.4394	83.8131	82.5826	81.0833	79.8000	79.8000	79.8000	79.8000	82.4209	84.0707	84.8825	(217)
Fuel for water heating, kWh/month	269.9327	239.8605	257.1531	230.7926	228.7097	210.3636	208.4439	216.2681	218.1110	234.3316	242.8548	266.9809	(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	24.8623	19.9455	17.9587	13.1573	10.1631	8.3033	9.2711	12.0509	15.6529	20.5375	23.1971	25.5533	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	-58.3174	-76.7385	-103.0244	-107.9540	-110.1975	-100.7466	-99.5281	-96.9298	-91.5521	-83.8882	-62.1549	-51.0932	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)	-51.7902	-106.0760	-205.7762	-302.0387	-392.8413	-392.3648	-387.6842	-331.0921	-246.5911	-149.1323	-68.2687	-41.1682	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1629.3289	(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												2823.8026	(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)												200.6529	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3716.9484	(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												1022.8359	(238)

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

Energy	Emission factor	Emissions
--------	-----------------	-----------

Full SAP Calculation Printout

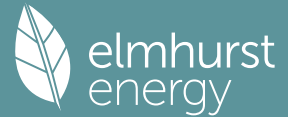


	kWh/year	kg CO2/kWh	kg CO2/year
Space heating - main system 1	1629.3289	0.2100	342.1591 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2823.8026	0.2100	592.9985 (264)
Space and water heating			935.1576 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	200.6529	0.1443	28.9604 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1042.1246	0.1361	-141.8152
PV Unit electricity exported	-2674.8239	0.1266	-338.6066
Total			-480.4218 (269)
Total CO2, kg/year			495.6255 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			6.5900 (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	1629.3289	1.1300	1841.1416 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2823.8026	1.1300	3190.8969 (278)
Space and water heating			5032.0385 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	200.6529	1.5338	307.7681 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1042.1246	1.5030	-1566.3342
PV Unit electricity exported	-2674.8239	0.4647	-1243.0018
Total			-2809.3360 (283)
Total Primary energy kWh/year			2660.5714 (286)
Target Primary Energy Rate (TPER)			35.3800 (287)

Full SAP Calculation Printout



Property Reference	Flat 2B				Issued on Date	01/02/2024
Assessment Reference	Baseline		Prop Type Ref	Conversion		
Property						
SAP Rating	73 C	DER	6.72	TER	6.59	
Environmental	94 A	% DER < TER				-1.97
CO ₂ Emissions (t/year)	0.44	DFEE	59.95	TFEE	26.32	
Compliance Check	See BREL	% DFEE < TFEE				-127.75
% DPER < TPER	-98.48	DPER	70.22	TPER	35.38	
Assessor Details	Mr. Matthew Ray				Assessor ID	T806-0001
Client						

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	75.2000 (1b)	x 2.6000 (2b)	= 195.5200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	75.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 195.5200 (5)

2. Ventilation rate

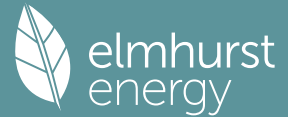
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1534 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9034 (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) = 0.7679 (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	0.9791	0.9599	0.9407	0.8447	0.8255	0.7295	0.7295	0.7103	0.7679	0.8255	0.8639	0.9023 (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	0.9793	0.9607	0.9425	0.8568	0.8407	0.7661	0.7661	0.7523	0.7949	0.8407	0.8732	0.9071 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Entrance Door			1.8900	1.0000	1.8900		(26)
Windows (Uw = 1.60)			3.8500	1.5038	5.7895		(27)
Patio Doors (Uw = 1.60)			4.3200	1.5038	6.4962		(27)
Existing Ext Wall	15.3400	3.8500	11.4900	0.5500	6.3195	190.0000	2183.1000 (29a)
New Ext Wall	14.3000	6.2100	8.0900	0.1800	1.4562	9.0000	72.8100 (29a)
Flat Roof	75.2000		75.2000	0.1600	12.0320	9.0000	676.8000 (30)
Total net area of external elements Aum(A, m ²)			104.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.9834		(33)
Party Wall			36.4000	0.0000	0.0000	20.0000	728.0000 (32)
Party Wall to Adjacent			33.0200	0.0000	0.0000	180.0000	5943.6000 (32)
Party Floor			75.2000			30.0000	2256.0000 (32d)
Internal Wall			153.6600			9.0000	1382.9400 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13243.2500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							176.1070 (35)
Thermal bridges (Default value 0.200 * total exposed area)							20.9680 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	54.9514 (37)

Full SAP Calculation Printout



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	63.1872	61.9863	60.8091	55.2802	54.2458	49.4302	49.4302	48.5385	51.2851	54.2458	56.3384	58.5262	(38)
Heat transfer coeff	118.1386	116.9377	115.7606	110.2316	109.1972	104.3816	104.3816	103.4899	106.2365	109.1972	111.2898	113.4776	(39)
Average = Sum(39)m / 12 =												110.2267	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.5710	1.5550	1.5394	1.4658	1.4521	1.3881	1.3881	1.3762	1.4127	1.4521	1.4799	1.5090	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3655 (42)
Hot water usage for mixer showers													(42a)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Hot water usage for baths													(42b)
27.5942	27.1844	26.6073	25.5432	24.7464	23.8630	23.3857	23.9588	24.5828	25.5281	26.6141	27.5009		
Hot water usage for other uses													(42c)
38.8550	37.4420	36.0291	34.6162	33.2033	31.7904	31.7904	33.2033	34.6162	36.0291	37.4420	38.8550		
Average daily hot water use (litres/day)												60.9069	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
66.4492	64.6264	62.6364	60.1594	57.9498	55.6534	55.1762	57.1621	59.1990	61.5573	64.0562	66.3559		(44)
Energy conte	105.2392	92.0272	96.2698	82.3553	78.0115	68.4323	66.7308	70.7787	72.9983	83.5326	91.2598	103.8972	(45)
Energy content (annual)												1011.5327	
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	0.0000	(46)
Water storage 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	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													
89.4533	78.2231	81.8294	70.0020	66.3098	58.1675	56.7212	60.1619	62.0485	71.0027	77.5708	88.3127		(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	89.4533	78.2231	81.8294	70.0020	66.3098	58.1675	56.7212	60.1619	62.0485	71.0027	77.5708	88.3127	(64)
12Total per year (kWh/year)												859.8028	(64)
Electric shower(s)	51.1581	45.5823	49.7741	47.4989	48.3902	46.1595	47.6982	48.3902	47.4989	49.7741	48.8382	51.1581	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												581.9208	(64a)
Heat gains from water heating, kWh/month	35.1529	30.9514	32.9009	29.3752	28.6750	26.0817	26.1048	27.1380	27.3869	30.1942	31.6022	34.8677	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
116.1924	128.6416	116.1924	120.0655	116.1924	120.0655	116.1924	120.0655	116.1924	120.0655	116.1924	120.0655	116.1924	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
209.1177	211.2877	205.8194	194.1780	179.4829	165.6715	156.4447	154.2747	159.7430	171.3844	186.0795	199.8908	199.8908	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	(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)													
-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	(71)
Water heating gains (Table 5)													
47.2485	46.0586	44.2216	40.7989	38.5417	36.2246	35.0871	36.4758	38.0373	40.5836	43.8920	46.8652	46.8652	(72)
Total internal gains	431.0409	444.4701	424.7157	413.5247	392.6993	380.4440	366.2066	365.4253	376.3281	386.6427	408.5193	421.4308	(73)

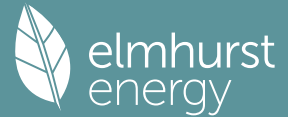
6. Solar gains

[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			
Northwest					3.8500	11.2829	0.6300	0.8000			0.7700			15.1721 (81)			
Southeast					4.3200	36.7938	0.6300	0.8000			0.7700			55.5166 (77)			
Solar gains					70.6887	125.4486	185.0302	251.6984	302.4026	309.2240	294.3762	255.1713	207.9007	142.2566	85.5865	59.9009	(83)
Total gains					501.7296	569.9187	609.7459	665.2231	695.1019	689.6680	660.5827	620.5966	584.2288	528.8994	494.1058	481.3317	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
31.1387	31.4585	31.7784	33.3723	33.6884	35.2426	35.2426	35.5463	34.6273	33.6884	33.0550	32.4177		
alpha	3.0759	3.0972	3.1186	3.2248	3.2459	3.3495	3.3495	3.3698	3.3085	3.2459	3.2037	3.1612	
util living area	0.9889	0.9826	0.9725	0.9438	0.8848	0.7577	0.6163	0.6605	0.8464	0.9535	0.9823	0.9903	(86)
MIT	18.5029	18.7557	19.1518	19.7786	20.3049	20.7438	20.9082	20.8833	20.5823	19.9042	19.1689	18.5496	(87)
Th 2	19.6347	19.6465	19.6581	19.7132	19.7236	19.7725	19.7725	19.7816	19.7536	19.7236	19.7026	19.6807	(88)

Full SAP Calculation Printout



util rest of house	0.9860	0.9781	0.9647	0.9264	0.8442	0.6686	0.4753	0.5251	0.7784	0.9356	0.9768	0.9878 (89)
MIT 2	17.4079	17.6663	18.0662	18.7171	19.2215	19.6338	19.7422	19.7391	19.4982	18.8533	18.1159	17.4848 (90)
Living area fraction									FLA = Living area / (4) =			0.4721 (91)
MIT	17.9248	18.1806	18.5787	19.2182	19.7329	20.1578	20.2926	20.2792	20.0100	19.3494	18.6130	17.9875 (92)
Temperature adjustment												0.0000
adjusted MIT	17.9248	18.1806	18.5787	19.2182	19.7329	20.1578	20.2926	20.2792	20.0100	19.3494	18.6130	17.9875 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9808	0.9711	0.9562	0.9179	0.8446	0.6996	0.5392	0.5850	0.7947	0.9287	0.9704	0.9832	(94)
Useful gains	492.0730	553.4739	583.0275	610.5826	587.0666	482.4895	356.2187	363.0700	464.3156	491.2038	479.5016	473.2475	(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	1609.6144	1553.0018	1398.2357	1137.3889	877.1733	580.1322	385.4438	401.4586	627.8596	955.4141	1281.2789	1564.5692	(97)
Space heating kWh	831.4508	671.6827	606.5149	379.3005	215.8393	0.0000	0.0000	0.0000	0.0000	345.3724	577.2796	811.9433	(98a)
Space heating requirement - total per year (kWh/year)												4439.3837	
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	831.4508	671.6827	606.5149	379.3005	215.8393	0.0000	0.0000	0.0000	0.0000	345.3724	577.2796	811.9433	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4439.3837	
Space heating per m2											(98c) / (4) =	59.0344	(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	981.1875	772.4242	786.5231	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6604	0.7437	0.7110	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	648.0194	574.4757	559.2336	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	753.9608	722.5160	678.1358	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	76.2778	110.1420	88.4633	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	19.0695	27.5355	22.1158	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement													68.7208 (107)
Energy for space heating													59.0344 (99)
Energy for space cooling													0.9138 (108)
Total													59.9482 (109)
Fabric Energy Efficiency (DFEE)													59.9 (109)

