

Summary for Input Data

Property Reference	Flat 1B	Issued on Date	01/02/2024
Assessment Reference	Be Lean	Prop Type Ref	Conversion
Property			

SAP Rating	74 C	DER	6.21	TER	6.57
Environmental	95 A	% DER < TER			5.48
CO ₂ Emissions (t/year)	0.46	DFEE	61.26	TFEE	29.38
Compliance Check	See BREL	% DFEE < TFEE			-108.47
% DPER < TPER	-81.97	DPER	64.53	TPER	35.46

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	Mid-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:	11.70 m	85.10 m ²	2.80 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	44.00	m ²
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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	0.18	190.00	16.52	12.67	0.00	None	3.85	Enter Gross Area
	New Ext Wall	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18	9.00	16.24	10.03	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	43.40	0.00	None
	Party Wall to Adjacent	Solid Wall	Dense plaster both sides, dense blocks, cavity or cavity fill	0.00	180.00	19.60	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	145.04

Summary for Input Data

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling	Timber I-joists, carpeted	20.00	85.10

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Floor Over Commercial	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.25	None	0.00	20.00	85.10

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	0.63	Metal 32 mm break	0.80	1.20
Patio Doors	Manufacturer	Window	Double Low-E Soft 0.05	≥ 16 mm	Argon Filled	0.63	Metal 32 mm break	0.80	1.20

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

FI Case

FI Water

Summary for Input Data

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
Combi boiler type	Standard Combi
Combi keep hot type	None

25.0 Main Heating 2

26.0 Heat Networks

	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

	None	
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

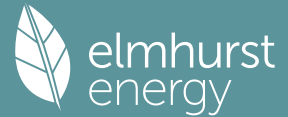
Lower cost measures

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



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% DPER < TPER	-81.97	DPER	64.53	TPER	35.46	
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	85.1000 (1b)	2.8000 (2b)	238.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	238.2800 (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) = 0.1259 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8759 (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) = 0.7445 (21)

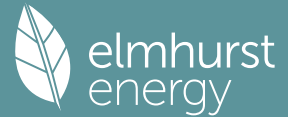
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.9493	0.9306	0.9120	0.8190	0.8004	0.7073	0.7073	0.6887	0.7445	0.8004	0.8376	0.8748 (22b)
Effective ac	0.9505	0.9331	0.9159	0.8354	0.8203	0.7501	0.7501	0.7371	0.7772	0.8203	0.8508	0.8826 (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 = 1.20)			3.8500	1.1450	4.4084		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Floor Over Commercial			85.1000	0.2500	21.2750	20.0000	1702.0000 (28b)
Existing Ext Wall	16.5200	3.8500	12.6700	0.1800	2.2806	190.0000	2407.3000 (29a)
New Ext Wall	16.2400	6.2100	10.0300	0.1800	1.8054	9.0000	90.2700 (29a)
Total net area of external elements Aum(A, m ²)			117.8600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	36.6060		(33)
Party Wall			43.4000	0.0000	0.0000	20.0000	868.0000 (32)
Party Wall to Adjacent			19.6000	0.0000	0.0000	180.0000	3528.0000 (32)
Party Ceiling			85.1000			20.0000	1702.0000 (32b)
Internal Wall			145.0400			9.0000	1305.3600 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	11602.9300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							136.3447 (35)
Thermal bridges (Default value 0.200 * total exposed area)							23.5720 (36)
Point Thermal Bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	60.1780 (37)

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

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(38)m	Jan 74.7437	Feb 73.3681	Mar 72.0196	Apr 65.6860	May 64.5010	Jun 58.9846	Jul 58.9846	Aug 57.9630	Sep 61.1094	Oct 64.5010	Nov 66.8982	Dec 69.4044	(38)
Heat transfer coeff	134.9217	133.5460	132.1976	125.8639	124.6789	119.1625	119.1625	118.1410	121.2873	124.6789	127.0762	129.5824	(39)
Average = Sum(39)m / 12 =												125.8582	
HLP	Jan 1.5854	Feb 1.5693	Mar 1.5534	Apr 1.4790	May 1.4651	Jun 1.4003	Jul 1.4003	Aug 1.3883	Sep 1.4252	Oct 1.4651	Nov 1.4933	Dec 1.5227	(40)
HLP (average)												1.4789	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.5525	(42)
Hot water usage for mixer showers														
67.0175	66.0104	64.5428	61.7348	59.6625	57.3516	56.0381	57.4946	59.0912	61.5724	64.4407	66.7607	66.7607	(42a)	
Hot water usage for baths														
28.9429	28.5131	27.9078	26.7917	25.9560	25.0293	24.5288	25.1299	25.7843	26.7759	27.9150	28.8451	28.8451	(42b)	
Hot water usage for other uses														
40.7706	39.2880	37.8055	36.3229	34.8403	33.3578	33.3578	34.8403	36.3229	37.8055	39.2880	40.7706	40.7706	(42c)	
Average daily hot water use (litres/day)												125.6868	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	136.7311	133.8115	130.2560	124.8494	120.4589	115.7387	113.9246	117.4648	121.1984	126.1538	131.6437	136.3764	(44)	
Energy content	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(45)	
Energy content (annual)										Total = Sum(45)m =		2087.6309		
Distribution loss (46)m = 0.15 x (45)m														
32.4823	28.5819	30.0298	25.6369	24.3241	21.3471	20.6673	21.8169	22.4175	25.6784	28.1326	32.0299	32.0299	(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	(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														
216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	213.5326	(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	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(64)	
												2087.6309	(64)	
12Total per year (kWh/year)												2088	(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														
72.0024	63.3565	66.5661	56.8284	53.9185	47.3195	45.8125	48.3608	49.6920	56.9205	62.3606	70.9996	70.9996	(65)	

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

Metabolic gains (Table 5), Watts													
(66)m	Jan 127.6272	Feb 127.6272	Mar 127.6272	Apr 127.6272	May 127.6272	Jun 127.6272	Jul 127.6272	Aug 127.6272	Sep 127.6272	Oct 127.6272	Nov 127.6272	Dec 127.6272	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	131.1923	145.2486	131.1923	135.5654	131.1923	135.5654	131.1923	131.1923	135.5654	131.1923	135.5654	131.1923	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	229.7690	232.1533	226.1450	213.3540	197.2077	182.0324	171.8944	169.5101	175.5184	188.3094	204.4557	219.6310	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	(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)	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	(71)
Water heating gains (Table 5)	96.7774	94.2805	89.4705	78.9284	72.4711	65.7215	61.5759	65.0010	69.0167	76.5060	86.6119	95.4295	(72)
Total internal gains	522.0269	535.9705	511.0959	492.1359	465.1592	444.6074	425.9507	426.9916	441.3886	460.2959	490.9212	510.5410	(73)

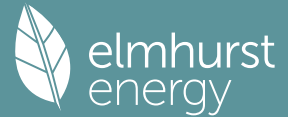
6. Solar gains

[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					592.7156	661.4191	696.1262	743.8343	767.5618	753.8314	720.3269	682.1629	649.2894	602.5525	576.5077	570.4419	(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	23.8882	24.1343	24.3805	25.6073	25.8507	27.0474	27.0474	27.2813	26.5736	25.8507	25.3630	24.8725
alpha	2.5925	2.6090	2.6254	2.7072	2.7234	2.8032	2.8032	2.8188	2.7716	2.7234	2.6909	2.6582
util living area	0.9767	0.9676	0.9543	0.9209	0.8599	0.7413	0.6119	0.6496	0.8199	0.9295	0.9664	0.9789 (86)
MIT	18.0704	18.3469	18.7904	19.4933	20.0986	20.6259	20.8467	20.8152	20.4447	19.6707	18.8336	18.1222 (87)
Th 2	19.6240	19.6359	19.6477	19.7033	19.7138	19.7631	19.7631	19.7723	19.7440	19.7138	19.6926	19.6705 (88)
util rest of house	0.9717	0.9606	0.9437	0.9009	0.8193	0.6584	0.4789	0.5228	0.7540	0.9078	0.9580	0.9744 (89)

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MIT 2	16.2751	16.6318	17.2004	18.1121	18.8562	19.4830	19.6878	19.6737	19.2877	18.3492	17.2836	16.3650 (90)
Living area fraction									FLA = Living area / (4) =			0.5170 (91)
MIT	17.2033	17.5185	18.0225	18.8262	19.4986	20.0739	20.2870	20.2639	19.8859	19.0325	18.0850	17.2735 (92)
Temperature adjustment												0.0000
adjusted MIT	17.2033	17.5185	18.0225	18.8262	19.4986	20.0739	20.2870	20.2639	19.8859	19.0325	18.0850	17.2735 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9588	0.9452	0.9262	0.8836	0.8111	0.6817	0.5397	0.5782	0.7627	0.8928	0.9435	0.9626	(94)
Useful gains	568.2765	625.1545	644.7429	657.2329	622.5481	513.8851	388.7746	394.4322	495.2247	537.9381	543.9293	549.0872	(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	1740.9413	1685.1549	1523.2469	1249.3541	972.3207	652.2846	439.3505	456.4848	701.7579	1051.3511	1395.9320	1694.1017	(97)
Space heating kWh	872.4626	712.3203	653.6070	426.3273	260.2308	0.0000	0.0000	0.0000	0.0000	381.9792	613.4419	851.8907	(98a)
Space heating requirement - total per year (kWh/year)												4772.2599	
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	872.4626	712.3203	653.6070	426.3273	260.2308	0.0000	0.0000	0.0000	0.0000	381.9792	613.4419	851.8907	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4772.2599	
Space heating per m2										(98c) / (4) =		56.0783	(99)

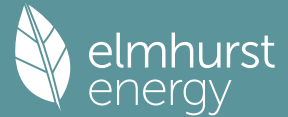
9a. Energy requirements - Individual heating systems, including micro-CHP

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	872.4626	712.3203	653.6070	426.3273	260.2308	0.0000	0.0000	0.0000	0.0000	381.9792	613.4419	851.8907	(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)	397.8398	324.8155	298.0424	194.4037	118.6643	0.0000	0.0000	0.0000	0.0000	174.1811	279.7273	388.4591	(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	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(64)
Efficiency of water heater													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	113.7335	100.0766	105.1464	89.7650	85.1685	74.7449	72.3645	76.3897	78.4925	89.9104	98.5035	112.1495	(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	32.6233	26.1716	23.5646	17.2645	13.3356	10.8953	12.1651	15.8127	20.5392	26.9485	30.4383	33.5300	(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													2176.1331 (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													1096.4448 (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)													263.2885 (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													3535.8664 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2176.1331	0.1540	335.1285	(261)
Total CO2 associated with community systems			0.0000	(373)

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Water heating (other fuel)	1096.4448	0.1416	155.2326 (264)
Space and water heating			490.3612 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	263.2885	0.1443	38.0007 (268)
Total CO ₂ , kg/year			528.3618 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.2100 (273)

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

	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year
Space heating - main system 1	2176.1331	1.5702	3416.8641 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	1096.4448	1.5235	1670.4755 (278)
Space and water heating			5087.3396 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	263.2885	1.5338	403.8407 (282)
Total Primary energy kWh/year			5491.1804 (286)
Dwelling Primary energy Rate (DPER)			64.5300 (287)

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	85.1000 (1b)	x 2.8000 (2b)	= 238.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 238.2800 (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) =	Air changes per hour 30.0000 / (5) = 0.1259 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3759 (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) = 0.3195 (21)

