

Summary for Input Data



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

SAP Rating	73 C	DER	6.61	TER	9.02
Environmental	95 A	% DER < TER			26.72
CO ₂ Emissions (t/year)	0.45	DFEE	69.14	TFEE	37.62
Compliance Check	See BREL	% DFEE < TFEE			-83.79
% DPER < TPER	-43.66	DPER	69.40	TPER	48.31

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

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

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

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	14.00 m	74.20 m ²	2.60 m
1st Storey:	0.00 m	0.00 m ²	0.00 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	29.90	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
	New Ext Wall	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18	9.00	36.40	22.29	0.00	None	14.11	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	55.12	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	139.36

10.0 External Roofs

Summary for Input Data



Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Flat Roof	External Flat Roof	Plasterboard, insulated flat roof	0.14	9.00	74.20	74.20	None	0.00	Calculate Wall Area	0.00

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	74.20

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Entrance Door	Manufacturer	Solid Door			None	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05	≥ 16 mm	Argon Filled	0.63	Metal 32 mm break	0.80	1.20
Patio Doors	Manufacturer	Window	Double Low-E Soft 0.05	≥ 16 mm	Argon Filled	0.63	Metal 32 mm break	0.80	1.20
Bifold 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	New Ext Wall	North West	0.70	0
Entrance Door	Entrance Door	New Ext Wall	North West	1.89	0
Patio Doors	Patio Doors	New Ext Wall	North West	4.32	0
Rear Elevation	Windows	New Ext Wall	South East	1.80	0
Bifolds	Bifold Doors	New Ext Wall	South East	5.40	0

14.0 Conservatory

None

15.0 Draught Proofing

100

 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Default

Y-value

0.20

 W/m²K

18.0 Pressure Testing

No

Designed AP₅₀

15.00

 m³/(h.m²) @ 50 Pa

Property Tested?

Yes

Test Method

Blower Door

As Built AP₅₀

15.00

 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

No

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

No

22.0 Lighting

No Fixed Lighting

No

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

24.0 Main Heating 1

Database

Percentage of Heat

100.00

 %

Database Ref. No.

107010

Fuel Type

Electricity

SAP Code

0

In Winter

334.39

In Summer

160.04

Model Name

AE080RXYDEG

Manufacturer

Samsung Electronics Air Conditioner Europe B.V.

System Type

Heat Pump

Controls SAP Code

2207

Summary for Input Data

PCDF Controls	0
Delayed Start Stat	Yes
HETAS approved System	No
Oil Pump Inside	No
FI Case	0.00
FI Water	0.00
Flue Type	None or Unknown
Smoke Control Area	Unknown
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Underfloor
Underfloor Heating	Yes - Pipes in Wood
Flow Temperature	Enter value
Flow Temperature Value	35.00
Boiler Interlock	Yes
Electric CPSU Temperature	0.00

25.0 Main Heating 2

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

Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes

Summary for Input Data

Independent Time Control	Yes	
Insulation Type	Measured Loss	
Insulation Thickness	0	
Cylinder Volume	210.00	L
Loss	1.94	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

Thermal Store	None
Thermal Store Pipework	within a single casing

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	-43.66		DPER	69.40	TPER	48.31
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	74.2000 (1b)	x 2.6000 (2b)	= 192.9200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 192.9200 (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	4 * 10 = 40.0000 (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) =	40.0000 / (5) = 0.2073 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9573 (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) = 0.8137 (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	1.0375	1.0172	0.9968	0.8951	0.8748	0.7731	0.7731	0.7527	0.8137	0.8748	0.9155	0.9561 (22b)
Effective ac	1.0375	1.0172	0.9968	0.9006	0.8826	0.7988	0.7988	0.7833	0.8311	0.8826	0.9190	0.9571 (25)

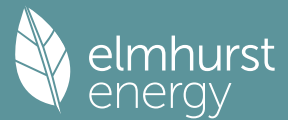
3. Heat losses and heat loss parameter

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)			2.5000	1.1450	2.8626		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Bifold Doors (Uw = 1.20)			5.4000	1.1450	6.1832		(27)
Floor Over Commercial			74.2000	0.2500	18.5500	20.0000	1484.0000 (28b)
New Ext Wall	36.4000	14.1100	22.2900	0.1800	4.0122	9.0000	200.6100 (29a)
Flat Roof	74.2000		74.2000	0.1400	10.3880	9.0000	667.8000 (30)
Total net area of external elements Aum(A, m ²)			184.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	48.8326			(33)
Party Wall			55.1200	0.0000	0.0000	20.0000	1102.4000 (32)
Internal Wall			139.3600			9.0000	1254.2400 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		4709.0500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							63.4643 (35)
Thermal bridges (Default value 0.200 * total exposed area)							36.9600 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss					(33) + (36) + (36a) =		85.7926 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Full SAP Calculation Printout