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

1. Overall dwelling characteristics

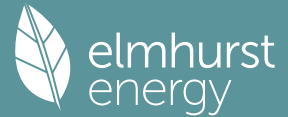
	Area (m2)	Storey height (m)	Volume (m3)	
Ground floor	75.2000 (1b)	x 2.6000 (2b)	= 195.5200 (1b) - (3b)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	75.2000			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	195.5200 (5)	

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	3 * 10 =	30.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1534 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.4034 (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) =	0.3429 (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)	

Full SAP Calculation Printout



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 infiltr rate	0.4372	0.4287	0.4201	0.3772	0.3686	0.3258	0.3258	0.3172	0.3429	0.3686	0.3858	0.4029 (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	0.5956	0.5919	0.5882	0.5711	0.5679	0.5531	0.5531	0.5503	0.5588	0.5679	0.5744	0.5812 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
TER Opaque door			1.8900	1.0000	1.8900		(26)
TER Opening Type (Uw = 1.20)			8.1700	1.1450	9.3550		(27)
Existing Ext Wall	15.3400	3.8500	11.4900	0.1800	2.0682		(29a)
New Ext Wall	14.3000	6.2100	8.0900	0.1800	1.4562		(29a)
Flat Roof	75.2000		75.2000	0.1100	8.2720		(30)
Total net area of external elements Aum(A, m ²)			104.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.0414		(33)
Party Wall			36.4000	0.0000	0.0000		(32)
Party Wall to Adjacent			33.0200	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							176.1070 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							5.2420 (36)
Point Thermal Bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	28.2834 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	38.4280	38.1885	37.9537	36.8512	36.6449	35.6846	35.6846	35.5068	36.0545	36.6449	37.0622	37.4985 (38)
Average = Sum(39)m / 12 =	66.7113	66.4718	66.2371	65.1346	64.9283	63.9680	63.9680	63.7902	64.3379	64.9283	65.3456	65.7819 (39)
												65.1336
HLP	0.8871	0.8839	0.8808	0.8662	0.8634	0.8506	0.8506	0.8483	0.8556	0.8634	0.8690	0.8748 (40)
HLP (average)												0.8661
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3655 (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	27.5942	27.1844	26.6073	25.5432	24.7464	23.8630	23.3857	23.9588	24.5828	25.5281	26.6141	27.5009 (42b)
Hot water usage for other uses	38.8550	37.4420	36.0291	34.6162	33.2033	31.7904	31.7904	33.2033	34.6162	36.0291	37.4420	38.8550 (42c)
Average daily hot water use (litres/day)												60.9069 (43)
Daily hot water use	66.4492	64.6264	62.6364	60.1594	57.9498	55.6534	55.1762	57.1621	59.1990	61.5573	64.0562	66.3559 (44)
Energy conte	105.2392	92.0272	96.2698	82.3553	78.0115	68.4323	66.7308	70.7787	72.9983	83.5326	91.2598	103.8972 (45)
Energy content (annual)										Total = Sum(45)m =		1011.5327
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:												
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												
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 (57)
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 (59)
Total heat required for water heating calculated for each month	89.4533	78.2231	81.8294	70.0020	66.3098	58.1675	56.7212	60.1619	62.0485	71.0027	77.5708	88.3127 (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	89.4533	78.2231	81.8294	70.0020	66.3098	58.1675	56.7212	60.1619	62.0485	71.0027	77.5708	88.3127 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		859.8028 (64)
Electric shower(s)	51.1581	45.5823	49.7741	47.4989	48.3902	46.1595	47.6982	48.3902	47.4989	49.7741	48.8382	51.1581 (64a)
Heat gains from water heating, kWh/month	35.1529	30.9514	32.9009	29.3752	28.6750	26.0817	26.1048	27.1380	27.3869	30.1942	31.6022	34.8677 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	119.6566	132.4770	119.6566	123.6452	119.6566	123.6452	119.6566	119.6566	123.6452	119.6566	123.6452	119.6566 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	209.1177	211.2877	205.8194	194.1780	179.4829	165.6715	156.4447	154.2747	159.7430	171.3844	186.0795	199.8908 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274 (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)	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195 (71)
Water heating gains (Table 5)	47.2485	46.0586	44.2216	40.7989	38.5417	36.2246	35.0871	36.4758	38.0373	40.5836	43.8920	46.8652 (72)
Total internal gains	434.5051	448.3055	428.1799	417.1044	396.1635	384.0237	369.6708	368.8895	379.9078	390.1070	412.0990	424.8950 (73)

Full SAP Calculation Printout



6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	Specific data or Table 6c	FF	Access factor Table 6d	Gains W
Southeast				4.3200	36.7938	0.6300	0.7000		0.7700	48.5770 (77)
Northwest				3.8500	11.2829	0.6300	0.7000		0.7700	13.2756 (81)
Solar gains	61.8526	109.7675	161.9014	220.2361	264.6023	270.5710	257.5791	223.2749	181.9131	52.4133 (83)
Total gains	496.3577	558.0730	590.0814	637.3405	660.7658	654.5947	627.2499	592.1644	514.5815	477.3083 (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	55.1433	55.3419	55.5381	56.4782	56.6576	57.5081	57.5081	57.6685	57.1775	56.6576	56.2958	55.9224
alpha	4.6762	4.6895	4.7025	4.7652	4.7772	4.8339	4.8339	4.8446	4.8118	4.7772	4.7531	4.7282
util living area	0.9872	0.9768	0.9584	0.9015	0.7877	0.5995	0.4435	0.4871	0.7186	0.9180	0.9753	0.9892 (86)
MIT	19.7618	19.9574	20.2152	20.5740	20.8336	20.9660	20.9935	20.9899	20.9195	20.5950	20.1363	19.7401 (87)
Th 2	20.1785	20.1812	20.1838	20.1964	20.1987	20.2097	20.2097	20.2117	20.2054	20.1987	20.1940	20.1890 (88)
util rest of house	0.9844	0.9719	0.9492	0.8802	0.7451	0.5342	0.3663	0.4073	0.6562	0.8957	0.9692	0.9868 (89)
MIT 2	19.0463	19.2412	19.4957	19.8477	20.0800	20.1914	20.2073	20.2078	20.1572	19.8747	19.4293	19.0331 (90)
Living area fraction	19.3840	19.5793	19.8354	20.1905	20.4358	20.5571	20.5784	20.5770	20.5171	fLA = Living area / (4) =		0.4721 (91)
MIT	19.3840	19.5793	19.8354	20.1905	20.4358	20.5571	20.5784	20.5770	20.5171	20.2147	19.7630	19.3669 (92)
Temperature adjustment												0.0000
adjusted MIT	19.3840	19.5793	19.8354	20.1905	20.4358	20.5571	20.5784	20.5770	20.5171	20.2147	19.7630	19.3669 (93)

8. Space heating requirement

Utilisation	0.9811	0.9675	0.9447	0.8800	0.7584	0.5636	0.4026	0.4447	0.6818	0.8962	0.9652	0.9838 (94)
Useful gains	486.9545	539.9279	557.4230	560.8536	501.1199	368.8971	252.5516	263.3645	383.0222	461.1682	470.0590	469.5714 (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	1006.2767	975.7602	883.2972	735.4041	567.1976	381.0611	254.4933	266.4543	412.8603	624.2689	827.4731	997.7047 (97)
Space heating kWh	386.3757	292.8793	242.4504	125.6763	49.1618	0.0000	0.0000	0.0000	0.0000	121.3470	257.3381	392.9312 (98a)
Space heating requirement - total per year (kWh/year)												1868.1599
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	386.3757	292.8793	242.4504	125.6763	49.1618	0.0000	0.0000	0.0000	0.0000	121.3470	257.3381	392.9312 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1868.1599
Space heating per m2										(98c) / (4) =		24.8426 (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	601.2991	473.3631	484.8052	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8891	0.9399	0.9218	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	534.6280	444.9351	446.9051	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	709.0851	679.8340	641.2800	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	125.6091	174.7648	144.6149	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	31.4023	43.6912	36.1537	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												111.2472 (107)
Energy for space heating												24.8426 (99)
Energy for space cooling												1.4794 (108)
Total												26.3219 (109)
Fabric Energy Efficiency (TFEE)												26.3 (109)

Full SAP Calculation Printout



Property Reference	Flat 2B			Issued on Date	01/02/2024
Assessment Reference	Baseline	Prop Type Ref	Conversion		
Property					
SAP Rating	73 C	DER	6.72	TER	6.59
Environmental	94 A	% DER < TER			-1.97
CO ₂ Emissions (t/year)	0.44	DFEE	59.95	TFEE	26.32
Compliance Check	See BREL	% DFEE < TFEE			-127.75
% DPER < TPER	-98.48	DPER	70.22	TPER	35.38
Assessor Details	Mr. Matthew Ray			Assessor ID	T806-0001
Client					

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	75.2000 (1b)	2.6000 (2b)	195.5200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	75.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	195.5200 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1534 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9034 (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) = 0.7679 (21)

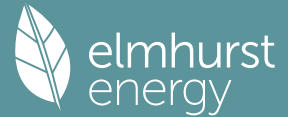
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.9791	0.9599	0.9407	0.8447	0.8255	0.7295	0.7295	0.7103	0.7679	0.8255	0.8639	0.9023 (22b)
Effective ac	0.9793	0.9607	0.9425	0.8568	0.8407	0.7661	0.7661	0.7523	0.7949	0.8407	0.8732	0.9071 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Entrance Door			1.8900	1.0000	1.8900		(26)
Windows (Uw = 1.60)			3.8500	1.5038	5.7895		(27)
Patio Doors (Uw = 1.60)			4.3200	1.5038	6.4962		(27)
Existing Ext Wall	15.3400	3.8500	11.4900	0.5500	6.3195	190.0000	2183.1000 (29a)
New Ext Wall	14.3000	6.2100	8.0900	0.1800	1.4562	9.0000	72.8100 (29a)
Flat Roof	75.2000		75.2000	0.1600	12.0320	9.0000	676.8000 (30)
Total net area of external elements Aum(A, m ²)			104.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.9834		(33)
Party Wall			36.4000	0.0000	0.0000	20.0000	728.0000 (32)
Party Wall to Adjacent			33.0200	0.0000	0.0000	180.0000	5943.6000 (32)
Party Floor			75.2000			30.0000	2256.0000 (32d)
Internal Wall			153.6600			9.0000	1382.9400 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		13243.2500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							176.1070 (35)
Thermal bridges (Default value 0.200 * total exposed area)							20.9680 (36)
Point Thermal Bridges						(36a) =	0.0000
Total fabric heat loss					(33) + (36) + (36a) =		54.9514 (37)