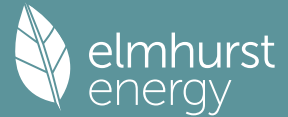
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.4074	0.3994	0.3914	0.3515	0.3435	0.3035	0.3035	0.2956	0.3195	0.3435	0.3595	0.3754 (22b)
Effective ac	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5510	0.5590	0.5646	0.5705 (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)
Floor Over Commercial			85.1000	0.1300	11.0630		(28b)
Existing Ext Wall	16.5200	3.8500	12.6700	0.1800	2.2806		(29a)
New Ext Wall	16.2400	6.2100	10.0300	0.1800	1.8054		(29a)
Total net area of external elements Aum(A, m ²)			117.8600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.3940		(33)
Party Wall			43.4000	0.0000	0.0000		(32)
Party Wall to Adjacent			19.6000	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							146.3447 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							5.8930 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	32.2870 (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	45.8412	45.5878	45.3395	44.1729	43.9547	42.9387	42.9387	42.7505	43.3300	43.9547	44.3962	44.8578 (38)
Average = Sum(39)m / 12 =	78.1281	77.8748	77.6264	76.4599	76.2416	75.2256	75.2256	75.0375	75.6170	76.2416	76.6832	77.1448 (39)
												76.4589

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HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.9181	0.9151	0.9122	0.8985	0.8959	0.8840	0.8840	0.8818	0.8886	0.8959	0.9011	0.9065	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	0.8985	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.5525	(42)
Hot water usage for mixer showers														
67.0175	66.0104	64.5428	61.7348	59.6625	57.3516	56.0381	57.4946	59.0912	61.5724	64.4407	66.7607	66.7607	(42a)	
Hot water usage for baths														
28.9429	28.5131	27.9078	26.7917	25.9560	25.0293	24.5288	25.1299	25.7843	26.7759	27.9150	28.8451	28.8451	(42b)	
Hot water usage for other uses														
40.7706	39.2880	37.8055	36.3229	34.8403	33.3578	33.3578	34.8403	36.3229	37.8055	39.2880	40.7706	40.7706	(42c)	
Average daily hot water use (litres/day)													125.6868	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	136.7311	133.8115	130.2560	124.8494	120.4589	115.7387	113.9246	117.4648	121.1984	126.1538	131.6437	136.3764	(44)	
Energy content	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(45)	
Energy content (annual)										Total = Sum(45)m =		2087.6309		
Distribution loss (46)m = 0.15 x (45)m														
32.4823	28.5819	30.0298	25.6369	24.3241	21.3471	20.6673	21.8169	22.4175	25.6784	28.1326	32.0299	32.0299	(46)	
Water storage loss:														
Store volume													150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													0.7527	(55)
Total storage loss														
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)	
If cylinder contains dedicated solar storage														
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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														
263.1435	232.6315	246.7936	216.0044	208.7557	187.4061	184.3769	192.0408	194.5416	217.7844	232.6424	260.1275	260.1275	(62)	
WWHRS	-30.6376	-27.0962	-28.3735	-23.4944	-21.8959	-18.7365	-17.5625	-18.6759	-19.3855	-22.8534	-25.8901	-30.0702	(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														
232.5059	205.5354	218.4200	192.5100	186.8598	168.6696	166.8144	173.3649	175.1561	194.9310	206.7523	230.0572	230.0572	(64)	
Total per year (kWh/year)													2351.5765	(64)
Electric shower(s)													2352	(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	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														
109.2783	97.0251	103.8420	92.9019	91.1944	83.3930	83.0884	85.6367	85.7655	94.1964	98.4340	108.2755	108.2755	(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	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	134.9654	149.4260	134.9654	139.4643	134.9654	139.4643	134.9654	134.9654	139.4643	134.9654	139.4643	134.9654	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	229.7690	232.1533	226.1450	213.3540	197.2077	182.0324	171.8944	169.5101	175.5184	188.3094	204.4557	219.6310	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	(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)													
	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	(71)
Water heating gains (Table 5)	146.8795	144.3825	139.5726	129.0304	122.5731	115.8236	111.6780	115.1031	119.1188	126.6081	136.7140	145.5316	(72)
Total internal gains	575.9021	590.2500	564.9711	546.1368	519.0343	498.6084	479.8259	480.8667	495.3896	514.1711	544.9221	564.4162	(73)

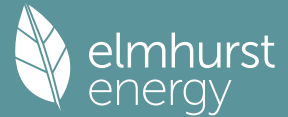
6. Solar gains

[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	637.7547	700.0175	726.8726	766.3729	783.6366	769.1794	737.4051	704.1416	677.3027	638.6456	619.8103	616.8295 (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	44.2789	44.4229	44.5650	45.2450	45.3745	45.9873	45.9873	46.1026	45.7493	45.3745	45.1132	44.8433
alpha	3.9519	3.9615	3.9710	4.0163	4.0250	4.0658	4.0658	4.0735	4.0500	4.0250	4.0075	3.9896
util living area												
	0.9689	0.9535	0.9296	0.8682	0.7591	0.5875	0.4392	0.4761	0.6864	0.8771	0.9490	0.9722 (86)
MIT	19.6267	19.8267	20.0989	20.4775	20.7701	20.9403	20.9856	20.9800	20.8853	20.5316	20.0401	19.6030 (87)
Th 2	20.1522	20.1547	20.1572	20.1688	20.1710	20.1811	20.1811	20.1830	20.1772	20.1710	20.1666	20.1620 (88)
util rest of house												
	0.9634	0.9455	0.9171	0.8446	0.7171	0.5237	0.3614	0.3971	0.6257	0.8505	0.9388	0.9673 (89)
MIT 2	18.5509	18.8037	19.1456	19.6157	19.9544	20.1369	20.1737	20.1721	20.0847	19.6893	19.0834	18.5280 (90)

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Living area fraction									fLA = Living area / (4) =	0.5170 (91)		
MIT	19.1071	19.3326	19.6385	20.0613	20.3762	20.5523	20.5935	20.5898	20.4986	20.1248	19.5781	19.0838 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1071	19.3326	19.6385	20.0613	20.3762	20.5523	20.5935	20.5898	20.4986	20.1248	19.5781	19.0838 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9550	0.9361	0.9081	0.8412	0.7281	0.5533	0.4011	0.4371	0.6504	0.8489	0.9303	0.9594	(94)
Useful gains	609.0514	655.2882	660.0556	644.6955	570.5444	425.6012	295.7399	307.7628	440.5289	542.1214	576.5859	591.7708	(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	1156.8551	1123.9382	1019.8964	853.3925	661.4842	447.7669	300.4117	314.3914	483.8458	726.1884	956.8566	1148.2074	(97)
Space heating kWh	407.5660	314.9328	267.7216	150.2619	67.6592	0.0000	0.0000	0.0000	0.0000	136.9459	273.7949	413.9889	(98a)
Space heating requirement - total per year (kWh/year)												2032.8711	
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	407.5660	314.9328	267.7216	150.2619	67.6592	0.0000	0.0000	0.0000	0.0000	136.9459	273.7949	413.9889	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2032.8711	
Space heating per m2										(98c) / (4) =		23.8880	(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	407.5660	314.9328	267.7216	150.2619	67.6592	0.0000	0.0000	0.0000	0.0000	136.9459	273.7949	413.9889	(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)	441.5666	341.2056	290.0559	162.7973	73.3036	0.0000	0.0000	0.0000	0.0000	148.3704	296.6359	448.5253	(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	232.5059	205.5354	218.4200	192.5100	186.8598	168.6696	166.8144	173.3649	175.1561	194.9310	206.7523	230.0572	(64)
Efficiency of water heater													79.8000 (216)
(217)m	85.3052	85.0137	84.5173	83.5103	82.0095	79.8000	79.8000	79.8000	79.8000	83.2830	84.6905	85.3611	(217)
Fuel for water heating, kWh/month	272.5576	241.7675	258.4323	230.5224	227.8513	211.3654	209.0406	217.2492	219.4938	234.0585	244.1269	269.5106	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	28.0431	22.4973	20.2563	14.8406	11.4633	9.3656	10.4572	13.5927	17.6556	23.1651	26.1649	28.8226	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-65.2726	-85.5354	-114.3379	-119.2407	-121.2287	-110.6229	-109.2623	-106.6503	-101.1323	-93.2035	-69.4268	-57.2296	(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	-59.3305	-121.3465	-235.1159	-344.7270	-448.0345	-447.4061	-442.0911	-377.7203	-281.5270	-170.4939	-78.1669	-47.1778	(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												2202.4606	(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												2835.9760	(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)												226.3243	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-4206.2807	(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												1144.4801	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2202.4606	0.2100	462.5167	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2835.9760	0.2100	595.5550	(264)

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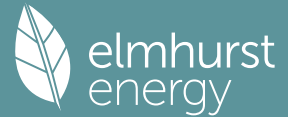


Space and water heating			1058.0717 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	226.3243	0.1443	32.6656 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1153.1431	0.1362	-157.0458
PV Unit electricity exported	-3053.1377	0.1266	-386.5954
Total			-543.6412 (269)
Total CO2, kg/year			559.0253 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			6.5700 (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	2202.4606	1.1300	2488.7805 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2835.9760	1.1300	3204.6529 (278)
Space and water heating			5693.4333 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	226.3243	1.5338	347.1437 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1153.1431	1.5034	-1733.6582
PV Unit electricity exported	-3053.1377	0.4648	-1419.1689
Total			-3152.8271 (283)
Total Primary energy kWh/year			3017.8508 (286)
Target Primary Energy Rate (TPER)			35.4600 (287)

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Property Reference	Flat 1B				Issued on Date	01/02/2024	
Assessment Reference	Be Lean			Prop Type Ref	Conversion		
Property							
SAP Rating	74 C		DER	6.21		TER	6.57
Environmental	95 A		% DER < TER				5.48
CO ₂ Emissions (t/year)	0.46		DFEE	61.26		TFEE	29.38
Compliance Check	See BREL		% DFEE < TFEE				-108.47
% DPER < TPER	-81.97		DPER	64.53		TPER	35.46
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	85.1000 (1b)	2.8000 (2b)	238.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	238.2800 (5)

2. Ventilation rate

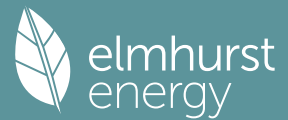
		m ³ per hour
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
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) =	0.1259 (8)
Pressure test	No	
Pressure Test Method	Blower Door	
Measured/design AP50	15.0000	(17)
Infiltration rate	0.8759	(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) =	0.7445 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
	0.9493	0.9306	0.9120	0.8190	0.8004	0.7073	0.7073	0.6887	0.7445	0.8004	0.8376	0.8748 (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	0.9505	0.9331	0.9159	0.8354	0.8203	0.7501	0.7501	0.7371	0.7772	0.8203	0.8508	0.8826 (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 = 1.20)			3.8500	1.1450	4.4084		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Floor Over Commercial			85.1000	0.2500	21.2750	20.0000	1702.0000 (28b)
Existing Ext Wall	16.5200	3.8500	12.6700	0.1800	2.2806	190.0000	2407.3000 (29a)
New Ext Wall	16.2400	6.2100	10.0300	0.1800	1.8054	9.0000	90.2700 (29a)
Total net area of external elements Aum(A, m ²)			117.8600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	36.6060		(33)
Party Wall			43.4000	0.0000	0.0000	20.0000	868.0000 (32)
Party Wall to Adjacent			19.6000	0.0000	0.0000	180.0000	3528.0000 (32)
Party Ceiling			85.1000			30.0000	2553.0000 (32b)
Internal Wall			145.0400			9.0000	1305.3600 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12453.9300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							146.3447 (35)
Thermal bridges (Default value 0.200 * total exposed area)							23.5720 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	60.1780 (37)

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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	74.7437	73.3681	72.0196	65.6860	64.5010	58.9846	58.9846	57.9630	61.1094	64.5010	66.8982	69.4044	(38)
Heat transfer coeff	134.9217	133.5460	132.1976	125.8639	124.6789	119.1625	119.1625	118.1410	121.2873	124.6789	127.0762	129.5824	(39)
Average = Sum(39)m / 12 =												125.8582	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.5854	1.5693	1.5534	1.4790	1.4651	1.4003	1.4003	1.3883	1.4252	1.4651	1.4933	1.5227	(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													2.5525 (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	28.9429	28.5131	27.9078	26.7917	25.9560	25.0293	24.5288	25.1299	25.7843	26.7759	27.9150	28.8451	(42b)
Hot water usage for other uses	40.7706	39.2880	37.8055	36.3229	34.8403	33.3578	33.3578	34.8403	36.3229	37.8055	39.2880	40.7706	(42c)
Average daily hot water use (litres/day)												63.8989	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	69.7136	67.8011	65.7133	63.1146	60.7963	58.3871	57.8866	59.9702	62.1072	64.5814	67.2030	69.6157	(44)
Energy content (annual)	110.4092	96.5479	100.9988	86.4008	81.8436	71.7938	70.0088	74.2556	76.5844	87.6363	95.7430	109.0014	(45)
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	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	93.8478	82.0657	85.8490	73.4406	69.5670	61.0247	59.5075	63.1173	65.0968	74.4909	81.3815	92.6512	(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	93.8478	82.0657	85.8490	73.4406	69.5670	61.0247	59.5075	63.1173	65.0968	74.4909	81.3815	92.6512	(64)
12Total per year (kWh/year)												902.0401	(64)
Electric shower(s)	53.6699	47.8203	52.2179	49.8309	50.7660	48.4258	50.0400	50.7660	49.8309	52.2179	51.2360	53.6699	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												610.4915	(64a)
Heat gains from water heating, kWh/month	36.8794	32.4715	34.5167	30.8179	30.0833	27.3626	27.3869	28.4708	28.7319	31.6772	33.1544	36.5803	(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	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	131.1923	145.2486	131.1923	135.5654	131.1923	135.5654	131.1923	131.1923	135.5654	131.1923	135.5654	131.1923	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	229.7690	232.1533	226.1450	213.3540	197.2077	182.0324	171.8944	169.5101	175.5184	188.3094	204.4557	219.6310	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	(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)	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	(71)
Water heating gains (Table 5)	49.5691	48.3207	46.3935	42.8026	40.4345	38.0036	36.8103	38.2672	39.9054	42.5769	46.0478	49.1670	(72)
Total internal gains	471.8186	487.0108	465.0189	453.0101	430.1226	416.8895	401.1851	400.2577	412.2774	423.3667	447.3570	461.2785	(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	542.5073	612.4593	650.0491	704.7085	732.5252	726.1136	695.5613	655.4291	620.1781	565.6233	532.9435	521.1794	(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	25.6402	25.9044	26.1686	27.4854	27.7467	29.0312	29.0312	29.2822	28.5226	27.7467	27.2232	26.6967	
alpha	2.7093	2.7270	2.7446	2.8324	2.8498	2.9354	2.9354	2.9521	2.9015	2.8498	2.8149	2.7798	
util living area	0.9839	0.9765	0.9654	0.9361	0.8800	0.7639	0.6332	0.6734	0.8426	0.9447	0.9758	0.9856	(86)
MIT	18.1181	18.3884	18.8221	19.5147	20.1111	20.6351	20.8528	20.8203	20.4518	19.6839	18.8633	18.1691	(87)
Th 2	19.6240	19.6359	19.6477	19.7033	19.7138	19.7631	19.7631	19.7723	19.7440	19.7138	19.6926	19.6705	(88)

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util rest of house	0.9802	0.9711	0.9568	0.9186	0.8420	0.6813	0.4968	0.5441	0.7792	0.9262	0.9693	0.9824 (89)
MIT 2	17.0499	17.3253	17.7623	18.4776	19.0536	19.5515	19.7080	19.6988	19.3930	18.6564	17.8348	17.1300 (90)
Living area fraction									FLA = Living area / (4) =			0.5170 (91)
MIT	17.6022	17.8750	18.3103	19.0138	19.6004	20.1118	20.2999	20.2787	19.9404	19.1877	18.3666	17.6672 (92)
Temperature adjustment												0.0000
adjusted MIT	17.6022	17.8750	18.3103	19.0138	19.6004	20.1118	20.2999	20.2787	19.9404	19.1877	18.3666	17.6672 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9724	0.9613	0.9453	0.9067	0.8380	0.7074	0.5609	0.6025	0.7909	0.9163	0.9602	0.9754	(94)
Useful gains	527.5284	588.7393	614.4595	638.9551	613.8304	513.6254	390.1073	394.9154	490.4687	518.2706	511.7343	508.3407	(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	1794.7522	1732.7532	1561.2883	1272.9655	985.0124	656.7940	440.8897	458.2288	708.3723	1070.7031	1431.7138	1745.1159	(97)
Space heating kWh	942.8145	768.7774	704.4406	456.4875	276.1594	0.0000	0.0000	0.0000	0.0000	411.0098	662.3853	920.1608	(98a)
Space heating requirement - total per year (kWh/year)												5142.2352	
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	942.8145	768.7774	704.4406	456.4875	276.1594	0.0000	0.0000	0.0000	0.0000	411.0098	662.3853	920.1608	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5142.2352	
Space heating per m2										(98c) / (4) =		60.4258	(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	1120.1276	881.8026	897.8713	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6036	0.6848	0.6537	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	676.0844	603.8623	586.8958	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	786.5220	753.7670	709.5605	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	79.5151	111.5291	91.2625	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	19.8788	27.8823	22.8156	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												70.5767 (107)
Energy for space heating												60.4258 (99)
Energy for space cooling												0.8293 (108)
Total												61.2551 (109)
Fabric Energy Efficiency (DFEE)												61.3 (109)

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

1. Overall dwelling characteristics

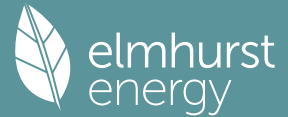
	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	85.1000 (1b)	x 2.8000 (2b)	= 238.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 238.2800 (5)

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) = 0.1259 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3759 (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) = 0.3195 (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)

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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	0.4074	0.3994	0.3914	0.3515	0.3435	0.3035	0.3035	0.2956	0.3195	0.3435	0.3595	0.3754 (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	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5510	0.5590	0.5646	0.5705 (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)
Floor Over Commercial			85.1000	0.1300	11.0630		(28b)
Existing Ext Wall	16.5200	3.8500	12.6700	0.1800	2.2806		(29a)
New Ext Wall	16.2400	6.2100	10.0300	0.1800	1.8054		(29a)
Total net area of external elements Aum(A, m ²)			117.8600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.3940		(33)
Party Wall			43.4000	0.0000	0.0000		(32)
Party Wall to Adjacent			19.6000	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							146.3447 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							5.8930 (36)
Point Thermal Bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	32.2870 (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	45.8412	45.5878	45.3395	44.1729	43.9547	42.9387	42.9387	42.7505	43.3300	43.9547	44.3962	44.8578 (38)
Average = Sum(39)m / 12 =	78.1281	77.8748	77.6264	76.4599	76.2416	75.2256	75.2256	75.0375	75.6170	76.2416	76.6832	77.1448 (39)
												76.4589
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9181	0.9151	0.9122	0.8985	0.8959	0.8840	0.8840	0.8818	0.8886	0.8959	0.9011	0.9065 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

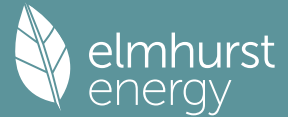
4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.5525 (42)
Hot water usage for mixer showers												0.0000 (42a)
Hot water usage for baths	28.9429	28.5131	27.9078	26.7917	25.9560	25.0293	24.5288	25.1299	25.7843	26.7759	27.9150	28.8451 (42b)
Hot water usage for other uses	40.7706	39.2880	37.8055	36.3229	34.8403	33.3578	33.3578	34.8403	36.3229	37.8055	39.2880	40.7706 (42c)
Average daily hot water use (litres/day)												63.8989 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	69.7136	67.8011	65.7133	63.1146	60.7963	58.3871	57.8866	59.9702	62.1072	64.5814	67.2030	69.6157 (44)
Energy content (annual)	110.4092	96.5479	100.9988	86.4008	81.8436	71.7938	70.0088	74.2556	76.5844	87.6363	95.7430	109.0014 (45)
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	93.8478	82.0657	85.8490	73.4406	69.5670	61.0247	59.5075	63.1173	65.0968	74.4909	81.3815	92.6512 (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	93.8478	82.0657	85.8490	73.4406	69.5670	61.0247	59.5075	63.1173	65.0968	74.4909	81.3815	92.6512 (64)
12Total per year (kWh/year)												902.0401 (64)
Electric shower(s)	53.6699	47.8203	52.2179	49.8309	50.7660	48.4258	50.0400	50.7660	49.8309	52.2179	51.2360	53.6699 (64a)
Heat gains from water heating, kWh/month	36.8794	32.4715	34.5167	30.8179	30.0833	27.3626	27.3869	28.4708	28.7319	31.6772	33.1544	36.5803 (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	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	134.9654	149.4260	134.9654	139.4643	134.9654	139.4643	134.9654	139.4643	139.4643	134.9654	139.4643	134.9654 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	229.7690	232.1533	226.1450	213.3540	197.2077	182.0324	171.8944	169.5101	175.5184	188.3094	204.4557	219.6310 (68)
Pumps, fans	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018 (71)
Total internal gains	49.5691	48.3207	46.3935	42.8026	40.4345	38.0036	36.8103	38.2672	39.9054	42.5769	46.0478	49.1670 (72)
	475.5917	491.1882	468.7920	456.9090	433.8957	420.7884	404.9582	404.0309	416.1763	427.1398	451.2559	465.0516 (73)

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6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		Gains W	
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	537.4443	600.9557	630.6935	677.1451	698.4980	691.3595	662.5374	627.3058	598.0894	551.6144	526.1441	517.4649 (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	44.2789	44.4229	44.5650	45.2450	45.3745	45.9873	45.9873	46.1026	45.7493	45.3745	45.1132	44.8433
alpha	3.9519	3.9615	3.9710	4.0163	4.0250	4.0658	4.0658	4.0735	4.0500	4.0250	4.0075	3.9896
util living area	0.9821	0.9710	0.9533	0.9032	0.8070	0.6386	0.4843	0.5274	0.7438	0.9158	0.9692	0.9844 (86)
MIT	19.4466	19.6586	19.9498	20.3695	20.7074	20.9193	20.9795	20.9711	20.8449	20.4209	19.8829	19.4219 (87)
Th 2	20.1522	20.1547	20.1572	20.1688	20.1710	20.1811	20.1811	20.1830	20.1772	20.1710	20.1666	20.1620 (88)
util rest of house	0.9788	0.9656	0.9443	0.8840	0.7684	0.5732	0.4003	0.4425	0.6851	0.8952	0.9626	0.9815 (89)
MIT 2	18.7276	18.9386	19.2266	19.6399	19.9514	20.1335	20.1727	20.1704	20.0769	19.6962	19.1709	18.7105 (90)
Living area fraction	19.0993	19.3109	19.6005	20.0171	20.3423	20.5398	20.5899	20.5844	20.4740	20.0709	19.5390	19.0783 (92)
MIT	19.0993	19.3109	19.6005	20.0171	20.3423	20.5398	20.5899	20.5844	20.4740	20.0709	19.5390	19.0783 (93)
Temperature adjustment												0.0000
adjusted MIT	19.0993	19.3109	19.6005	20.0171	20.3423	20.5398	20.5899	20.5844	20.4740	20.0709	19.5390	19.0783 (93)