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

Full SAP Calculation Printout



(38)m	Jan 63.1872	Feb 61.9863	Mar 60.8091	Apr 55.2802	May 54.2458	Jun 49.4302	Jul 49.4302	Aug 48.5385	Sep 51.2851	Oct 54.2458	Nov 56.3384	Dec 58.5262	(38)
Heat transfer coeff	118.1386	116.9377	115.7606	110.2316	109.1972	104.3816	104.3816	103.4899	106.2365	109.1972	111.2898	113.4776	(39)
Average = Sum(39)m / 12 =												110.2267	
HLP	Jan 1.5710	Feb 1.5550	Mar 1.5394	Apr 1.4658	May 1.4521	Jun 1.3881	Jul 1.3881	Aug 1.3762	Sep 1.4127	Oct 1.4521	Nov 1.4799	Dec 1.5090	(40)
HLP (average)												1.4658	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3655	(42)
Hot water usage for mixer showers	63.8811	62.9211	61.5222	58.8456	56.8704	54.6676	53.4155	54.8038	56.3257	58.6908	61.4249	63.6364	(42a)	
Hot water usage for baths	27.5942	27.1844	26.6073	25.5432	24.7464	23.8630	23.3857	23.9588	24.5828	25.5281	26.6141	27.5009	(42b)	
Hot water usage for other uses	38.8550	37.4420	36.0291	34.6162	33.2033	31.7904	31.7904	33.2033	34.6162	36.0291	37.4420	38.8550	(42c)	
Average daily hot water use (litres/day)												119.8031	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	130.3303	127.5475	124.1586	119.0051	114.8201	110.3210	108.5917	111.9660	115.5247	120.2481	125.4811	129.9922	(44)	
Energy conte	206.4113	181.6260	190.8272	162.9120	154.5700	135.6525	131.3322	138.6373	142.4535	163.1755	178.7708	203.5364	(45)	
Energy content (annual)										Total = Sum(45)m =		1989.9047		
Distribution loss (46)m = 0.15 x (45)m	30.9617	27.2439	28.6241	24.4368	23.1855	20.3479	19.6998	20.7956	21.3680	24.4763	26.8156	30.5305	(46)	
Water storage loss:														
Store volume												210.0000	(47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.9400	(48)	
Temperature factor from Table 2b												0.5400	(49)	
Enter (49) or (54) in (55)												1.0476	(55)	
Total storage loss	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	(56)	
If cylinder contains dedicated solar storage	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	(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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744	(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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744	(64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2646.1747	(64)	
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)	
												0.0000	(64a)	
Heat gains from water heating, kWh/month	113.2222	100.6658	108.0404	97.3202	95.9849	88.2564	88.2584	90.6873	90.5178	98.8463	102.5933	112.2663	(65)	

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

Metabolic gains (Table 5), Watts													
(66)m	Jan 118.2744	Feb 118.2744	Mar 118.2744	Apr 118.2744	May 118.2744	Jun 118.2744	Jul 118.2744	Aug 118.2744	Sep 118.2744	Oct 118.2744	Nov 118.2744	Dec 118.2744	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	116.1924	128.6416	116.1924	120.0655	116.1924	120.0655	116.1924	116.1924	120.0655	116.1924	120.0655	116.1924	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	209.1177	211.2877	205.8194	194.1780	179.4829	165.6715	156.4447	154.2747	159.7430	171.3844	186.0795	199.8908	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	(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)	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	(71)
Water heating gains (Table 5)	152.1803	149.8004	145.2156	135.1670	129.0120	122.5784	118.6268	121.8915	125.7192	132.8579	142.4907	150.8955	(72)
Total internal gains	538.9727	551.2119	528.7097	510.8928	486.1696	466.7978	449.7463	450.8410	464.0100	481.9170	510.1180	528.4611	(73)

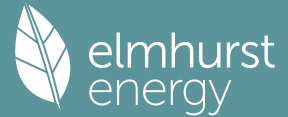
6. Solar gains

[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	
Northwest													3.8500		11.2829		0.6300		0.8000		0.7700		15.1721 (81)	
Southeast													4.3200		36.7938		0.6300		0.8000		0.7700		55.5166 (77)	
Solar gains													70.6887	125.4486	185.0302	251.6984	302.4026	309.2240	294.3762	255.1713	207.9007	142.2566	85.5865	59.9009 (83)
Total gains													609.6614	676.6605	713.7399	762.5912	788.5722	776.0218	744.1224	706.0123	671.9107	624.1736	595.7045	588.3620 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)														
tau	Jan 31.1387	Feb 31.4585	Mar 31.7784	Apr 33.3723	May 33.6884	Jun 35.2426	Jul 35.2426	Aug 35.5463	Sep 34.6273	Oct 33.6884	Nov 33.0550	Dec 32.4177		
alpha	3.0759	3.0972	3.1186	3.2248	3.2459	3.3495	3.3495	3.3698	3.3085	3.2459	3.2037	3.1612		
util living area	0.9812	0.9727	0.9589	0.9221	0.8506	0.7094	0.5637	0.6034	0.8001	0.9299	0.9706	0.9831	(86)	

Full SAP Calculation Printout



MIT	18.6754	18.9222	19.3074	19.9088	20.4017	20.7931	20.9299	20.9117	20.6579	20.0364	19.3290	18.7239 (87)
Th 2	19.6347	19.6465	19.6581	19.7132	19.7236	19.7725	19.7725	19.7816	19.7536	19.7236	19.7026	19.6807 (88)
util rest of house												
	0.9764	0.9657	0.9477	0.8994	0.8030	0.6166	0.4281	0.4711	0.7231	0.9051	0.9619	0.9788 (89)
MIT 2	16.9955	17.3147	17.8082	18.5897	19.1827	19.6338	19.7441	19.7422	19.4958	18.7630	17.8666	17.0839 (90)
Living area fraction									fLA = Living area / (4) =			0.4721 (91)
MIT	17.7886	18.0736	18.5159	19.2124	19.7581	20.1811	20.3039	20.2943	20.0444	19.3642	18.5570	17.8581 (92)
Temperature adjustment												0.0000
adjusted MIT	17.7886	18.0736	18.5159	19.2124	19.7581	20.1811	20.3039	20.2943	20.0444	19.3642	18.5570	17.8581 (93)

8. Space heating requirement

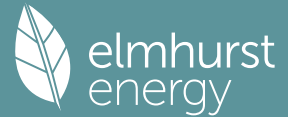
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9672	0.9546	0.9351	0.8885	0.8045	0.6502	0.4900	0.5303	0.7436	0.8962	0.9515	0.9704	(94)
Useful gains	589.6665	645.9191	667.3931	677.5741	634.4317	504.5710	364.6208	374.4015	499.5994	559.4065	566.8048	570.9711	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1593.5202	1540.4879	1390.9679	1136.7538	879.9265	582.5597	386.6187	403.0209	631.5126	957.0227	1275.0435	1549.8867	(97)
Space heating kWh	746.8671	601.1502	538.3396	330.6094	182.6481	0.0000	0.0000	0.0000	0.0000	295.8264	509.9319	728.3133	(98a)
Space heating requirement - total per year (kWh/year)												3933.6861	
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	746.8671	601.1502	538.3396	330.6094	182.6481	0.0000	0.0000	0.0000	0.0000	295.8264	509.9319	728.3133	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3933.6861	
Space heating per m2											(98c) / (4) =	52.3097	(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 %)												219.3000 (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	746.8671	601.1502	538.3396	330.6094	182.6481	0.0000	0.0000	0.0000	0.0000	295.8264	509.9319	728.3133 (98)
Space heating efficiency (main heating system 1)	219.3000	219.3000	219.3000	219.3000	219.3000	0.0000	0.0000	0.0000	0.0000	219.3000	219.3000	219.3000 (210)
Space heating fuel (main heating system)	340.5687	274.1223	245.4809	150.7567	83.2869	0.0000	0.0000	0.0000	0.0000	134.8958	232.5271	332.1082 (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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744 (64)
Efficiency of water heater (217)m	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000 (216)
Fuel for water heating, kWh/month	137.6835	121.8330	129.4985	113.8928	110.4559	99.5759	98.2512	102.0879	103.1479	114.9756	122.2221	136.1735 (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)
(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 (231)
Pumps and Fa	28.0625	22.5128	20.2702	14.8509	11.4712	9.3721	10.4644	13.6021	17.6677	23.1810	26.1829	28.8424 (232)
Lighting	Electricity generated by PVs (Appendix M) (negative quantity)											
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)
(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)	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)
(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)	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)
(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)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)
(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)	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)
(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)	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)
(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												1793.7465 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												190.4000
Water heating fuel used												1389.7976 (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)												226.4803 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												0.0000 (233)
Wind generation												0.0000 (234)
Hydro-electric generation (Appendix N)												0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)												0.0000 (235)
Appendix Q - special features												
Energy saved or generated												-0.0000 (236)
Energy used												0.0000 (237)
Total delivered energy for all uses												3410.0244 (238)

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

Full SAP Calculation Printout



	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1793.7465	0.1545	277.0740 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1389.7976	0.1409	195.7772 (264)
Space and water heating			472.8511 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	226.4803	0.1443	32.6881 (268)
Total CO2, kg/year			505.5392 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.7200 (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	1793.7465	1.5719	2819.5492 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1389.7976	1.5209	2113.7084 (278)
Space and water heating			4933.2576 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	226.4803	1.5338	347.3830 (282)
Total Primary energy kWh/year			5280.6406 (286)
Dwelling Primary energy Rate (DPER)			70.2200 (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)
Ground floor	75.2000 (1b)	x 2.6000 (2b)	= 195.5200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	75.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 195.5200 (5)

2. Ventilation rate

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

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1534 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.4034	(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) =		0.3429 (21)

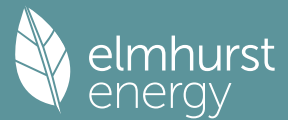
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.4372	0.4287	0.4201	0.3772	0.3686	0.3258	0.3258	0.3172	0.3429	0.3686	0.3858	0.4029 (22b)
Effective ac	0.5956	0.5919	0.5882	0.5711	0.5679	0.5531	0.5531	0.5503	0.5588	0.5679	0.5744	0.5812 (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
TER Opaque door			1.8900	1.0000	1.8900		(26)
TER Opening Type (Uw = 1.20)			8.1700	1.1450	9.3550		(27)
Existing Ext Wall	15.3400	3.8500	11.4900	0.1800	2.0682		(29a)
New Ext Wall	14.3000	6.2100	8.0900	0.1800	1.4562		(29a)
Flat Roof	75.2000		75.2000	0.1100	8.2720		(30)
Total net area of external elements Aum(A, m2)			104.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.0414		(33)
Party Wall			36.4000	0.0000	0.0000		(32)
Party Wall to Adjacent			33.0200	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							176.1070 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							5.2420 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	28.2834 (37)