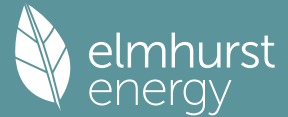
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9735	0.9590	0.9372	0.8801	0.7770	0.6028	0.4429	0.4852	0.7075	0.8923	0.9565	0.9767 (94)
Useful gains	523.1930	576.3331	591.0750	595.9285	542.7072	416.7349	293.4555	304.3422	423.1670	492.2101	503.2375	505.4003 (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	1156.2431	1122.2443	1016.9453	850.0147	658.9036	446.8257	300.1398	313.9851	481.9814	722.0766	953.8619	1147.7827 (97)
Space heating kWh	470.9893	366.8523	316.8474	182.9421	86.4501	0.0000	0.0000	0.0000	0.0000	171.0207	324.4495	477.9325 (98a)
Space heating requirement - total per year (kWh/year)												2397.4839
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	470.9893	366.8523	316.8474	182.9421	86.4501	0.0000	0.0000	0.0000	0.0000	171.0207	324.4495	477.9325 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2397.4839
Space heating per m2										(98c) / (4) =		28.1725 (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	707.1211	556.6698	570.2850	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8213	0.8871	0.8631	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	580.7321	493.8126	492.2151	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	741.6733	711.1143	672.7426	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	115.8776	161.6724	134.3125	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	28.9694	40.4181	33.5781	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												102.9656 (107)
Energy for space heating												28.1725 (99)
Energy for space cooling												1.2099 (108)
Total												29.3825 (109)
Fabric Energy Efficiency (TFEE)												29.4 (109)

Full SAP Calculation Printout



Property Reference	Flat 1B	Issued on Date	01/02/2024
Assessment Reference	Be Lean	Prop Type Ref	Conversion
Property			
SAP Rating	74 C	DER	6.21
Environmental	95 A	% DER < TER	5.48
CO ₂ Emissions (t/year)	0.46	DFEE	61.26
Compliance Check	See BREL	% DFEE < TFEE	-108.47
% DPER < TPER	-81.97	DPER	64.53
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	85.1000 (1b)	2.8000 (2b)	238.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	238.2800 (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) = 0.1259 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8759 (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) = 0.7445 (21)

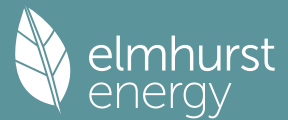
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.9493	0.9306	0.9120	0.8190	0.8004	0.7073	0.7073	0.6887	0.7445	0.8004	0.8376	0.8748 (22b)
Effective ac	0.9505	0.9331	0.9159	0.8354	0.8203	0.7501	0.7501	0.7371	0.7772	0.8203	0.8508	0.8826 (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 = 1.20)			3.8500	1.1450	4.4084		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Floor Over Commercial			85.1000	0.2500	21.2750	20.0000	1702.0000 (28b)
Existing Ext Wall	16.5200	3.8500	12.6700	0.1800	2.2806	190.0000	2407.3000 (29a)
New Ext Wall	16.2400	6.2100	10.0300	0.1800	1.8054	9.0000	90.2700 (29a)
Total net area of external elements Aum(A, m ²)			117.8600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	36.6060		(33)
Party Wall			43.4000	0.0000	0.0000	20.0000	868.0000 (32)
Party Wall to Adjacent			19.6000	0.0000	0.0000	180.0000	3528.0000 (32)
Party Ceiling			85.1000			20.0000	1702.0000 (32b)
Internal Wall			145.0400			9.0000	1305.3600 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	11602.9300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							136.3447 (35)
Thermal bridges (Default value 0.200 * total exposed area)							23.5720 (36)
Point Thermal Bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	60.1780 (37)

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

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(38)m	Jan 74.7437	Feb 73.3681	Mar 72.0196	Apr 65.6860	May 64.5010	Jun 58.9846	Jul 58.9846	Aug 57.9630	Sep 61.1094	Oct 64.5010	Nov 66.8982	Dec 69.4044	(38)
Heat transfer coeff	134.9217	133.5460	132.1976	125.8639	124.6789	119.1625	119.1625	118.1410	121.2873	124.6789	127.0762	129.5824	(39)
Average = Sum(39)m / 12 =												125.8582	
HLP	Jan 1.5854	Feb 1.5693	Mar 1.5534	Apr 1.4790	May 1.4651	Jun 1.4003	Jul 1.4003	Aug 1.3883	Sep 1.4252	Oct 1.4651	Nov 1.4933	Dec 1.5227	(40)
HLP (average)												1.4789	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.5525 (42)
Hot water usage for mixer showers													
67.0175	66.0104	64.5428	61.7348	59.6625	57.3516	56.0381	57.4946	59.0912	61.5724	64.4407	66.7607	66.7607	(42a)
Hot water usage for baths													
28.9429	28.5131	27.9078	26.7917	25.9560	25.0293	24.5288	25.1299	25.7843	26.7759	27.9150	28.8451	28.8451	(42b)
Hot water usage for other uses													
40.7706	39.2880	37.8055	36.3229	34.8403	33.3578	33.3578	34.8403	36.3229	37.8055	39.2880	40.7706	40.7706	(42c)
Average daily hot water use (litres/day)												125.6868	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
136.7311	133.8115	130.2560	124.8494	120.4589	115.7387	113.9246	117.4648	121.1984	126.1538	131.6437	136.3764	136.3764	(44)
Energy content	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(45)
Energy content (annual)										Total = Sum(45)m =		2087.6309	
Distribution loss (46)m = 0.15 x (45)m													
32.4823	28.5819	30.0298	25.6369	24.3241	21.3471	20.6673	21.8169	22.4175	25.6784	28.1326	32.0299	32.0299	(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	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													
216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	213.5326	(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													
216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	213.5326	(64)
12Total per year (kWh/year)									Total per year (kWh/year) = Sum(64)m =			2087.6309	(64)
Electric shower(s)												2088	(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	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													
72.0024	63.3565	66.5661	56.8284	53.9185	47.3195	45.8125	48.3608	49.6920	56.9205	62.3606	70.9996	70.9996	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan 127.6272	Feb 127.6272	Mar 127.6272	Apr 127.6272	May 127.6272	Jun 127.6272	Jul 127.6272	Aug 127.6272	Sep 127.6272	Oct 127.6272	Nov 127.6272	Dec 127.6272	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	131.1923	145.2486	131.1923	135.5654	131.1923	135.5654	131.1923	131.1923	135.5654	131.1923	135.5654	131.1923	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	229.7690	232.1533	226.1450	213.3540	197.2077	182.0324	171.8944	169.5101	175.5184	188.3094	204.4557	219.6310	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	(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)	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	(71)
Water heating gains (Table 5)	96.7774	94.2805	89.4705	78.9284	72.4711	65.7215	61.5759	65.0010	69.0167	76.5060	86.6119	95.4295	(72)
Total internal gains	522.0269	535.9705	511.0959	492.1359	465.1592	444.6074	425.9507	426.9916	441.3886	460.2959	490.9212	510.5410	(73)

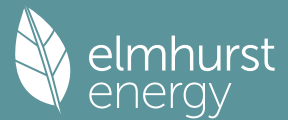
6. Solar gains

[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	592.7156	661.4191	696.1262	743.8343	767.5618	753.8314	720.3269	682.1629	649.2894	602.5525	576.5077	570.4419 (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 23.8882	Feb 24.1343	Mar 24.3805	Apr 25.6073	May 25.8507	Jun 27.0474	Jul 27.0474	Aug 27.2813	Sep 26.5736	Oct 25.8507	Nov 25.3630	Dec 24.8725		
alpha	2.5925	2.6090	2.6254	2.7072	2.7234	2.8032	2.8032	2.8188	2.7716	2.7234	2.6909	2.6582		
util living area	0.9767	0.9676	0.9543	0.9209	0.8599	0.7413	0.6119	0.6496	0.8199	0.9295	0.9664	0.9789	(86)	
MIT	18.0704	18.3469	18.7904	19.4933	20.0986	20.6259	20.8467	20.8152	20.4447	19.6707	18.8336	18.1222	(87)	
Th 2	19.6240	19.6359	19.6477	19.7033	19.7138	19.7631	19.7631	19.7723	19.7440	19.7138	19.6926	19.6705	(88)	
util rest of house	0.9717	0.9606	0.9437	0.9009	0.8193	0.6584	0.4789	0.5228	0.7540	0.9078	0.9580	0.9744	(89)	

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MIT 2	16.2751	16.6318	17.2004	18.1121	18.8562	19.4830	19.6878	19.6737	19.2877	18.3492	17.2836	16.3650 (90)
Living area fraction									FLA = Living area / (4) =			0.5170 (91)
MIT	17.2033	17.5185	18.0225	18.8262	19.4986	20.0739	20.2870	20.2639	19.8859	19.0325	18.0850	17.2735 (92)
Temperature adjustment												0.0000
adjusted MIT	17.2033	17.5185	18.0225	18.8262	19.4986	20.0739	20.2870	20.2639	19.8859	19.0325	18.0850	17.2735 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9588	0.9452	0.9262	0.8836	0.8111	0.6817	0.5397	0.5782	0.7627	0.8928	0.9435	0.9626	(94)
Useful gains	568.2765	625.1545	644.7429	657.2329	622.5481	513.8851	388.7746	394.4322	495.2247	537.9381	543.9293	549.0872	(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	1740.9413	1685.1549	1523.2469	1249.3541	972.3207	652.2846	439.3505	456.4848	701.7579	1051.3511	1395.9320	1694.1017	(97)
Space heating kWh	872.4626	712.3203	653.6070	426.3273	260.2308	0.0000	0.0000	0.0000	0.0000	381.9792	613.4419	851.8907	(98a)
Space heating requirement - total per year (kWh/year)												4772.2599	
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	872.4626	712.3203	653.6070	426.3273	260.2308	0.0000	0.0000	0.0000	0.0000	381.9792	613.4419	851.8907	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4772.2599	
Space heating per m2										(98c) / (4) =		56.0783	(99)

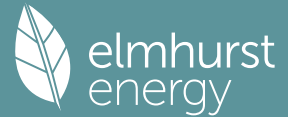
9a. Energy requirements - Individual heating systems, including micro-CHP

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	872.4626	712.3203	653.6070	426.3273	260.2308	0.0000	0.0000	0.0000	0.0000	381.9792	613.4419	851.8907	(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)	397.8398	324.8155	298.0424	194.4037	118.6643	0.0000	0.0000	0.0000	0.0000	174.1811	279.7273	388.4591	(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	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(64)
Efficiency of water heater													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	113.7335	100.0766	105.1464	89.7650	85.1685	74.7449	72.3645	76.3897	78.4925	89.9104	98.5035	112.1495	(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	32.6233	26.1716	23.5646	17.2645	13.3356	10.8953	12.1651	15.8127	20.5392	26.9485	30.4383	33.5300	(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													2176.1331 (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													1096.4448 (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)													263.2885 (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													3535.8664 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2176.1331	0.1540	335.1285	(261)
Total CO2 associated with community systems			0.0000	(373)

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Water heating (other fuel)	1096.4448	0.1416	155.2326 (264)
Space and water heating			490.3612 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	263.2885	0.1443	38.0007 (268)
Total CO ₂ , kg/year			528.3618 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.2100 (273)

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

	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year
Space heating - main system 1	2176.1331	1.5702	3416.8641 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	1096.4448	1.5235	1670.4755 (278)
Space and water heating			5087.3396 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	263.2885	1.5338	403.8407 (282)
Total Primary energy kWh/year			5491.1804 (286)
Dwelling Primary energy Rate (DPER)			64.5300 (287)

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	85.1000 (1b)	x 2.8000 (2b)	= 238.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 238.2800 (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) =	Air changes per hour 30.0000 / (5) = 0.1259 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3759 (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) = 0.3195 (21)

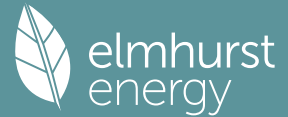
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.4074	0.3994	0.3914	0.3515	0.3435	0.3035	0.3035	0.2956	0.3195	0.3435	0.3595	0.3754 (22b)
Effective ac	0.5830	0.5798	0.5766	0.5618	0.5590	0.5461	0.5461	0.5437	0.5510	0.5590	0.5646	0.5705 (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)
Floor Over Commercial			85.1000	0.1300	11.0630		(28b)
Existing Ext Wall	16.5200	3.8500	12.6700	0.1800	2.2806		(29a)
New Ext Wall	16.2400	6.2100	10.0300	0.1800	1.8054		(29a)
Total net area of external elements Aum(A, m ²)			117.8600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.3940		(33)
Party Wall			43.4000	0.0000	0.0000		(32)
Party Wall to Adjacent			19.6000	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							146.3447 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							5.8930 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	32.2870 (37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	45.8412	45.5878	45.3395	44.1729	43.9547	42.9387	42.9387	42.7505	43.3300	43.9547	44.3962	44.8578 (38)
Heat transfer coeff	78.1281	77.8748	77.6264	76.4599	76.2416	75.2256	75.2256	75.0375	75.6170	76.2416	76.6832	77.1448 (39)
Average = Sum(39)m / 12 =												76.4589

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HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.9181	0.9151	0.9122	0.8985	0.8959	0.8840	0.8840	0.8818	0.8886	0.8959	0.9011	0.9065	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	0.8985	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.5525 (42)
Hot water usage for mixer showers													
67.0175	66.0104	64.5428	61.7348	59.6625	57.3516	56.0381	57.4946	59.0912	61.5724	64.4407	66.7607	(42a)	
Hot water usage for baths													
28.9429	28.5131	27.9078	26.7917	25.9560	25.0293	24.5288	25.1299	25.7843	26.7759	27.9150	28.8451	(42b)	
Hot water usage for other uses													
40.7706	39.2880	37.8055	36.3229	34.8403	33.3578	33.3578	34.8403	36.3229	37.8055	39.2880	40.7706	(42c)	
Average daily hot water use (litres/day)													125.6868 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.7311	133.8115	130.2560	124.8494	120.4589	115.7387	113.9246	117.4648	121.1984	126.1538	131.6437	136.3764	(44)
Energy content	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(45)
Energy content (annual)										Total = Sum(45)m =		2087.6309	
Distribution loss (46)m = 0.15 x (45)m													
32.4823	28.5819	30.0298	25.6369	24.3241	21.3471	20.6673	21.8169	22.4175	25.6784	28.1326	32.0299	(46)	
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss													
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)	
If cylinder contains dedicated solar storage													
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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													
263.1435	232.6315	246.7936	216.0044	208.7557	187.4061	184.3769	192.0408	194.5416	217.7844	232.6424	260.1275	(62)	
WWHRS	-30.6376	-27.0962	-28.3735	-23.4944	-21.8959	-18.7365	-17.5625	-18.6759	-19.3855	-22.8534	-25.8901	-30.0702	(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													
232.5059	205.5354	218.4200	192.5100	186.8598	168.6696	166.8144	173.3649	175.1561	194.9310	206.7523	230.0572	(64)	
12Total per year (kWh/year)													2351.5765 (64)
Electric shower(s)													2352 (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	0.0000	(64a)
													0.0000 (64a)
Heat gains from water heating, kWh/month													
109.2783	97.0251	103.8420	92.9019	91.1944	83.3930	83.0884	85.6367	85.7655	94.1964	98.4340	108.2755	(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	
127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	127.6272	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
134.9654	149.4260	134.9654	139.4643	134.9654	139.4643	134.9654	134.9654	139.4643	134.9654	139.4643	134.9654	134.9654	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
229.7690	232.1533	226.1450	213.3540	197.2077	182.0324	171.8944	169.5101	175.5184	188.3094	204.4557	219.6310	219.6310	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	35.7627	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	(71)
Water heating gains (Table 5)													
146.8795	144.3825	139.5726	129.0304	122.5731	115.8236	111.6780	115.1031	119.1188	126.6081	136.7140	145.5316	145.5316	(72)
Total internal gains													
575.9021	590.2500	564.9711	546.1368	519.0343	498.6084	479.8259	480.8667	495.3896	514.1711	544.9221	564.4162	564.4162	(73)

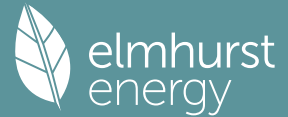
6. Solar gains

[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	637.7547	700.0175	726.8726	766.3729	783.6366	769.1794	737.4051	704.1416	677.3027	638.6456	619.8103	616.8295 (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	44.2789	44.4229	44.5650	45.2450	45.3745	45.9873	45.9873	46.1026	45.7493	45.3745	45.1132	44.8433
alpha	3.9519	3.9615	3.9710	4.0163	4.0250	4.0658	4.0658	4.0735	4.0500	4.0250	4.0075	3.9896
util living area												
	0.9689	0.9535	0.9296	0.8682	0.7591	0.5875	0.4392	0.4761	0.6864	0.8771	0.9490	0.9722 (86)
MIT	19.6267	19.8267	20.0989	20.4775	20.7701	20.9403	20.9856	20.9800	20.8853	20.5316	20.0401	19.6030 (87)
Th 2	20.1522	20.1547	20.1572	20.1688	20.1710	20.1811	20.1811	20.1830	20.1772	20.1710	20.1666	20.1620 (88)
util rest of house												
	0.9634	0.9455	0.9171	0.8446	0.7171	0.5237	0.3614	0.3971	0.6257	0.8505	0.9388	0.9673 (89)
MIT 2	18.5509	18.8037	19.1456	19.6157	19.9544	20.1369	20.1737	20.1721	20.0847	19.6893	19.0834	18.5280 (90)

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Living area fraction									fLA = Living area / (4) =		0.5170 (91)	
MIT	19.1071	19.3326	19.6385	20.0613	20.3762	20.5523	20.5935	20.5898	20.4986	20.1248	19.5781	19.0838 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1071	19.3326	19.6385	20.0613	20.3762	20.5523	20.5935	20.5898	20.4986	20.1248	19.5781	19.0838 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9550	0.9361	0.9081	0.8412	0.7281	0.5533	0.4011	0.4371	0.6504	0.8489	0.9303	0.9594	(94)
Useful gains	609.0514	655.2882	660.0556	644.6955	570.5444	425.6012	295.7399	307.7628	440.5289	542.1214	576.5859	591.7708	(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	1156.8551	1123.9382	1019.8964	853.3925	661.4842	447.7669	300.4117	314.3914	483.8458	726.1884	956.8566	1148.2074	(97)
Space heating kWh	407.5660	314.9328	267.7216	150.2619	67.6592	0.0000	0.0000	0.0000	0.0000	136.9459	273.7949	413.9889	(98a)
Space heating requirement - total per year (kWh/year)												2032.8711	
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	407.5660	314.9328	267.7216	150.2619	67.6592	0.0000	0.0000	0.0000	0.0000	136.9459	273.7949	413.9889	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2032.8711	
Space heating per m2										(98c) / (4) =		23.8880	(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	407.5660	314.9328	267.7216	150.2619	67.6592	0.0000	0.0000	0.0000	0.0000	136.9459	273.7949	413.9889	(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)	441.5666	341.2056	290.0559	162.7973	73.3036	0.0000	0.0000	0.0000	0.0000	148.3704	296.6359	448.5253	(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	232.5059	205.5354	218.4200	192.5100	186.8598	168.6696	166.8144	173.3649	175.1561	194.9310	206.7523	230.0572	(64)
Efficiency of water heater													79.8000 (216)
(217)m	85.3052	85.0137	84.5173	83.5103	82.0095	79.8000	79.8000	79.8000	79.8000	83.2830	84.6905	85.3611	(217)
Fuel for water heating, kWh/month	272.5576	241.7675	258.4323	230.5224	227.8513	211.3654	209.0406	217.2492	219.4938	234.0585	244.1269	269.5106	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	28.0431	22.4973	20.2563	14.8406	11.4633	9.3656	10.4572	13.5927	17.6556	23.1651	26.1649	28.8226	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-65.2726	-85.5354	-114.3379	-119.2407	-121.2287	-110.6229	-109.2623	-106.6503	-101.1323	-93.2035	-69.4268	-57.2296	(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	-59.3305	-121.3465	-235.1159	-344.7270	-448.0345	-447.4061	-442.0911	-377.7203	-281.5270	-170.4939	-78.1669	-47.1778	(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												2202.4606	(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												2835.9760	(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)												226.3243	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-4206.2807	(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												1144.4801	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2202.4606	0.2100	462.5167	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2835.9760	0.2100	595.5550	(264)

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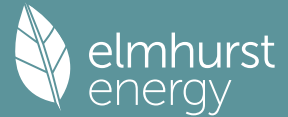


Space and water heating			1058.0717 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	226.3243	0.1443	32.6656 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1153.1431	0.1362	-157.0458
PV Unit electricity exported	-3053.1377	0.1266	-386.5954
Total			-543.6412 (269)
Total CO2, kg/year			559.0253 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			6.5700 (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	2202.4606	1.1300	2488.7805 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2835.9760	1.1300	3204.6529 (278)
Space and water heating			5693.4333 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	226.3243	1.5338	347.1437 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1153.1431	1.5034	-1733.6582
PV Unit electricity exported	-3053.1377	0.4648	-1419.1689
Total			-3152.8271 (283)
Total Primary energy kWh/year			3017.8508 (286)
Target Primary Energy Rate (TPER)			35.4600 (287)

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Property Reference	Flat 1B				Issued on Date	01/02/2024
Assessment Reference	Be Lean		Prop Type Ref	Conversion		
Property						
SAP Rating	74 C	DER	6.21	TER	6.57	
Environmental	95 A	% DER < TER				5.48
CO ₂ Emissions (t/year)	0.46	DFEE	61.26	TFEE	29.38	
Compliance Check	See BREL	% DFEE < TFEE				-108.47
% DPER < TPER	-81.97	DPER	64.53	TPER	35.46	
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	85.1000 (1b)	x 2.8000 (2b)	= 238.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 238.2800 (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) = 0.1259 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8759 (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) = 0.7445 (21)

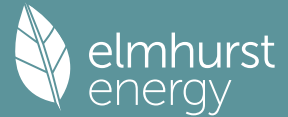
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.9493	0.9306	0.9120	0.8190	0.8004	0.7073	0.7073	0.6887	0.7445	0.8004	0.8376	0.8748 (22b)
Effective ac	0.9505	0.9331	0.9159	0.8354	0.8203	0.7501	0.7501	0.7371	0.7772	0.8203	0.8508	0.8826 (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 = 1.20)			3.8500	1.1450	4.4084		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Floor Over Commercial			85.1000	0.2500	21.2750	20.0000	1702.0000 (28b)
Existing Ext Wall	16.5200	3.8500	12.6700	0.1800	2.2806	190.0000	2407.3000 (29a)
New Ext Wall	16.2400	6.2100	10.0300	0.1800	1.8054	9.0000	90.2700 (29a)
Total net area of external elements Aum(A, m ²)			117.8600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	36.6060		(33)
Party Wall			43.4000	0.0000	0.0000	20.0000	868.0000 (32)
Party Wall to Adjacent			19.6000	0.0000	0.0000	180.0000	3528.0000 (32)
Party Ceiling			85.1000			30.0000	2553.0000 (32b)
Internal Wall			145.0400			9.0000	1305.3600 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12453.9300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							146.3447 (35)
Thermal bridges (Default value 0.200 * total exposed area)							23.5720 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	60.1780 (37)