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

Full SAP Calculation Printout



(38)m	38.4280	38.1885	37.9537	36.8512	36.6449	35.6846	35.6846	35.5068	36.0545	36.6449	37.0622	37.4985 (38)
Heat transfer coeff	66.7113	66.4718	66.2371	65.1346	64.9283	63.9680	63.9680	63.7902	64.3379	64.9283	65.3456	65.7819 (39)
Average = Sum(39)m / 12 =												65.1336
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.8871	0.8839	0.8808	0.8662	0.8634	0.8506	0.8506	0.8483	0.8556	0.8634	0.8690	0.8748 (40)
HLP (average)												0.8661
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3655 (42)
Hot water usage for mixer showers	63.8811	62.9211	61.5222	58.8456	56.8704	54.6676	53.4155	54.8038	56.3257	58.6908	61.4249	63.6364 (42a)
Hot water usage for baths	27.5942	27.1844	26.6073	25.5432	24.7464	23.8630	23.3857	23.9588	24.5828	25.5281	26.6141	27.5009 (42b)
Hot water usage for other uses	38.8550	37.4420	36.0291	34.6162	33.2033	31.7904	31.7904	33.2033	34.6162	36.0291	37.4420	38.8550 (42c)
Average daily hot water use (litres/day)												119.8031 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	130.3303	127.5475	124.1586	119.0051	114.8201	110.3210	108.5917	111.9660	115.5247	120.2481	125.4811	129.9922 (44)
Energy conte	206.4113	181.6260	190.8272	162.9120	154.5700	135.6525	131.3322	138.6373	142.4535	163.1755	178.7708	203.5364 (45)
Energy content (annual)										Total = Sum(45)m =		1989.9047
Distribution loss (46)m = 0.15 x (45)m	30.9617	27.2439	28.6241	24.4368	23.1855	20.3479	19.6998	20.7956	21.3680	24.4763	26.8156	30.5305 (46)
Water storage 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	258.1579	228.3649	242.5738	212.9893	206.3165	185.7298	183.0788	190.3839	192.5309	214.9221	228.8481	255.2830 (62)
WWHRS	-29.2038	-25.8281	-27.0457	-22.3949	-20.8712	-17.8596	-16.7406	-17.8019	-18.4783	-21.7839	-24.6785	-28.6630 (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	228.9541	202.5368	215.5281	190.5944	185.4453	167.8702	166.3382	172.5819	174.0526	193.1383	204.1697	226.6200 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2327.8297 (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	110.0290	97.7817	104.8473	94.2301	92.7918	85.1663	85.0652	87.4942	87.4277	95.6531	99.5032	109.0731 (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	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744	118.2744 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	119.6566	132.4770	119.6566	123.6452	119.6566	123.6452	119.6566	119.6566	123.6452	119.6566	123.6452	119.6566 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	209.1177	211.2877	205.8194	194.1780	179.4829	165.6715	156.4447	154.2747	159.7430	171.3844	186.0795	199.8908 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274	34.8274 (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)	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195 (71)
Water heating gains (Table 5)	147.8885	145.5085	140.9238	130.8751	124.7201	118.2866	114.3350	117.5997	121.4273	128.5661	138.1988	146.6037 (72)
Total internal gains	538.1451	550.7555	527.8821	510.1807	485.3420	466.0856	448.9187	450.0134	463.2979	481.0894	509.4059	527.6335 (73)

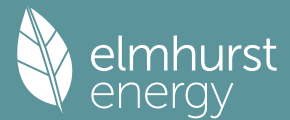
6. Solar gains

[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
Southeast				4.3200	36.7938		0.6300		0.7000		0.7700		48.5770 (77)
Northwest				3.8500	11.2829		0.6300		0.7000		0.7700		13.2756 (81)
Solar gains	61.8526	109.7675	161.9014	220.2361	264.6023	270.5710	257.5791	223.2749	181.9131	124.4745	74.8882		52.4133 (83)
Total gains	599.9977	660.5230	689.7836	730.4168	749.9443	736.6566	706.4978	673.2883	645.2110	605.5639	584.2941		580.0468 (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	55.1433	55.3419	55.5381	56.4782	56.6576	57.5081	57.5081	57.6685	57.1775	56.6576	56.2958	55.9224
alpha	4.6762	4.6895	4.7025	4.7652	4.7772	4.8339	4.8339	4.8446	4.8118	4.7772	4.7531	4.7282
util living area	0.9737	0.9574	0.9300	0.8564	0.7271	0.5408	0.3956	0.4314	0.6480	0.8687	0.9524	0.9769 (86)
MIT	19.9487	20.1307	20.3661	20.6757	20.8832	20.9780	20.9960	20.9940	20.9483	20.7021	20.2987	19.9282 (87)

Full SAP Calculation Printout



Th 2	20.1785	20.1812	20.1838	20.1964	20.1987	20.2097	20.2097	20.2117	20.2054	20.1987	20.1940	20.1890 (88)
util rest of house	0.9684	0.9491	0.9162	0.8296	0.6817	0.4793	0.3258	0.3595	0.5856	0.8386	0.9418	0.9722 (89)
MIT 2	18.9608	19.1904	19.4841	19.8640	20.0948	20.1948	20.2079	20.2088	20.1671	19.9031	19.4129	18.9430 (90)
Living area fraction									fLA = Living area / (4) =			0.4721 (91)
MIT	19.4272	19.6343	19.9005	20.2472	20.4670	20.5645	20.5799	20.5795	20.5359	20.2803	19.8311	19.4081 (92)
Temperature adjustment												0.0000
adjusted MIT	19.4272	19.6343	19.9005	20.2472	20.4670	20.5645	20.5799	20.5795	20.5359	20.2803	19.8311	19.4081 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9624	0.9426	0.9107	0.8314	0.6975	0.5073	0.3587	0.3933	0.6123	0.8419	0.9361	0.9666	(94)
Useful gains	577.4308	622.5810	628.1921	607.2605	523.1003	373.7243	253.4128	264.7913	395.0745	509.8385	546.9728	560.6717	(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	1009.1526	979.4144	887.6083	739.0922	569.2261	381.5395	254.5882	266.6101	414.0703	628.5253	831.9211	1000.4157	(97)
Space heating kWh	321.2011	239.7921	193.0057	94.9188	34.3176	0.0000	0.0000	0.0000	0.0000	88.3030	205.1628	327.1696	(98a)
Space heating requirement - total per year (kWh/year)												1503.8705	
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	321.2011	239.7921	193.0057	94.9188	34.3176	0.0000	0.0000	0.0000	0.0000	88.3030	205.1628	327.1696	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1503.8705	
Space heating per m2										(98c) / (4) =		19.9983	(99)

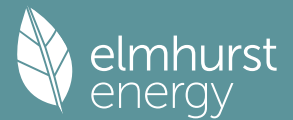
9a. Energy requirements - Individual heating systems, including micro-CHP

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	321.2011	239.7921	193.0057	94.9188	34.3176	0.0000	0.0000	0.0000	0.0000	88.3030	205.1628	327.1696	(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)	347.9968	259.7964	209.1069	102.8373	37.1805	0.0000	0.0000	0.0000	0.0000	95.6695	222.2782	354.4632	(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	228.9541	202.5368	215.5281	190.5944	185.4453	167.8702	166.3382	172.5819	174.0526	193.1383	204.1697	226.6200	(64)
Efficiency of water heater	84.8190	84.4394	83.8131	82.5826	81.0833	79.8000	79.8000	79.8000	79.8000	82.4209	84.0707	84.8825	(216)
(217)m	84.8190	84.4394	83.8131	82.5826	81.0833	79.8000	79.8000	79.8000	79.8000	82.4209	84.0707	84.8825	(217)
Fuel for water heating, kWh/month	269.9327	239.8605	257.1531	230.7926	228.7097	210.3636	208.4439	216.2681	218.1110	234.3316	242.8548	266.9809	(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	24.8623	19.9455	17.9587	13.1573	10.1631	8.3033	9.2711	12.0509	15.6529	20.5375	23.1971	25.5533	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	-58.3174	-76.7385	-103.0244	-107.9540	-110.1975	-100.7466	-99.5281	-96.9298	-91.5521	-83.8882	-62.1549	-51.0932	(233a)
(233a)m	-58.3174	-76.7385	-103.0244	-107.9540	-110.1975	-100.7466	-99.5281	-96.9298	-91.5521	-83.8882	-62.1549	-51.0932	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
(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)	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)
(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)	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)
(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)	-51.7902	-106.0760	-205.7762	-302.0387	-392.8413	-392.3648	-387.6842	-331.0921	-246.5911	-149.1323	-68.2687	-41.1682	(233b)
(233b)m	-51.7902	-106.0760	-205.7762	-302.0387	-392.8413	-392.3648	-387.6842	-331.0921	-246.5911	-149.1323	-68.2687	-41.1682	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
(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)	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)
(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)	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)
(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												1629.3289	(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												2823.8026	(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)												200.6529	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3716.9484	(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												1022.8359	(238)

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

Energy	Emission factor	Emissions
--------	-----------------	-----------

Full SAP Calculation Printout

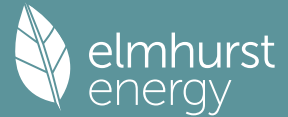


	kWh/year	kg CO2/kWh	kg CO2/year
Space heating - main system 1	1629.3289	0.2100	342.1591 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2823.8026	0.2100	592.9985 (264)
Space and water heating			935.1576 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	200.6529	0.1443	28.9604 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1042.1246	0.1361	-141.8152
PV Unit electricity exported	-2674.8239	0.1266	-338.6066
Total			-480.4218 (269)
Total CO2, kg/year			495.6255 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			6.5900 (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	1629.3289	1.1300	1841.1416 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2823.8026	1.1300	3190.8969 (278)
Space and water heating			5032.0385 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	200.6529	1.5338	307.7681 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1042.1246	1.5030	-1566.3342
PV Unit electricity exported	-2674.8239	0.4647	-1243.0018
Total			-2809.3360 (283)
Total Primary energy kWh/year			2660.5714 (286)
Target Primary Energy Rate (TPER)			35.3800 (287)

Full SAP Calculation Printout



Property Reference	Flat 2B				Issued on Date	01/02/2024
Assessment Reference	Baseline		Prop Type Ref	Conversion		
Property						
SAP Rating	73 C	DER	6.72	TER	6.59	
Environmental	94 A	% DER < TER				-1.97
CO ₂ Emissions (t/year)	0.44	DFEE	59.95	TFEE	26.32	
Compliance Check	See BREL	% DFEE < TFEE				-127.75
% DPER < TPER	-98.48	DPER	70.22	TPER	35.38	
Assessor Details	Mr. Matthew Ray				Assessor ID	T806-0001
Client						