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

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(38)m	Jan 74.7437	Feb 73.3681	Mar 72.0196	Apr 65.6860	May 64.5010	Jun 58.9846	Jul 58.9846	Aug 57.9630	Sep 61.1094	Oct 64.5010	Nov 66.8982	Dec 69.4044	(38)
Heat transfer coeff	134.9217	133.5460	132.1976	125.8639	124.6789	119.1625	119.1625	118.1410	121.2873	124.6789	127.0762	129.5824	(39)
Average = Sum(39)m / 12 =												125.8582	
HLP	Jan 1.5854	Feb 1.5693	Mar 1.5534	Apr 1.4790	May 1.4651	Jun 1.4003	Jul 1.4003	Aug 1.3883	Sep 1.4252	Oct 1.4651	Nov 1.4933	Dec 1.5227	(40)
HLP (average)												1.4789	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.5525	(42)
Hot water usage for mixer showers														
67.0175	66.0104	64.5428	61.7348	59.6625	57.3516	56.0381	57.4946	59.0912	61.5724	64.4407	66.7607	66.7607	(42a)	
Hot water usage for baths														
28.9429	28.5131	27.9078	26.7917	25.9560	25.0293	24.5288	25.1299	25.7843	26.7759	27.9150	28.8451	28.8451	(42b)	
Hot water usage for other uses														
40.7706	39.2880	37.8055	36.3229	34.8403	33.3578	33.3578	34.8403	36.3229	37.8055	39.2880	40.7706	40.7706	(42c)	
Average daily hot water use (litres/day)												125.6868	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	136.7311	133.8115	130.2560	124.8494	120.4589	115.7387	113.9246	117.4648	121.1984	126.1538	131.6437	136.3764	(44)	
Energy content	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(45)	
Energy content (annual)										Total = Sum(45)m =		2087.6309		
Distribution loss (46)m = 0.15 x (45)m														
32.4823	28.5819	30.0298	25.6369	24.3241	21.3471	20.6673	21.8169	22.4175	25.6784	28.1326	32.0299	32.0299	(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	(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														
216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	213.5326	(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	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(64)	
								Total per year (kWh/year) = Sum(64)m =				2087.6309	(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														
72.0024	63.3565	66.5661	56.8284	53.9185	47.3195	45.8125	48.3608	49.6920	56.9205	62.3606	70.9996	70.9996	(65)	

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

Metabolic gains (Table 5), Watts													
(66)m	Jan 153.1527	Feb 153.1527	Mar 153.1527	Apr 153.1527	May 153.1527	Jun 153.1527	Jul 153.1527	Aug 153.1527	Sep 153.1527	Oct 153.1527	Nov 153.1527	Dec 153.1527	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
37.2712	33.1040	26.9220	20.3816	15.2355	12.8625	13.8984	18.0656	24.2476	30.7879	35.9340	38.3071	38.3071	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
342.9388	346.4975	337.5298	318.4388	294.3398	271.6901	256.5587	253.0001	261.9678	281.0588	305.1578	327.8075	327.8075	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	(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)													
-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	(71)
Water heating gains (Table 5)													
96.7774	94.2805	89.4705	78.9284	72.4711	65.7215	61.5759	65.0010	69.0167	76.5060	86.6119	95.4295	95.4295	(72)
Total internal gains	583.9062	580.8006	560.8410	524.6675	488.9651	454.1928	435.9517	439.9855	459.1508	495.2715	534.6225	568.4628	(73)

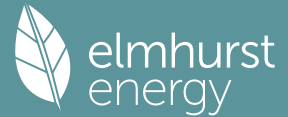
6. Solar gains

[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	654.5949	706.2492	745.8712	776.3659	791.3677	763.4168	730.3279	695.1568	667.0515	637.5281	620.2090	628.3637	(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	25.6402	25.9044	26.1686	27.4854	27.7467	29.0312	29.0312	29.2822	28.5226	27.7467	27.2232	26.6967		
alpha	2.7093	2.7270	2.7446	2.8324	2.8498	2.9354	2.9354	2.9521	2.9015	2.8498	2.8149	2.7798		
util living area	0.9748	0.9672	0.9528	0.9213	0.8612	0.7455	0.6128	0.6492	0.8211	0.9281	0.9653	0.9773	(86)	
MIT	18.2930	18.5315	18.9625	19.6104	20.1748	20.6604	20.8653	20.8378	20.4957	19.7829	18.9981	18.3400	(87)	
Th 2	19.6240	19.6359	19.6477	19.7033	19.7138	19.7631	19.7631	19.7723	19.7440	19.7138	19.6926	19.6705	(88)	
util rest of house	0.9693	0.9599	0.9415	0.9007	0.8194	0.6608	0.4774	0.5199	0.7532	0.9052	0.9563	0.9724	(89)	
MIT 2	16.5418	16.8506	17.4024	18.2451	18.9368	19.5137	19.6995	19.6888	19.3366	18.4749	17.4771	16.6267	(90)	

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Living area fraction									fLA = Living area / (4) =	0.5170 (91)		
MIT	17.4472	17.7197	18.2091	18.9510	19.5769	20.1066	20.3023	20.2829	19.9359	19.1512	18.2635	17.5125 (92)
Temperature adjustment												0.0000
adjusted MIT	17.4472	17.7197	18.2091	18.9510	19.5769	20.1066	20.3023	20.2829	19.9359	19.1512	18.2635	17.5125 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9566	0.9455	0.9253	0.8855	0.8141	0.6870	0.5409	0.5783	0.7653	0.8923	0.9427	0.9608	(94)
Useful gains	626.1578	667.7355	690.1487	687.4449	644.2230	524.4886	395.0512	402.0257	510.5035	568.8374	584.7003	603.7061	(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	1773.8481	1712.0174	1547.9084	1265.0636	982.0806	656.1816	441.1731	458.7255	707.8182	1066.1543	1418.6133	1725.0699	(97)
Space heating kWh	853.8815	701.7575	638.1733	415.8855	251.3660	0.0000	0.0000	0.0000	0.0000	370.0038	600.4174	834.2947	(98a)
Space heating requirement - total per year (kWh/year)												4665.7796	
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	853.8815	701.7575	638.1733	415.8855	251.3660	0.0000	0.0000	0.0000	0.0000	370.0038	600.4174	834.2947	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4665.7796	
Space heating per m2										(98c) / (4) =		54.8270	(99)

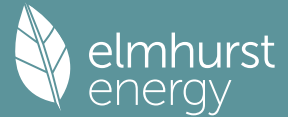
9a. Energy requirements - Individual heating systems, including micro-CHP

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	853.8815	701.7575	638.1733	415.8855	251.3660	0.0000	0.0000	0.0000	0.0000	370.0038	600.4174	834.2947	(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)	389.3669	319.9988	291.0047	189.6423	114.6220	0.0000	0.0000	0.0000	0.0000	168.7204	273.7881	380.4353	(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	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(64)
Efficiency of water heater													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	113.7335	100.0766	105.1464	89.7650	85.1685	74.7449	72.3645	76.3897	78.4925	89.9104	98.5035	112.1495	(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	32.6233	26.1716	23.5646	17.2645	13.3356	10.8953	12.1651	15.8127	20.5392	26.9485	30.4383	33.5300	(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												2127.5785	(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												1096.4448	(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)												263.2885	(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												3487.3118	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2127.5785	16.4900	350.8377	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1096.4448	16.4900	180.8037	(247)

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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	263.2885	16.4900	43.4163 (250)
Additional standing charges			0.0000 (251)
Total energy cost			575.0577 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.5912 (257)
SAP value		74.2059
SAP rating (Section 12)		74 (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	2127.5785	0.1540	327.7382 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1096.4448	0.1416	155.2326 (264)
Space and water heating			482.9708 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	263.2885	0.1443	38.0007 (268)
Total CO2, kg/year			520.9715 (272)
CO2 emissions per m2			6.1200 (273)
EI value			94.6341
EI rating			95 (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	85.1000 (1b)	x 2.8000 (2b)	= 238.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	238.2800 (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) = 0.1259 (8)
Pressure Test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8759 (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) = 0.7445 (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	0.7817	0.7445	0.7445	0.6887	0.6887	0.6142	0.6328	0.5956	0.6142	0.6515	0.6515	0.7073 (22b)
Effective ac	0.8056	0.7772	0.7772	0.7371	0.7371	0.6886	0.7002	0.6774	0.6886	0.7122	0.7122	0.7501 (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 = 1.20)			3.8500	1.1450	4.4084		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Floor Over Commercial			85.1000	0.2500	21.2750	20.0000	1702.0000 (28b)
Existing Ext Wall	16.5200	3.8500	12.6700	0.1800	2.2806	190.0000	2407.3000 (29a)
New Ext Wall	16.2400	6.2100	10.0300	0.1800	1.8054	9.0000	90.2700 (29a)
Total net area of external elements Aum(A, m2)			117.8600				(31)

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Fabric heat loss, W/K = Sum (A x U)	(26)...(30) + (32) =	36.6060			(33)
Party Wall	43.4000	0.0000	0.0000	20.0000	868.0000 (32)
Party Wall to Adjacent	19.6000	0.0000	0.0000	180.0000	3528.0000 (32)
Party Ceiling	85.1000			30.0000	2553.0000 (32b)
Internal Wall	145.0400			9.0000	1305.3600 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12453.9300	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		146.3447	(35)
Thermal bridges (Default value 0.200 * total exposed area)		23.5720	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	60.1780	(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	63.3432	61.1094	61.1094	57.9630	57.9630	54.1492	55.0618	53.2638	54.1492	56.0016	56.0016	58.9846	(38)
Average = Sum(39)m / 12 =	123.5211	121.2873	121.2873	118.1410	118.1410	114.3271	115.2397	113.4418	114.3271	116.1796	116.1796	119.1625	(39)
												117.6029	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.4515	1.4252	1.4252	1.3883	1.3883	1.3434	1.3542	1.3330	1.3434	1.3652	1.3652	1.4003	(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													2.5525	(42)
Hot water usage for mixer showers														
	67.0175	66.0104	64.5428	61.7348	59.6625	57.3516	56.0381	57.4946	59.0912	61.5724	64.4407	66.7607	(42a)	
Hot water usage for baths														
	28.9429	28.5131	27.9078	26.7917	25.9560	25.0293	24.5288	25.1299	25.7843	26.7759	27.9150	28.8451	(42b)	
Hot water usage for other uses														
	40.7706	39.2880	37.8055	36.3229	34.8403	33.3578	33.3578	34.8403	36.3229	37.8055	39.2880	40.7706	(42c)	
Average daily hot water use (litres/day)													125.6868	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Energy conte	136.7311	133.8115	130.2560	124.8494	120.4589	115.7387	113.9246	117.4648	121.1984	126.1538	131.6437	136.3764	(44)	
Energy content (annual)	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(45)	
Distribution loss (46)m = 0.15 x (45)m													2087.6309	
	32.4823	28.5819	30.0298	25.6369	24.3241	21.3471	20.6673	21.8169	22.4175	25.6784	28.1326	32.0299	(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	(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														
	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(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	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326	(64)	
													2087.6309	(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														
	72.0024	63.3565	66.5661	56.8284	53.9185	47.3195	45.8125	48.3608	49.6920	56.9205	62.3606	70.9996	(65)	

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

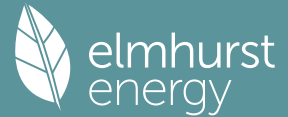
Metabolic gains (Table 5), Watts														
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	(66)	
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	37.2712	33.1040	26.9220	20.3816	15.2355	12.8625	13.8984	18.0656	24.2476	30.7879	35.9340	38.3071	(67)	
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	342.9388	346.4975	337.5298	318.4388	294.3398	271.6901	256.5587	253.0001	261.9678	281.0588	305.1578	327.8075	(68)	
Pumps, fans	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	(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)	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	(71)	
Total internal gains	96.7774	94.2805	89.4705	78.9284	72.4711	65.7215	61.5759	65.0010	69.0167	76.5060	86.6119	95.4295	(72)	
	583.9062	580.8006	560.8410	524.6675	488.9651	454.1928	435.9517	439.9855	459.1508	495.2715	534.6225	568.4628	(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	662.3477	706.3689	744.6670	783.8163	793.3393	787.6322	749.8141	717.5271	683.5556	647.5509	631.9792	634.2572 (84)	

7. Mean internal temperature (heating season)

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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	28.0067	28.5226	28.5226	29.2822	29.2822	30.2590	30.0194	30.4952	30.2590	29.7765	29.7765	29.0312	
alpha	2.8671	2.9015	2.9015	2.9521	2.9521	3.0173	3.0013	3.0330	3.0173	2.9851	2.9851	2.9354	
util living area	0.9702	0.9621	0.9428	0.8987	0.8082	0.6213	0.4480	0.4721	0.7395	0.9023	0.9555	0.9729 (86)	
MIT	18.7109	18.9280	19.3479	19.9316	20.4650	20.8534	20.9622	20.9567	20.7194	20.1009	19.3949	18.7579 (87)	
Th 2	19.7241	19.7440	19.7440	19.7723	19.7723	19.8070	19.7986	19.8150	19.8070	19.7901	19.7901	19.7631 (88)	
util rest of house	0.9636	0.9537	0.9291	0.8719	0.7501	0.5071	0.2866	0.3118	0.6465	0.8709	0.9439	0.9669 (89)	
MIT 2	17.1273	17.4128	17.9421	18.6816	19.3093	19.7251	19.7898	19.8038	19.6132	18.9095	18.0333	17.2094 (90)	
Living area fraction	17.9461	18.1962	18.6689	19.3279	19.9068	20.3085	20.3960	20.3999	fLA = Living area / (4) =				0.5170 (91)
MIT	17.9461	18.1962	18.6689	19.3279	19.9068	20.3085	20.3960	20.3999	20.1852	19.5255	18.7373	18.0100 (92)	
Temperature adjustment												0.0000	
adjusted MIT	17.9461	18.1962	18.6689	19.3279	19.9068	20.3085	20.3960	20.3999	20.1852	19.5255	18.7373	18.0100 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9507	0.9397	0.9138	0.8601	0.7574	0.5584	0.3700	0.3943	0.6793	0.8624	0.9306	0.9550 (94)
Useful gains	629.7154	663.7687	680.4640	674.1664	600.8631	439.7997	277.4181	282.8879	464.3093	558.4577	588.1031	605.7225 (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	1586.7643	1527.7638	1366.7793	1113.8238	815.9815	492.5782	287.6351	294.9367	569.9402	920.7802	1247.4559	1538.3939 (97)
Space heating kWh	712.0444	580.6047	510.6186	316.5533	160.0481	0.0000	0.0000	0.0000	0.0000	269.5679	474.7340	693.9075 (98a)
Space heating requirement - total per year (kWh/year)												3718.0786
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	712.0444	580.6047	510.6186	316.5533	160.0481	0.0000	0.0000	0.0000	0.0000	269.5679	474.7340	693.9075 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3718.0786
Space heating per m2										(98c) / (4) =		43.6907 (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	712.0444	580.6047	510.6186	316.5533	160.0481	0.0000	0.0000	0.0000	0.0000	269.5679	474.7340	693.9075 (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)	324.6897	264.7536	232.8402	144.3472	72.9813	0.0000	0.0000	0.0000	0.0000	122.9220	216.4770	316.4193 (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	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326 (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	113.7335	100.0766	105.1464	89.7650	85.1685	74.7449	72.3645	76.3897	78.4925	89.9104	98.5035	112.1495 (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	32.6233	26.1716	23.5646	17.2645	13.3356	10.8953	12.1651	15.8127	20.5392	26.9485	30.4383	33.5300 (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													1695.4303 (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													1096.4448 (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)													263.2885 (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)

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Energy used
Total delivered energy for all uses

0.0000 (237)
3055.1636 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1695.4303	25.1600	426.5703 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1096.4448	25.1600	275.8655 (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	263.2885	25.1600	66.2434 (250)
Additional standing charges			0.0000 (251)
Total energy cost			768.6792 (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	1695.4303	0.1546	262.1665 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1096.4448	0.1416	155.2326 (264)
Space and water heating			417.3991 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	263.2885	0.1443	38.0007 (268)
Total CO2, kg/year			455.3998 (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	1695.4303	1.5725	2666.0556 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1096.4448	1.5235	1670.4755 (278)
Space and water heating			4336.5311 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	263.2885	1.5338	403.8407 (282)
Total Primary energy kWh/year			4740.3718 (286)

SAP 10 EPC IMPROVEMENTS

Be Lean

Current energy efficiency rating: C 74
Current environmental impact rating: A 95

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

Recommended measures:
(none)

SAP change	Cost change	CO2 change
------------	-------------	------------

Recommended measures
(none)

Typical annual savings	Energy efficiency	Environmental impact
Total Savings £0	0.00 kg/m²	

Potential energy efficiency rating: C 74
Potential environmental impact rating: A 95

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 £769	Potential £769	Saving £0
Electricity			
Space heating	£427	£427	£0
Water heating	£276	£276	£0
Lighting	£66	£66	£0
Total cost of fuels	£769	£769	£0
Total cost of uses	£769	£769	£0
Delivered energy	36 kWh/m²	36 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.5 tonnes	0.5 tonnes	0.0 tonnes
CO2 emissions per m²	5 kg/m²	5 kg/m²	0 kg/m²
Primary energy	56 kWh/m²	56 kWh/m²	0 kWh/m²

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1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	85.1000 (1b)	x 2.8000 (2b)	= 238.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 238.2800 (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)
		Air changes per hour
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1259 (8)
Pressure test	No	
Pressure Test Method	Blower Door	
Measured/design AP50	15.0000	(17)
Infiltration rate	0.8759	(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) =	0.7445 (21)

Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.9493	0.9306	0.9120	0.8190	0.8004	0.7073	0.7073	0.6887	0.7445	0.8004	0.8376	0.8748 (22b)
Effective ac	0.9505	0.9331	0.9159	0.8354	0.8203	0.7501	0.7501	0.7371	0.7772	0.8203	0.8508	0.8826 (25)

3. Heat losses and heat loss parameter

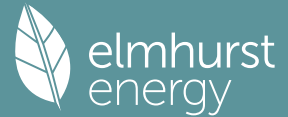
Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Entrance Door			1.8900	1.0000	1.8900		(26)
Windows (Uw = 1.20)			3.8500	1.1450	4.4084		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Floor Over Commercial			85.1000	0.2500	21.2750	20.0000	1702.0000 (28b)
Existing Ext Wall	16.5200	3.8500	12.6700	0.1800	2.2806	190.0000	2407.3000 (29a)
New Ext Wall	16.2400	6.2100	10.0300	0.1800	1.8054	9.0000	90.2700 (29a)
Total net area of external elements Aum(A, m ²)			117.8600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.6060		(33)
Party Wall			43.4000	0.0000	0.0000	20.0000	868.0000 (32)
Party Wall to Adjacent			19.6000	0.0000	0.0000	180.0000	3528.0000 (32)
Party Ceiling			85.1000			30.0000	2553.0000 (32b)
Internal Wall			145.0400			9.0000	1305.3600 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12453.9300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							146.3447 (35)
Thermal bridges (Default value 0.200 * total exposed area)							23.5720 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	60.1780 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 74.7437	Feb 73.3681	Mar 72.0196	Apr 65.6860	May 64.5010	Jun 58.9846	Jul 58.9846	Aug 57.9630	Sep 61.1094	Oct 64.5010	Nov 66.8982	Dec 69.4044 (38)
Heat transfer coeff	134.9217	133.5460	132.1976	125.8639	124.6789	119.1625	119.1625	118.1410	121.2873	124.6789	127.0762	129.5824 (39)
Average = Sum(39)m / 12 =												125.8582
HLP	Jan 1.5854	Feb 1.5693	Mar 1.5534	Apr 1.4790	May 1.4651	Jun 1.4003	Jul 1.4003	Aug 1.3883	Sep 1.4252	Oct 1.4651	Nov 1.4933	Dec 1.5227 (40)
HLP (average)												1.4789
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.5525 (42)
Hot water usage for mixer showers	67.0175	66.0104	64.5428	61.7348	59.6625	57.3516	56.0381	57.4946	59.0912	61.5724	64.4407	66.7607 (42a)
Hot water usage for baths	28.9429	28.5131	27.9078	26.7917	25.9560	25.0293	24.5288	25.1299	25.7843	26.7759	27.9150	28.8451 (42b)
Hot water usage for other uses	40.7706	39.2880	37.8055	36.3229	34.8403	33.3578	33.3578	34.8403	36.3229	37.8055	39.2880	40.7706 (42c)
Average daily hot water use (litres/day)												125.6868 (43)
Daily hot water use	Jan 136.7311	Feb 133.8115	Mar 130.2560	Apr 124.8494	May 120.4589	Jun 115.7387	Jul 113.9246	Aug 117.4648	Sep 121.1984	Oct 126.1538	Nov 131.6437	Dec 136.3764 (44)
Energy conte	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326 (45)
Energy content (annual)										Total = Sum(45)m =		2087.6309
Distribution loss (46)m = 0.15 x (45)m	32.4823	28.5819	30.0298	25.6369	24.3241	21.3471	20.6673	21.8169	22.4175	25.6784	28.1326	32.0299 (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)

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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 (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 (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											
	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (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 (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 (63b)
FGHRS	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 (63d)
	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506
Total per year (kWh/year) = Sum(64)m =											213.5326 (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 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =											0.0000 (64a)
Heat gains from water heating, kWh/month											
	72.0024	63.3565	66.5661	56.8284	53.9185	47.3195	45.8125	48.3608	49.6920	56.9205	62.3606
											70.9996 (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
(66)m	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	37.2712	33.1040	26.9220	20.3816	15.2355	12.8625	13.8984	18.0656	24.2476	30.7879	35.9340
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	342.9388	346.4975	337.5298	318.4388	294.3398	271.6901	256.5587	253.0001	261.9678	281.0588	305.1578
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Losses e.g. evaporation (negative values) (Table 5)	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018
Water heating gains (Table 5)	96.7774	94.2805	89.4705	78.9284	72.4711	65.7215	61.5759	65.0010	69.0167	76.5060	86.6119
Total internal gains	583.9062	580.8006	560.8410	524.6675	488.9651	454.1928	435.9517	439.9855	459.1508	495.2715	534.6225
											568.4628 (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	654.5949	706.2492	745.8712	776.3659	791.3677	763.4168	730.3279	695.1568	667.0515	637.5281	620.2090	628.3637 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)											
Utilisation factor for gains for living area, nil,m (see Table 9a)											21.0000 (85)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
tau	25.6402	25.9044	26.1686	27.4854	27.7467	29.0312	29.0312	29.2822	28.5226	27.7467	27.2232
alpha	2.7093	2.7270	2.7446	2.8324	2.8498	2.9354	2.9354	2.9521	2.9015	2.8498	2.8149
util living area	0.9748	0.9672	0.9528	0.9213	0.8612	0.7455	0.6128	0.6492	0.8211	0.9281	0.9653
											0.9773 (86)
MIT	18.2930	18.5315	18.9625	19.6104	20.1748	20.6604	20.8653	20.8378	20.4957	19.7829	18.9981
Th 2	19.6240	19.6359	19.6477	19.7033	19.7138	19.7631	19.7631	19.7723	19.7440	19.7138	19.6926
util rest of house	0.9693	0.9599	0.9415	0.9007	0.8194	0.6608	0.4774	0.5199	0.7532	0.9052	0.9563
MIT 2	16.5418	16.8506	17.4024	18.2451	18.9368	19.5137	19.6995	19.6888	19.3366	18.4749	17.4771
Living area fraction											
MIT	17.4472	17.7197	18.2091	18.9510	19.5769	20.1066	20.3023	20.2829	19.9359	19.1512	18.2635
Temperature adjustment											0.0000
adjusted MIT	17.4472	17.7197	18.2091	18.9510	19.5769	20.1066	20.3023	20.2829	19.9359	19.1512	18.2635
											17.5125 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9566	0.9455	0.9253	0.8855	0.8141	0.6870	0.5409	0.5783	0.7653	0.8923	0.9427	0.9608
Useful gains	626.1578	667.7355	690.1487	687.4449	644.2230	524.4886	395.0512	402.0257	510.5035	568.8374	584.7003	603.7061
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	1773.8481	1712.0174	1547.9084	1265.0636	982.0806	656.1816	441.1731	458.7255	707.8182	1066.1543	1418.6133	1725.0699
Space heating kWh	853.8815	701.7575	638.1733	415.8855	251.3660	0.0000	0.0000	0.0000	0.0000	370.0038	600.4174	834.2947
Space heating requirement - total per year (kWh/year)												4665.7796
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
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	853.8815	701.7575	638.1733	415.8855	251.3660	0.0000	0.0000	0.0000	0.0000	370.0038	600.4174	834.2947
Space heating requirement after solar contribution - total per year (kWh/year)												4665.7796
Space heating per m ²												54.8270
												(98c) / (4) =