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	75.2000 (1b)	2.6000 (2b)	195.5200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	75.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	195.5200 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1534 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9034 (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) = 0.7679 (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)
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	0.9791	0.9599	0.9407	0.8447	0.8255	0.7295	0.7295	0.7103	0.7679	0.8255	0.8639	0.9023 (22b)
Effective ac	0.9793	0.9607	0.9425	0.8568	0.8407	0.7661	0.7661	0.7523	0.7949	0.8407	0.8732	0.9071 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Entrance Door			1.8900	1.0000	1.8900		(26)
Windows (Uw = 1.60)			3.8500	1.5038	5.7895		(27)
Patio Doors (Uw = 1.60)			4.3200	1.5038	6.4962		(27)
Existing Ext Wall	15.3400	3.8500	11.4900	0.5500	6.3195	190.0000	2183.1000 (29a)
New Ext Wall	14.3000	6.2100	8.0900	0.1800	1.4562	9.0000	72.8100 (29a)
Flat Roof	75.2000		75.2000	0.1600	12.0320	9.0000	676.8000 (30)
Total net area of external elements Aum(A, m ²)			104.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.9834		(33)
Party Wall			36.4000	0.0000	0.0000	20.0000	728.0000 (32)
Party Wall to Adjacent			33.0200	0.0000	0.0000	180.0000	5943.6000 (32)
Party Floor			75.2000			30.0000	2256.0000 (32d)
Internal Wall			153.6600			9.0000	1382.9400 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		13243.2500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							176.1070 (35)
Thermal bridges (Default value 0.200 * total exposed area)							20.9680 (36)
Point Thermal Bridges						(36a) =	0.0000
Total fabric heat loss					(33) + (36) + (36a) =		54.9514 (37)

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

Full SAP Calculation Printout



(38)m	Jan 63.1872	Feb 61.9863	Mar 60.8091	Apr 55.2802	May 54.2458	Jun 49.4302	Jul 49.4302	Aug 48.5385	Sep 51.2851	Oct 54.2458	Nov 56.3384	Dec 58.5262 (38)
Heat transfer coeff	118.1386	116.9377	115.7606	110.2316	109.1972	104.3816	104.3816	103.4899	106.2365	109.1972	111.2898	113.4776 (39)
Average = Sum(39)m / 12 =												110.2267

HLP	Jan 1.5710	Feb 1.5550	Mar 1.5394	Apr 1.4658	May 1.4521	Jun 1.3881	Jul 1.3881	Aug 1.3762	Sep 1.4127	Oct 1.4521	Nov 1.4799	Dec 1.5090 (40)
HLP (average)												1.4658
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3655 (42)
Hot water usage for mixer showers													
63.8811	62.9211	61.5222	58.8456	56.8704	54.6676	53.4155	54.8038	56.3257	58.6908	61.4249	63.6364	(42a)	
Hot water usage for baths													
27.5942	27.1844	26.6073	25.5432	24.7464	23.8630	23.3857	23.9588	24.5828	25.5281	26.6141	27.5009	(42b)	
Hot water usage for other uses													
38.8550	37.4420	36.0291	34.6162	33.2033	31.7904	31.7904	33.2033	34.6162	36.0291	37.4420	38.8550	(42c)	
Average daily hot water use (litres/day)												119.8031 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
130.3303	127.5475	124.1586	119.0051	114.8201	110.3210	108.5917	111.9660	115.5247	120.2481	125.4811	129.9922	(44)	
Energy conte	206.4113	181.6260	190.8272	162.9120	154.5700	135.6525	131.3322	138.6373	142.4535	163.1755	178.7708	203.5364 (45)	
Energy content (annual)										Total = Sum(45)m =		1989.9047	
Distribution loss (46)m = 0.15 x (45)m													
30.9617	27.2439	28.6241	24.4368	23.1855	20.3479	19.6998	20.7956	21.3680	24.4763	26.8156	30.5305	(46)	
Water storage loss:													
Store volume												210.0000 (47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.9400 (48)	
Temperature factor from Table 2b												0.5400 (49)	
Enter (49) or (54) in (55)												1.0476 (55)	
Total storage loss													
32.4756	29.3328		31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	(56)	
If cylinder contains dedicated solar storage													
32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	(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	(61)	
Total heat required for water heating calculated for each month													
262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744	(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													
262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744	(64)	
												Total per year (kWh/year) = Sum(64)m = 2646.1747 (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													
113.2222	100.6658	108.0404	97.3202	95.9849	88.2564	88.2584	90.6873	90.5178	98.8463	102.5933	112.2663	(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	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	32.0606	28.4760	23.1582	17.5323	13.1056	11.0643	11.9553	15.5400	20.8578	26.4837	30.9104	32.9517 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	312.1159	315.3547	307.1931	289.8179	267.8849	247.2709	233.4996	230.2608	238.4224	255.7976	277.7306	298.3445 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584 (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)	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195 (71)
Water heating gains (Table 5)	152.1803	149.8004	145.2156	135.1670	129.0120	122.5784	118.6268	121.8915	125.7192	132.8579	142.4907	150.8955 (72)
Total internal gains	598.2250	595.4992	577.4351	544.3853	511.8706	479.7818	462.9499	466.5604	483.8675	517.0073	552.9998	584.0599 (73)

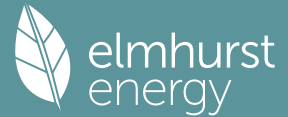
6. Solar gains

[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
Northwest	3.8500				11.2829		0.6300		0.8000		0.7700		15.1721 (81)
Southeast	4.3200				36.7938		0.6300		0.8000		0.7700		55.5166 (77)
Solar gains	70.6887	125.4486	185.0302	251.6984	302.4026	309.2240	294.3762	255.1713	207.9007	142.2566	85.5865	59.9009	(83)
Total gains	668.9137	720.9478	762.4653	796.0837	814.2732	789.0058	757.3260	721.7318	691.7682	659.2639	638.5863	643.9608	(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	
31.1387	31.4585	31.7784	33.3723	33.6884	35.2426	35.2426	35.5463	34.6273	33.6884	33.0550	32.4177	
alpha	3.0759	3.0972	3.1186	3.2248	3.2459	3.3495	3.3495	3.3698	3.2459	3.2037	3.1612	
util living area	0.9760	0.9678	0.9515	0.9139	0.8410	0.7024	0.5560	0.5937	0.7896	0.9203	0.9646	0.9783 (86)
MIT	18.7678	18.9894	19.3774	19.9511	20.4260	20.7995	20.9328	20.9160	20.6730	20.0820	19.3943	18.8124 (87)

Full SAP Calculation Printout



Th 2	19.6347	19.6465	19.6581	19.7132	19.7236	19.7725	19.7725	19.7816	19.7536	19.7236	19.7026	19.6807 (88)
util rest of house	0.9700	0.9598	0.9387	0.8896	0.7917	0.6093	0.4214	0.4621	0.7110	0.8929	0.9545	0.9730 (89)
MIT 2	17.1118	17.3985	17.8941	18.6391	19.2080	19.6388	19.7454	19.7444	19.5093	18.8158	17.9474	17.1954 (90)
Living area fraction									fLA = Living area / (4) =			0.4721 (91)
MIT	17.8936	18.1495	18.5943	19.2585	19.7830	20.1867	20.3059	20.2975	20.0586	19.4136	18.6305	17.9587 (92)
Temperature adjustment												0.0000
adjusted MIT	17.8936	18.1495	18.5943	19.2585	19.7830	20.1867	20.3059	20.2975	20.0586	19.4136	18.6305	17.9587 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9594	0.9477	0.9255	0.8790	0.7943	0.6433	0.4830	0.5212	0.7327	0.8846	0.9433	0.9633	(94)
Useful gains	641.7582	683.2543	705.6269	699.7682	646.7886	507.5993	365.7549	376.1662	506.8870	583.1799	602.3619	620.3528	(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	1605.9242	1549.3687	1400.0478	1141.8296	882.6404	583.1523	386.8311	403.3510	633.0230	962.4172	1283.2227	1561.3052	(97)
Space heating kWh	717.3395	582.0289	516.6492	318.2842	175.4737	0.0000	0.0000	0.0000	0.0000	282.1525	490.2198	700.0686	(98a)
Space heating requirement - total per year (kWh/year)												3782.2165	
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	717.3395	582.0289	516.6492	318.2842	175.4737	0.0000	0.0000	0.0000	0.0000	282.1525	490.2198	700.0686	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3782.2165	
Space heating per m2										(98c) / (4) =		50.2954	(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 %)													219.3000 (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	717.3395	582.0289	516.6492	318.2842	175.4737	0.0000	0.0000	0.0000	0.0000	282.1525	490.2198	700.0686	(98)
Space heating efficiency (main heating system 1)	219.3000	219.3000	219.3000	219.3000	219.3000	0.0000	0.0000	0.0000	0.0000	219.3000	219.3000	219.3000	(210)
Space heating fuel (main heating system)	327.1042	265.4030	235.5901	145.1364	80.0154	0.0000	0.0000	0.0000	0.0000	128.6605	223.5384	319.2287	(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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744	(64)
Efficiency of water heater	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	(216)
(217)m	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	(217)
Fuel for water heating, kWh/month	137.6835	121.8330	129.4985	113.8928	110.4559	99.5759	98.2512	102.0879	103.1479	114.9756	122.2221	136.1735	(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	28.0625	22.5128	20.2702	14.8509	11.4712	9.3721	10.4644	13.6021	17.6677	23.1810	26.1829	28.8424	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1724.6769	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												190.4000	
Water heating fuel used												1389.7976	(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)												226.4803	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												3340.9548	(238)

10a. Fuel costs - using Table 12 prices

Fuel Fuel price Fuel cost

Full SAP Calculation Printout



	kWh/year	p/kWh	£/year
Space heating - main system 1	1724.6769	16.4900	284.3992 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1389.7976	16.4900	229.1776 (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	226.4803	16.4900	37.3466 (250)
Additional standing charges			0.0000 (251)
Total energy cost			550.9234 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.6500 (257)
SAP value		73.2532
SAP rating (Section 12)		73 (258)
SAP band		C

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	1724.6769	0.1545	266.4307 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1389.7976	0.1409	195.7772 (264)
Space and water heating			462.2079 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	226.4803	0.1443	32.6881 (268)
Total CO2, kg/year			494.8960 (272)
CO2 emissions per m2			6.5800 (273)
EI value			94.4829
EI rating			94 (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)
Ground floor	75.2000 (1b)	x 2.6000 (2b)	= 195.5200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	75.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	195.5200 (5)

2. Ventilation rate

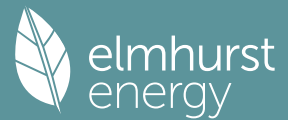
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1534 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9034 (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) = 0.7679 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000 (22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500 (22a)
Adj infilt rate	0.8063	0.7679	0.7679	0.7103	0.7103	0.6335	0.6527	0.6143	0.6335	0.6719	0.6719	0.7295 (22b)
Effective ac	0.8251	0.7949	0.7949	0.7523	0.7523	0.7007	0.7130	0.6887	0.7007	0.7257	0.7257	0.7661 (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
Entrance Door			1.8900	1.0000	1.8900		(26)
Windows (Uw = 1.60)			3.8500	1.5038	5.7895		(27)
Patio Doors (Uw = 1.60)			4.3200	1.5038	6.4962		(27)

Full SAP Calculation Printout



Existing Ext Wall	15.3400	3.8500	11.4900	0.5500	6.3195	190.0000	2183.1000 (29a)
New Ext Wall	14.3000	6.2100	8.0900	0.1800	1.4562	9.0000	72.8100 (29a)
Flat Roof	75.2000		75.2000	0.1600	12.0320	9.0000	676.8000 (30)
Total net area of external elements Aum(A, m2)			104.8400				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	33.9834			(33)
Party Wall			36.4000	0.0000		20.0000	728.0000 (32)
Party Wall to Adjacent			33.0200	0.0000	0.0000	180.0000	5943.6000 (32)
Party Floor			75.2000			30.0000	2256.0000 (32d)
Internal Wall			153.6600			9.0000	1382.9400 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13243.2500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		176.1070 (35)
Thermal bridges (Default value 0.200 * total exposed area)		20.9680 (36)
Point Thermal Bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	54.9514 (37)

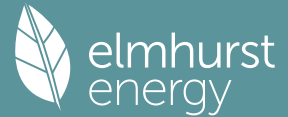
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	53.2351	51.2851	51.2851	48.5385	48.5385	45.2092	46.0059	44.4364	45.2092	46.8263	46.8263	49.4302 (38)
Average = Sum(39)m / 12 =	108.1865	106.2365	106.2365	103.4899	103.4899	100.1606	100.9573	99.3878	100.1606	101.7777	101.7777	104.3816 (39)
												103.0202
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.4387	1.4127	1.4127	1.3762	1.3762	1.3319	1.3425	1.3216	1.3319	1.3534	1.3534	1.3881 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.3655 (42)
Hot water usage for mixer showers												
Hot water usage for baths	63.8811	62.9211	61.5222	58.8456	56.8704	54.6676	53.4155	54.8038	56.3257	58.6908	61.4249	63.6364 (42a)
Hot water usage for other uses	27.5942	27.1844	26.6073	25.5432	24.7464	23.8630	23.3857	23.9588	24.5828	25.5281	26.6141	27.5009 (42b)
Average daily hot water use (litres/day)	38.8550	37.4420	36.0291	34.6162	33.2033	31.7904	31.7904	33.2033	34.6162	36.0291	37.4420	38.8550 (42c)
	38.8550	37.4420	36.0291	34.6162	33.2033	31.7904	31.7904	33.2033	34.6162	36.0291	37.4420	119.8031 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	130.3303	127.5475	124.1586	119.0051	114.8201	110.3210	108.5917	111.9660	115.5247	120.2481	125.4811	129.9922 (44)
Energy content (annual)	206.4113	181.6260	190.8272	162.9120	154.5700	135.6525	131.3322	138.6373	142.4535	163.1755	178.7708	203.5364 (45)
Distribution loss (46)m = 0.15 x (45)m												
Water storage loss:	30.9617	27.2439	28.6241	24.4368	23.1855	20.3479	19.6998	20.7956	21.3680	24.4763	26.8156	30.5305 (46)
Store volume												210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.9400 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0476 (55)
Total storage loss												
If cylinder contains dedicated solar storage	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756 (56)
Primary loss	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756 (57)
Combi 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)
Total heat required for water heating calculated for each month	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)
WWHRS	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744 (62)
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 (63a)
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 (63b)
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 (63c)
Output from w/h	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	113.2222	100.6658	108.0404	97.3202	95.9849	88.2564	88.2584	90.6873	90.5178	98.8463	102.5933	112.2663 (65)

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	32.0606	28.4760	23.1582	17.5323	13.1056	11.0643	11.9553	15.5400	20.8578	26.4837	30.9104	32.9517 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	312.1159	315.3547	307.1931	289.8179	267.8849	247.2709	233.4996	230.2608	238.4224	255.7976	277.7306	298.3445 (68)
Pumps, fans	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195 (71)
Total internal gains	152.1803	149.8004	145.2156	135.1670	129.0120	122.5784	118.6268	121.8915	125.7192	132.8579	142.4907	150.8955 (72)
	598.2250	595.4992	577.4351	544.3853	511.8706	479.7818	462.9499	466.5604	483.8675	517.0073	552.9998	584.0599 (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
Northwest	3.8500	12.9236	0.6300	0.8000	0.7700	17.3783 (81)
Southeast	4.3200	40.4699	0.6300	0.8000	0.7700	61.0632 (77)

Full SAP Calculation Printout



Solar gains	78.4415	125.5683	183.8260	259.1488	304.3742	333.4394	313.8624	277.5417	224.4048	152.2795	97.3568	65.7944 (83)
Total gains	676.6665	721.0674	761.2611	803.5341	816.2448	813.2212	776.8123	744.1021	708.2723	669.2868	650.3566	649.8543 (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	34.0031	34.6273	34.6273	35.5463	35.5463	36.7278	36.4380	37.0134	36.7278	36.1443	36.1443	35.2426
alpha	3.2669	3.3085	3.3085	3.3698	3.3698	3.4485	3.4292	3.4676	3.4485	3.4096	3.4096	3.3495
util living area	0.9707	0.9617	0.9394	0.8860	0.7766	0.5656	0.3920	0.4143	0.6931	0.8880	0.9528	0.9732 (86)
MIT	19.1490	19.3497	19.7224	20.2289	20.6575	20.9271	20.9850	20.9825	20.8395	20.3570	19.7518	19.1916 (87)
Th 2	19.7338	19.7536	19.7536	19.7816	19.7816	19.8159	19.8077	19.8239	19.8159	19.7992	19.7992	19.7725 (88)
util rest of house	0.9634	0.9522	0.9234	0.8540	0.7099	0.4509	0.2464	0.2682	0.5915	0.8500	0.9393	0.9666 (89)
MIT 2	17.6537	17.9181	18.3844	19.0196	19.5044	19.7804	19.8049	19.8203	19.7167	19.1945	18.4559	17.7317 (90)
Living area fraction	18.3596	18.5939	19.0160	19.5905	20.0487	20.3217	20.3620	20.3690	20.2467	19.7433	19.0677	0.4721 (91)
MIT	18.3596	18.5939	19.0160	19.5905	20.0487	20.3217	20.3620	20.3690	20.2467	19.7433	19.0677	18.4209 (92)
Temperature adjustment												0.0000
adjusted MIT	18.3596	18.5939	19.0160	19.5905	20.0487	20.3217	20.3620	20.3690	20.2467	19.7433	19.0677	18.4209 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9527	0.9407	0.9115	0.8481	0.7261	0.5022	0.3156	0.3376	0.6315	0.8479	0.9287	0.9567 (94)
Useful gains	644.6674	678.2846	693.8660	681.5095	592.6415	408.3732	245.1401	251.1791	447.2805	567.4734	604.0022	621.7387 (95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000 (96)
Heat loss rate W	1434.5071	1380.4285	1234.0460	1002.8678	729.4716	432.8662	248.5574	255.3230	505.4843	828.8012	1126.4405	1390.4528 (97)
Space heating kWh	587.6407	471.8407	401.8939	231.3779	101.8016	0.0000	0.0000	0.0000	0.0000	194.4279	376.1556	571.9233 (98a)
Space heating requirement - total per year (kWh/year)												2937.0617
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	587.6407	471.8407	401.8939	231.3779	101.8016	0.0000	0.0000	0.0000	0.0000	194.4279	376.1556	571.9233 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2937.0617
Space heating per m2										(98c) / (4) =		39.0567 (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 %)												219.3000 (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	587.6407	471.8407	401.8939	231.3779	101.8016	0.0000	0.0000	0.0000	0.0000	194.4279	376.1556	571.9233 (98)
Space heating efficiency (main heating system 1)	219.3000	219.3000	219.3000	219.3000	219.3000	0.0000	0.0000	0.0000	0.0000	219.3000	219.3000	219.3000 (210)
Space heating fuel (main heating system)	267.9620	215.1576	183.2622	105.5075	46.4212	0.0000	0.0000	0.0000	0.0000	88.6584	171.5256	260.7949 (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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744 (64)
Efficiency of water heater	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000 (216)
Fuel for water heating, kWh/month	137.6835	121.8330	129.4985	113.8928	110.4559	99.5759	98.2512	102.0879	103.1479	114.9756	122.2221	136.1735 (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	28.0625	22.5128	20.2702	14.8509	11.4712	9.3721	10.4644	13.6021	17.6677	23.1810	26.1829	28.8424 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)
Annual totals kWh/year												
Space heating fuel - main system 1												1339.2894 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												190.4000
Water heating fuel used												1389.7976 (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)												226.4803 (232)

Full SAP Calculation Printout



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

PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	2955.5673 (238)

10a. Fuel costs - using BEDF prices (535)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1339.2894	25.1600	336.9652 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1389.7976	25.1600	349.6731 (247)
Energy for instantaneous electric shower(s)	0.0000	25.1600	0.0000 (247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (249)
Energy for lighting	226.4803	25.1600	56.9824 (250)
Additional standing charges			0.0000 (251)
Total energy cost			743.6207 (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	1339.2894	0.1552	207.8248 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1389.7976	0.1409	195.7772 (264)
Space and water heating			403.6020 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	226.4803	0.1443	32.6881 (268)
Total CO2, kg/year			436.2901 (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	1339.2894	1.5745	2108.7253 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1389.7976	1.5209	2113.7084 (278)
Space and water heating			4222.4337 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	226.4803	1.5338	347.3830 (282)
Total Primary energy kWh/year			4569.8167 (286)

SAP 10 EPC IMPROVEMENTS

Baseline

Current energy efficiency rating:	C 73
Current environmental impact rating:	A 94

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

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

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

Potential energy efficiency rating:	C 73
Potential environmental impact rating:	A 94

Fuel prices for cost data on this page from database revision number 535 TEST (04 Jan 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

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

	Current £744	Potential £744	Saving £0
Electricity			
Space heating	£337	£337	£0
Water heating	£350	£350	£0
Lighting	£57	£57	£0
Total cost of fuels	£744	£744	£0
Total cost of uses	£744	£744	£0
Delivered energy	39 kWh/m²	39 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.4 tonnes	0.4 tonnes	0.0 tonnes
CO2 emissions per m²	6 kg/m²	6 kg/m²	0 kg/m²
Primary energy	61 kWh/m²	61 kWh/m²	0 kWh/m²

Full SAP Calculation Printout



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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	75.2000 (1b)	x 2.6000 (2b)	= 195.5200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	75.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 195.5200 (5)