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)

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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	853.8815	701.7575	638.1733	415.8855	251.3660	0.0000	0.0000	0.0000	0.0000	370.0038	600.4174	834.2947 (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)	389.3669	319.9988	291.0047	189.6423	114.6220	0.0000	0.0000	0.0000	0.0000	168.7204	273.7881	380.4353 (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 requirement	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326 (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	113.7335	100.0766	105.1464	89.7650	85.1685	74.7449	72.3645	76.3897	78.4925	89.9104	98.5035	112.1495 (219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)
Lighting	32.6233	26.1716	23.5646	17.2645	13.3356	10.8953	12.1651	15.8127	20.5392	26.9485	30.4383	33.5300 (232)
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 (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)	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)
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												2127.5785 (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												1096.4448 (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)												263.2885 (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												3487.3118 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2127.5785	16.4900	350.8377 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1096.4448	16.4900	180.8037 (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	263.2885	16.4900	43.4163 (250)
Additional standing charges			0.0000 (251)
Total energy cost			575.0577 (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] =	1.5912 (257)
SAP value		74.2059
SAP rating (Section 12)		74 (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	2127.5785	0.1540	327.7382 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1096.4448	0.1416	155.2326 (264)
Space and water heating			482.9708 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	263.2885	0.1443	38.0007 (268)
Total CO2, kg/year			520.9715 (272)
CO2 emissions per m2			6.1200 (273)
EI value			94.6341
EI rating			95 (274)
EI band			A

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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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	85.1000 (1b)	x 2.8000 (2b)	= 238.2800 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.1000		(4)
Dwelling volume		(3a) + (3b) + (3c) + (3d) + (3e) ... (3n)	= 238.2800 (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) = 0.1259 (8)
Pressure Test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8759 (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) = 0.7445 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	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)
Adj infilt rate	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)
Effective ac	0.7817	0.7445	0.7445	0.6887	0.6887	0.6142	0.6328	0.5956	0.6142	0.6515	0.6515	0.7073 (22b)
	0.8056	0.7772	0.7772	0.7371	0.7371	0.6886	0.7002	0.6774	0.6886	0.7122	0.7122	0.7501 (25)

3. Heat losses and heat loss parameter

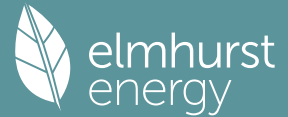
Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Entrance Door			1.8900	1.0000	1.8900		(26)
Windows (Uw = 1.20)			3.8500	1.1450	4.4084		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Floor Over Commercial			85.1000	0.2500	21.2750	20.0000	1702.0000 (28b)
Existing Ext Wall	16.5200	3.8500	12.6700	0.1800	2.2806	190.0000	2407.3000 (29a)
New Ext Wall	16.2400	6.2100	10.0300	0.1800	1.8054	9.0000	90.2700 (29a)
Total net area of external elements Aum(A, m ²)			117.8600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	36.6060			(33)
Party Wall			43.4000	0.0000	0.0000	20.0000	868.0000 (32)
Party Wall to Adjacent			19.6000	0.0000	0.0000	180.0000	3528.0000 (32)
Party Ceiling			85.1000			30.0000	2553.0000 (32b)
Internal Wall			145.0400			9.0000	1305.3600 (32c)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =	12453.9300			(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K				146.3447			(35)
Thermal bridges (Default value 0.200 * total exposed area)				23.5720			(36)
Point Thermal bridges				(36a) =	0.0000		
Total fabric heat loss			(33) + (36) + (36a) =	60.1780			(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	63.3432	61.1094	61.1094	57.9630	57.9630	54.1492	55.0618	53.2638	54.1492	56.0016	56.0016	58.9846 (38)
Average = Sum(39)m / 12 =	123.5211	121.2873	121.2873	118.1410	118.1410	114.3271	115.2397	113.4418	114.3271	116.1796	116.1796	119.1625 (39)
												117.6029
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.4515	1.4252	1.4252	1.3883	1.3883	1.3434	1.3542	1.3330	1.3434	1.3652	1.3652	1.4003 (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												2.5525 (42)
Hot water usage for mixer showers												
	67.0175	66.0104	64.5428	61.7348	59.6625	57.3516	56.0381	57.4946	59.0912	61.5724	64.4407	66.7607 (42a)
Hot water usage for baths												
	28.9429	28.5131	27.9078	26.7917	25.9560	25.0293	24.5288	25.1299	25.7843	26.7759	27.9150	28.8451 (42b)
Hot water usage for other uses												

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Average daily hot water use (litres/day)	40.7706	39.2880	37.8055	36.3229	34.8403	33.3578	33.3578	34.8403	36.3229	37.8055	39.2880	40.7706 (42c) 125.6868 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	136.7311	133.8115	130.2560	124.8494	120.4589	115.7387	113.9246	117.4648	121.1984	126.1538	131.6437	136.3764 (44)
Distribution loss (46)m = 0.15 x (45)m	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326 (45)
Water storage loss:	32.4823	28.5819	30.0298	25.6369	24.3241	21.3471	20.6673	21.8169	22.4175	25.6784	28.1326	32.0299 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326 (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	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326 (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	72.0024	63.3565	66.5661	56.8284	53.9185	47.3195	45.8125	48.3608	49.6920	56.9205	62.3606	70.9996 (65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)												
Total per year (kWh/year) = Sum(64)m = 2087.6309 (64)												

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	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527	153.1527 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	37.2712	33.1040	26.9220	20.3816	15.2355	12.8625	13.8984	18.0656	24.2476	30.7879	35.9340	38.3071 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	342.9388	346.4975	337.5298	318.4388	294.3398	271.6901	256.5587	253.0001	261.9678	281.0588	305.1578	327.8075 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678	52.8678 (69)
Pumps, fans	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)
Losses e.g. evaporation (negative values) (Table 5)	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018	-102.1018 (71)
Water heating gains (Table 5)	96.7774	94.2805	89.4705	78.9284	72.4711	65.7215	61.5759	65.0010	69.0167	76.5060	86.6119	95.4295 (72)
Total internal gains	583.9062	580.8006	560.8410	524.6675	488.9651	454.1928	435.9517	439.9855	459.1508	495.2715	534.6225	568.4628 (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)	
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		662.3477	706.3689	744.6670	783.8163	793.3393	787.6322	749.8141	717.5271	683.5556	647.5509	631.9792	634.2572 (84)

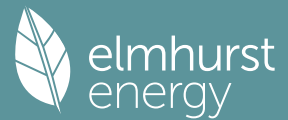
7. Mean internal temperature (heating season)

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	28.0067	28.5226	28.5226	29.2822	29.2822	30.2590	30.0194	30.4952	30.2590	29.7765	29.7765	29.0312
alpha	2.8671	2.9015	2.9015	2.9521	2.9521	3.0173	3.0013	3.0330	3.0173	2.9851	2.9851	2.9354
util living area	0.9702	0.9621	0.9428	0.8987	0.8082	0.6213	0.4480	0.4721	0.7395	0.9023	0.9555	0.9729 (86)
MIT	18.7109	18.9280	19.3479	19.9316	20.4650	20.8534	20.9622	20.9567	20.7194	20.1009	19.3949	18.7579 (87)
Th 2	19.7241	19.7440	19.7440	19.7723	19.7723	19.8070	19.7986	19.8150	19.8070	19.7901	19.7901	19.7631 (88)
util rest of house	0.9636	0.9537	0.9291	0.8719	0.7501	0.5071	0.2866	0.3118	0.6465	0.8709	0.9439	0.9669 (89)
MIT 2	17.1273	17.4128	17.9421	18.6816	19.3093	19.7251	19.7898	19.8038	19.6132	18.9095	18.0333	17.2094 (90)
Living area fraction	17.9461	18.1962	18.6689	19.3279	19.9068	20.3085	20.3960	20.3999	20.1852	19.5255	18.7373	18.0100 (91)
MIT	17.9461	18.1962	18.6689	19.3279	19.9068	20.3085	20.3960	20.3999	20.1852	19.5255	18.7373	18.0100 (92)
Temperature adjustment	17.9461	18.1962	18.6689	19.3279	19.9068	20.3085	20.3960	20.3999	20.1852	19.5255	18.7373	18.0100 (93)
adjusted MIT	17.9461	18.1962	18.6689	19.3279	19.9068	20.3085	20.3960	20.3999	20.1852	19.5255	18.7373	18.0100 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9507	0.9397	0.9138	0.8601	0.7574	0.5584	0.3700	0.3943	0.6793	0.8624	0.9306	0.9550 (94)
Ext temp.	629.7154	663.7687	680.4640	674.1664	600.8631	439.7997	277.4181	282.8879	464.3093	558.4577	588.1031	605.7225 (95)
Heat loss rate W	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)
Space heating kWh	1586.7643	1527.7638	1366.7793	1113.8238	815.9815	492.5782	287.6351	294.9367	569.9402	920.7802	1247.4559	1538.3939 (97)
Space heating requirement - total per year (kWh/year)	712.0444	580.6047	510.6186	316.5533	160.0481	0.0000	0.0000	0.0000	0.0000	269.5679	474.7340	693.9075 (98a)
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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)

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Space heating kWh	712.0444	580.6047	510.6186	316.5533	160.0481	0.0000	0.0000	0.0000	0.0000	269.5679	474.7340	693.9075 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3718.0786
Space heating per m2												(98c) / (4) = 43.6907 (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	712.0444	580.6047	510.6186	316.5533	160.0481	0.0000	0.0000	0.0000	0.0000	269.5679	474.7340	693.9075 (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)	324.6897	264.7536	232.8402	144.3472	72.9813	0.0000	0.0000	0.0000	0.0000	122.9220	216.4770	316.4193 (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	216.5486	190.5458	200.1987	170.9126	162.1608	142.3142	137.7820	145.4459	149.4497	171.1895	187.5506	213.5326 (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	113.7335	100.0766	105.1464	89.7650	85.1685	74.7449	72.3645	76.3897	78.4925	89.9104	98.5035	112.1495 (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	32.6233	26.1716	23.5646	17.2645	13.3356	10.8953	12.1651	15.8127	20.5392	26.9485	30.4383	33.5300 (232)
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 (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)	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)
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												1695.4303 (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												1096.4448 (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)												263.2885 (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												3055.1636 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1695.4303	25.1600	426.5703 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1096.4448	25.1600	275.8655 (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	263.2885	25.1600	66.2434 (250)
Additional standing charges			0.0000 (251)
Total energy cost			768.6792 (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	1695.4303	0.1546	262.1665 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1096.4448	0.1416	155.2326 (264)
Space and water heating			417.3991 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	263.2885	0.1443	38.0007 (268)
Total CO2, kg/year			455.3998 (272)

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----- 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	1695.4303	1.5725	2666.0556	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1096.4448	1.5235	1670.4755	(278)
Space and water heating			4336.5311	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	263.2885	1.5338	403.8407	(282)
Total Primary energy kWh/year			4740.3718	(286)

Overview Report

Dwelling Address	
Report Date	01/02/2024
Property Type	Flat, Semi-Detached
Floor Area [m ²]	85

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

74

74

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
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Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.25 W/m ² K	Good
Windows	High performance glazing	Very 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 56 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: **0.5** 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
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Estimated energy use and potential savings

Estimated energy cost for this property over a year

£769

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	31/01/2024
Date of certificate	31/01/2024
Type of assessment	SAP, new dwelling