2. Ventilation rate

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

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1534 (8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9034	(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) =		0.7679 (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	0.9791	0.9599	0.9407	0.8447	0.8255	0.7295	0.7295	0.7103	0.7679	0.8255	0.8639	0.9023 (22b)
Effective ac	0.9793	0.9607	0.9425	0.8568	0.8407	0.7661	0.7661	0.7523	0.7949	0.8407	0.8732	0.9071 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Entrance Door			1.8900	1.0000	1.8900		(26)
Windows (Uw = 1.60)			3.8500	1.5038	5.7895		(27)
Patio Doors (Uw = 1.60)			4.3200	1.5038	6.4962		(27)
Existing Ext Wall	15.3400	3.8500	11.4900	0.5500	6.3195	190.0000	2183.1000 (29a)
New Ext Wall	14.3000	6.2100	8.0900	0.1800	1.4562	9.0000	72.8100 (29a)
Flat Roof	75.2000		75.2000	0.1600	12.0320	9.0000	676.8000 (30)
Total net area of external elements Aum(A, m ²)			104.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.9834		(33)
Party Wall			36.4000	0.0000	0.0000	20.0000	728.0000 (32)
Party Wall to Adjacent			33.0200	0.0000	0.0000	180.0000	5943.6000 (32)
Party Floor			75.2000			30.0000	2256.0000 (32d)
Internal Wall			153.6600			9.0000	1382.9400 (32c)

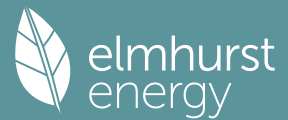
Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	13243.2500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		176.1070 (35)
Thermal bridges (Default value 0.200 * total exposed area)		20.9680 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	54.9514 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	63.1872	61.9863	60.8091	55.2802	54.2458	49.4302	49.4302	48.5385	51.2851	54.2458	56.3384	58.5262 (38)
Average = Sum(39)m / 12 =	118.1386	116.9377	115.7606	110.2316	109.1972	104.3816	104.3816	103.4899	106.2365	109.1972	111.2898	113.4776 (39)
												110.2267
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.5710	1.5550	1.5394	1.4658	1.4521	1.3881	1.3881	1.3762	1.4127	1.4521	1.4799	1.5090 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3655 (42)
Hot water usage for mixer showers												63.6364 (42a)
Hot water usage for baths												27.5009 (42b)
Hot water usage for other uses												38.8550 (42c)
Average daily hot water use (litres/day)												119.8031 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												

Full SAP Calculation Printout



Energy conte	130.3303	127.5475	124.1586	119.0051	114.8201	110.3210	108.5917	111.9660	115.5247	120.2481	125.4811	129.9922 (44)
Energy content (annual)	206.4113	181.6260	190.8272	162.9120	154.5700	135.6525	131.3322	138.6373	142.4535	163.1755	178.7708	203.5364 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1989.9047
Water storage loss:	30.9617	27.2439	28.6241	24.4368	23.1855	20.3479	19.6998	20.7956	21.3680	24.4763	26.8156	30.5305 (46)
Store volume												210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.9400 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0476 (55)
Total storage loss												
If cylinder contains dedicated solar storage	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756 (56)
Primary loss	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756 (57)
Combi 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)
Total heat required for water heating calculated for each month	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)
WWHRS	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744 (62)
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 (63a)
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 (63b)
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 (63c)
Output from w/h	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)
Electric shower(s)	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month												0.0000 (64a)
	113.2222	100.6658	108.0404	97.3202	95.9849	88.2564	88.2584	90.6873	90.5178	98.8463	102.5933	112.2663 (65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												

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	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	32.0606	28.4760	23.1582	17.5323	13.1056	11.0643	11.9553	15.5400	20.8578	26.4837	30.9104	32.9517 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	312.1159	315.3547	307.1931	289.8179	267.8849	247.2709	233.4996	230.2608	238.4224	255.7976	277.7306	298.3445 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584 (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)	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195 (71)
Water heating gains (Table 5)	152.1803	149.8004	145.2156	135.1670	129.0120	122.5784	118.6268	121.8915	125.7192	132.8579	142.4907	150.8955 (72)
Total internal gains	598.2250	595.4992	577.4351	544.3853	511.8706	479.7818	462.9499	466.5604	483.8675	517.0073	552.9998	584.0599 (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
Northwest				3.8500	11.2829		0.6300	0.8000		0.7700		15.1721 (81)
Southeast				4.3200	36.7938		0.6300	0.8000		0.7700		55.5166 (77)
Solar gains	70.6887	125.4486	185.0302	251.6984	302.4026	309.2240	294.3762	255.1713	207.9007	142.2566	85.5865	59.9009 (83)
Total gains	668.9137	720.9478	762.4653	796.0837	814.2732	789.0058	757.3260	721.7318	691.7682	659.2639	638.5863	643.9608 (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	31.1387	31.4585	31.7784	33.3723	33.6884	35.2426	35.2426	35.5463	34.6273	33.6884	33.0550	32.4177
Feb	3.0759	3.0972	3.1186	3.2248	3.2459	3.3495	3.3495	3.3698	3.3085	3.2459	3.2037	3.1612
util living area	0.9760	0.9678	0.9515	0.9139	0.8410	0.7024	0.5560	0.5937	0.7896	0.9203	0.9646	0.9783 (86)
MIT	18.7678	18.9894	19.3774	19.9511	20.4260	20.7995	20.9328	20.9160	20.6730	20.0820	19.3943	18.8124 (87)
Th 2	19.6347	19.6465	19.6581	19.7132	19.7236	19.7725	19.7725	19.7816	19.7536	19.7236	19.7026	19.6807 (88)
util rest of house	0.9700	0.9598	0.9387	0.8896	0.7917	0.6093	0.4214	0.4621	0.7110	0.8929	0.9545	0.9730 (89)
MIT 2	17.1118	17.3985	17.8941	18.6391	19.2080	19.6388	19.7454	19.7444	19.5093	18.8158	17.9474	17.1954 (90)
Living area fraction	17.8936	18.1495	18.5943	19.2585	19.7830	20.1867	20.3059	20.2975	20.0586	19.4136	18.6305	17.9587 (91)
MIT	17.8936	18.1495	18.5943	19.2585	19.7830	20.1867	20.3059	20.2975	20.0586	19.4136	18.6305	17.9587 (92)
Temperature adjustment												0.0000
adjusted MIT	17.8936	18.1495	18.5943	19.2585	19.7830	20.1867	20.3059	20.2975	20.0586	19.4136	18.6305	17.9587 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9594	0.9477	0.9255	0.8790	0.7943	0.6433	0.4830	0.5212	0.7327	0.8846	0.9433	0.9633 (94)
Ext temp.	641.7582	683.2543	705.6269	699.7682	646.7886	507.5993	365.7549	376.1662	506.8870	583.1799	602.3619	620.3528 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Space heating kWh	1605.9242	1549.3687	1400.0478	1141.8296	882.6404	583.1523	386.8311	403.3510	633.0230	962.4172	1283.2227	1561.3052 (97)
Space heating requirement - total per year (kWh/year)	717.3395	582.0289	516.6492	318.2842	175.4737	0.0000	0.0000	0.0000	0.0000	282.1525	490.2198	700.0686 (98a)
Solar heating kWh												3782.2165
Solar heating contribution - total per year (kWh/year)	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)
Space heating kWh												0.0000

Full SAP Calculation Printout



717.3395	582.0289	516.6492	318.2842	175.4737	0.0000	0.0000	0.0000	0.0000	282.1525	490.2198	700.0686 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)											3782.2165
Space heating per m2											(98c) / (4) = 50.2954 (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 %)												219.3000 (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	717.3395	582.0289	516.6492	318.2842	175.4737	0.0000	0.0000	0.0000	0.0000	282.1525	490.2198	700.0686 (98)
Space heating efficiency (main heating system 1)	219.3000	219.3000	219.3000	219.3000	219.3000	0.0000	0.0000	0.0000	0.0000	219.3000	219.3000	219.3000 (210)
Space heating fuel (main heating system)	327.1042	265.4030	235.5901	145.1364	80.0154	0.0000	0.0000	0.0000	0.0000	128.6605	223.5384	319.2287 (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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744 (64)
Efficiency of water heater (217)m	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000 (216)
Fuel for water heating, kWh/month	137.6835	121.8330	129.4985	113.8928	110.4559	99.5759	98.2512	102.0879	103.1479	114.9756	122.2221	136.1735 (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	28.0625	22.5128	20.2702	14.8509	11.4712	9.3721	10.4644	13.6021	17.6677	23.1810	26.1829	28.8424 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)
Annual totals kWh/year												
Space heating fuel - main system 1												1724.6769 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												190.4000
Water heating fuel used												1389.7976 (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)												226.4803 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												0.0000 (233)
Wind generation												0.0000 (234)
Hydro-electric generation (Appendix N)												0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)												0.0000 (235)
Appendix Q - special features												
Energy saved or generated												-0.0000 (236)
Energy used												0.0000 (237)
Total delivered energy for all uses												3340.9548 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1724.6769	16.4900	284.3992 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1389.7976	16.4900	229.1776 (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	226.4803	16.4900	37.3466 (250)
Additional standing charges			0.0000 (251)
Total energy cost			550.9234 (255)

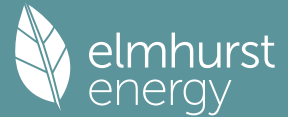
11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.6500 (257)
SAP value		73.2532
SAP rating (Section 12)		73 (258)
SAP band		C

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

Energy	Emission factor	Emissions
--------	-----------------	-----------

Full SAP Calculation Printout



Space heating - main system 1	kWh/year	kg CO2/kWh	kg CO2/year
Total CO2 associated with community systems	1724.6769	0.1545	266.4307 (261)
Water heating (other fuel)			0.0000 (373)
Space and water heating	1389.7976	0.1409	195.7772 (264)
Pumps, fans and electric keep-hot			462.2079 (265)
Energy for lighting	0.0000	0.0000	0.0000 (267)
Total CO2, kg/year	226.4803	0.1443	32.6881 (268)
CO2 emissions per m2			494.8960 (272)
EI value			6.5800 (273)
EI rating			94.4829
EI band			94 (274)
			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)
Ground floor	75.2000 (1b)	x 2.6000 (2b)	= 195.5200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	75.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 195.5200 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1534 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9034 (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) = 0.7679 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.2000	4.0000	4.0000	3.7000	3.7000	3.3000	3.4000	3.2000	3.3000	3.5000	3.5000	3.8000 (22)
Wind factor	1.0500	1.0000	1.0000	0.9250	0.9250	0.8250	0.8500	0.8000	0.8250	0.8750	0.8750	0.9500 (22a)
Adj infilt rate	0.8063	0.7679	0.7679	0.7103	0.7103	0.6335	0.6527	0.6143	0.6335	0.6719	0.6719	0.7295 (22b)
Effective ac	0.8251	0.7949	0.7949	0.7523	0.7523	0.7007	0.7130	0.6887	0.7007	0.7257	0.7257	0.7661 (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
Entrance Door			1.8900	1.0000	1.8900		(26)
Windows (Uw = 1.60)			3.8500	1.5038	5.7895		(27)
Patio Doors (Uw = 1.60)			4.3200	1.5038	6.4962		(27)
Existing Ext Wall	15.3400	3.8500	11.4900	0.5500	6.3195	190.0000	2183.1000 (29a)
New Ext Wall	14.3000	6.2100	8.0900	0.1800	1.4562	9.0000	72.8100 (29a)
Flat Roof	75.2000		75.2000	0.1600	12.0320	9.0000	676.8000 (30)
Total net area of external elements Aum(A, m2)			104.8400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.9834		(33)
Party Wall			36.4000	0.0000	0.0000	20.0000	728.0000 (32)
Party Wall to Adjacent			33.0200	0.0000	0.0000	180.0000	5943.6000 (32)
Party Floor			75.2000			30.0000	2256.0000 (32d)
Internal Wall			153.6600			9.0000	1382.9400 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13243.2500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							176.1070 (35)
Thermal bridges (Default value 0.200 * total exposed area)							20.9680 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	54.9514 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	53.2351	51.2851	51.2851	48.5385	48.5385	45.2092	46.0059	44.4364	45.2092	46.8263	46.8263	49.4302 (38)
Average = Sum(39)m / 12 =	108.1865	106.2365	106.2365	103.4899	103.4899	100.1606	100.9573	99.3878	100.1606	101.7777	101.7777	104.3816 (39)
												103.0202
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.4387	1.4127	1.4127	1.3762	1.3762	1.3319	1.3425	1.3216	1.3319	1.3534	1.3534	1.3881 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

Full SAP Calculation Printout



4. Water heating energy requirements (kWh/year)												
Assumed occupancy	2.3655 (42)											
Hot water usage for mixer showers	63.6364 (42a)											
Hot water usage for baths	27.5009 (42b)											
Hot water usage for other uses	38.8550 (42c)											
Average daily hot water use (litres/day)	119.8031 (43)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	130.3303	127.5475	124.1586	119.0051	114.8201	110.3210	108.5917	111.9660	115.5247	120.2481	125.4811	129.9922 (44)
Energy content (annual)	206.4113	181.6260	190.8272	162.9120	154.5700	135.6525	131.3322	138.6373	142.4535	163.1755	178.7708	203.5364 (45)
Distribution loss (46)m = 0.15 x (45)m	1989.9047											
Water storage loss:	30.9617	27.2439	28.6241	24.4368	23.1855	20.3479	19.6998	20.7956	21.3680	24.4763	26.8156	30.5305 (46)
Store volume	210.0000 (47)											
a) If manufacturer declared loss factor is known (kWh/day):	1.9400 (48)											
Temperature factor from Table 2b	0.5400 (49)											
Enter (49) or (54) in (55)	1.0476 (55)											
Total storage loss	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756 (56)
If cylinder contains dedicated solar storage	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756 (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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744 (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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	113.2222	100.6658	108.0404	97.3202	95.9849	88.2564	88.2584	90.6873	90.5178	98.8463	102.5933	112.2663 (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	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292	141.9292 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	32.0606	28.4760	23.1582	17.5323	13.1056	11.0643	11.9553	15.5400	20.8578	26.4837	30.9104	32.9517 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	312.1159	315.3547	307.1931	289.8179	267.8849	247.2709	233.4996	230.2608	238.4224	255.7976	277.7306	298.3445 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584	51.5584 (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)	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195	-94.6195 (71)
Water heating gains (Table 5)	152.1803	149.8004	145.2156	135.1670	129.0120	122.5784	118.6268	121.8915	125.7192	132.8579	142.4907	150.8955 (72)
Total internal gains	598.2250	595.4992	577.4351	544.3853	511.8706	479.7818	462.9499	466.5604	483.8675	517.0073	552.9998	584.0599 (73)
6. Solar gains												
[Jan]	Area	Solar flux	g	FF	Access	Gains						
	m2	Table 6a	Specific data	Specific data	factor	W						
		W/m2	or Table 6b	or Table 6c	Table 6d							
Northwest	3.8500	12.9236	0.6300	0.8000	0.7700	17.3783 (81)						
Southeast	4.3200	40.4699	0.6300	0.8000	0.7700	61.0632 (77)						
Solar gains	78.4415	125.5683	183.8260	259.1488	304.3742	333.4394	313.8624	277.5417	224.4048	152.2795	97.3568	65.7944 (83)
Total gains	676.6665	721.0674	761.2611	803.5341	816.2448	813.2212	776.8123	744.1021	708.2723	669.2868	650.3566	649.8543 (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	34.0031	34.6273	34.6273	35.5463	35.5463	36.7278	36.4380	37.0134	36.7278	36.1443	36.1443	35.2426
alpha	3.2669	3.3085	3.3085	3.3698	3.3698	3.4485	3.4292	3.4676	3.4485	3.4096	3.4096	3.3495
util living area	0.9707	0.9617	0.9394	0.8860	0.7766	0.5656	0.3920	0.4143	0.6931	0.8880	0.9528	0.9732 (86)
MIT	19.1490	19.3497	19.7224	20.2289	20.6575	20.9271	20.9850	20.9825	20.8395	20.3570	19.7518	19.1916 (87)
Th 2	19.7338	19.7536	19.7536	19.7816	19.7816	19.8159	19.8077	19.8239	19.8159	19.7992	19.7992	19.7725 (88)
util rest of house	0.9634	0.9522	0.9234	0.8540	0.7099	0.4509	0.2464	0.2682	0.5915	0.8500	0.9393	0.9666 (89)
MIT 2	17.6537	17.9181	18.3844	19.0196	19.5044	19.7804	19.8049	19.8203	19.7167	19.1945	18.4559	17.7317 (90)
Living area fraction	18.3596	18.5939	19.0160	19.5905	20.0487	20.3217	20.3620	20.3690	20.2467	19.7433	19.0677	18.4209 (91)
MIT	18.3596	18.5939	19.0160	19.5905	20.0487	20.3217	20.3620	20.3690	20.2467	19.7433	19.0677	18.4209 (92)
Temperature adjustment	18.3596	18.5939	19.0160	19.5905	20.0487	20.3217	20.3620	20.3690	20.2467	19.7433	19.0677	18.4209 (93)

Full SAP Calculation Printout



8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9527	0.9407	0.9115	0.8481	0.7261	0.5022	0.3156	0.3376	0.6315	0.8479	0.9287	0.9567	(94)
Useful gains	644.6674	678.2846	693.8660	681.5095	592.6415	408.3732	245.1401	251.1791	447.2805	567.4734	604.0022	621.7387	(95)
Ext temp.	5.1000	5.6000	7.4000	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000	(96)
Heat loss rate W	1434.5071	1380.4285	1234.0460	1002.8678	729.4716	432.8662	248.5574	255.3230	505.4843	828.8012	1126.4405	1390.4528	(97)
Space heating kWh	587.6407	471.8407	401.8939	231.3779	101.8016	0.0000	0.0000	0.0000	0.0000	194.4279	376.1556	571.9233	(98a)
Space heating requirement - total per year (kWh/year)												2937.0617	
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	587.6407	471.8407	401.8939	231.3779	101.8016	0.0000	0.0000	0.0000	0.0000	194.4279	376.1556	571.9233	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2937.0617	
Space heating per m2											(98c) / (4) =	39.0567	(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 %)												219.3000	(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	587.6407	471.8407	401.8939	231.3779	101.8016	0.0000	0.0000	0.0000	0.0000	194.4279	376.1556	571.9233	(98)
Space heating efficiency (main heating system 1)	219.3000	219.3000	219.3000	219.3000	219.3000	0.0000	0.0000	0.0000	0.0000	219.3000	219.3000	219.3000	(210)
Space heating fuel (main heating system)	267.9620	215.1576	183.2622	105.5075	46.4212	0.0000	0.0000	0.0000	0.0000	88.6584	171.5256	260.7949	(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	262.1493	231.9700	246.5652	216.8520	210.3080	189.5925	187.0702	194.3753	196.3935	218.9135	232.7108	259.2744	(64)
Efficiency of water heater (217)m	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	(216)
Fuel for water heating, kWh/month	137.6835	121.8330	129.4985	113.8928	110.4559	99.5759	98.2512	102.0879	103.1479	114.9756	122.2221	136.1735	(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	28.0625	22.5128	20.2702	14.8509	11.4712	9.3721	10.4644	13.6021	17.6677	23.1810	26.1829	28.8424	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1339.2894	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												190.4000	
Water heating fuel used												1389.7976	(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)												226.4803	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												2955.5673	(238)

10a. Fuel costs - using BEDF prices (535)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1339.2894	25.1600	336.9652	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1389.7976	25.1600	349.6731	(247)
Energy for instantaneous electric shower(s)	0.0000	25.1600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	226.4803	25.1600	56.9824	(250)
Additional standing charges			0.0000	(251)
Total energy cost			743.6207	(255)

Full SAP Calculation Printout



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	1339.2894	0.1552	207.8248 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1389.7976	0.1409	195.7772 (264)
Space and water heating			403.6020 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	226.4803	0.1443	32.6881 (268)
Total CO2, kg/year			436.2901 (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	1339.2894	1.5745	2108.7253 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1389.7976	1.5209	2113.7084 (278)
Space and water heating			4222.4337 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	226.4803	1.5338	347.3830 (282)
Total Primary energy kWh/year			4569.8167 (286)

Overview Report

Dwelling Address	
Report Date	01/02/2024
Property Type	Flat, Semi-Detached
Floor Area [m ²]	75

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

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.

Most energy efficient - lower running costs

CURRENT

POTENTIAL

(92 plus)

A

(81-91)

B

(69-80)

C

(55-68)

D

(39-54)

E

(21-38)

F

(1-20)

G

73

73

Least energy efficient - higher running costs

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 0.4 W/m ² K	Good
Roof	Average thermal transmittance 0.16 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Average
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Primary Energy use

The primary energy use for this property per year is 61 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is: **0.4** per year

With the recommended measures the potential CO emissions could be: **0** per year

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 measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
---------------------	-----------------------	--	-------------------------------	-----------------------------

Estimated energy use and potential savings

Estimated energy cost for this property over a year

£744

Over a year you could save

£0

The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details	
Assessor name	Mr. Matthew Ray
Assessor's accreditation number	EES/024957
Email Address	matt@buildenergy.co.uk

Accreditation scheme contact details

Accreditation scheme	Elmhurst Energy Systems Ltd
Telephone	0330 055 3405
Email Address	matt@buildenergy.co.uk

Assessment details

Related party disclosure	No related party
Date of assessment	26/01/2024
Date of certificate	26/01/2024
Type of assessment	SAP, new dwelling