(38)m	66.0521	64.7569	63.4621	57.3363	56.1902	50.8548	50.8548	49.8667	52.9099	56.1902	58.5088	60.9327	(38)
Heat transfer coeff	151.8446	150.5495	149.2547	143.1289	141.9827	136.6473	136.6473	135.6593	138.7025	141.9827	144.3013	146.7253	(39)
Average = Sum(39)m / 12 =												143.1189	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0464	2.0290	2.0115	1.9290	1.9135	1.8416	1.8416	1.8283	1.8693	1.9135	1.9448	1.9774	(40)
HLP (average)												1.9288	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3436	(42)
Hot water usage for mixer showers														
63.5146	62.5601	61.1692	58.5080	56.5441	54.3539	53.1091	54.4894	56.0026	58.3541	61.0725	63.2713	63.2713	(42a)	
Hot water usage for baths														
27.4366	27.0291	26.4553	25.3973	24.6051	23.7267	23.2522	23.8220	24.4424	25.3823	26.4621	27.3438	27.3438	(42b)	
Hot water usage for other uses														
38.6311	37.2263	35.8216	34.4168	33.0120	31.6073	31.6073	33.0120	34.4168	35.8216	37.2263	38.6311	38.6311	(42c)	
Average daily hot water use (litres/day)												119.1156	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
129.5823	126.8156	123.4461	118.3221	114.1612	109.6879	107.9685	111.3234	114.8618	119.5580	124.7610	129.2462	129.2462	(44)	
Energy content	205.2268	180.5837	189.7321	161.9771	153.6830	134.8741	130.5786	137.8417	141.6360	162.2391	177.7449	202.3684	(45)	
Energy content (annual)										Total = Sum(45)m =		1978.4854		
Distribution loss (46)m = 0.15 x (45)m														
30.7840	27.0876	28.4598	24.2966	23.0524	20.2311	19.5868	20.6763	21.2454	24.3359	26.6617	30.3553	30.3553	(46)	
Water storage loss:														
Store volume												210.0000	(47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.9400	(48)	
Temperature factor from Table 2b												0.5400	(49)	
Enter (49) or (54) in (55)												1.0476	(55)	
Total storage loss														
32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	(56)	
If cylinder contains dedicated solar storage														
32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month														
260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	258.1064	(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														
260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	258.1064	(64)	
Total per year (kWh/year)												2634.7554	(64)	
Electric shower(s)												2635	(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														
112.8283	100.3193	107.6763	97.0094	95.6900	87.9976	88.0078	90.4228	90.2460	98.5349	102.2522	111.8779	111.8779	(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	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	105.8735	117.2171	105.8735	109.4026	105.8735	109.4026	105.8735	105.8735	109.4026	105.8735	109.4026	105.8735	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.8948	209.0417	203.6315	192.1139	177.5750	163.9105	154.7817	152.6348	158.0450	169.5626	184.1015	197.7660	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	(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)	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	(71)
Water heating gains (Table 5)	151.6509	149.2847	144.7262	134.7353	128.6156	122.2189	118.2900	121.5360	125.3416	132.4394	142.0169	150.3735	(72)
Total internal gains	522.5736	533.6979	512.3857	494.4062	470.2185	453.6864	437.0997	438.1987	450.9437	466.0299	493.6755	512.1675	(73)

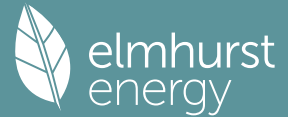
6. Solar gains

[Jan]												Gains
				Area	Solar flux	g	FF		Access			W
				m2	Table 6a	Specific data	Specific data		factor			
					W/m2	or Table 6b	or Table 6c		Table 6d			
Southeast				1.8000	36.7938	0.6300	0.8000		0.7700			23.1319 (77)
Northwest				0.7000	11.2829	0.6300	0.8000		0.7700			2.7586 (81)
Northwest				4.3200	11.2829	0.6300	0.8000		0.7700			17.0243 (81)
Southeast				5.4000	36.7938	0.6300	0.8000		0.7700			69.3957 (77)
Solar gains	112.3105	197.8774	288.1984	386.3473	459.4443	467.8676	446.1863	389.8569	321.9051	223.4027	135.7187	95.3401 (83)
Total gains	634.8841	731.5753	800.5842	880.7536	929.6628	921.5541	883.2859	828.0556	772.8488	689.4326	629.3942	607.5075 (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	8.6145	8.6886	8.7640	9.1391	9.2129	9.5726	9.5726	9.6423	9.4308	9.2129	9.0648	8.9151
alpha	1.5743	1.5792	1.5843	1.6093	1.6142	1.6382	1.6382	1.6428	1.6287	1.6142	1.6043	1.5943
util living area												
	0.9128	0.8897	0.8588	0.8002	0.7202	0.6046	0.4991	0.5320	0.6839	0.8194	0.8876	0.9170 (86)

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Living	16.2512	16.6682	17.3687	18.3943	19.3389	20.1671	20.5791	20.5159	19.8876	18.6732	17.3506	16.2478
Non living	14.2226	14.7256	15.5704	16.8078	17.9076	18.8394	19.2344	19.1939	18.5576	17.1659	15.5767	14.2312
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10
MIT	18.6129	16.6682	17.3687	18.3943	19.3389	20.1671	20.5791	20.5159	19.8876	18.6732	17.3506	16.9269 (87)
Th 2	19.3026	19.3141	19.3257	19.3811	19.3916	19.4410	19.4410	19.4503	19.4219	19.3916	19.3704	19.3484 (88)
util rest of house	0.8997	0.8733	0.8366	0.7666	0.6662	0.5160	0.3672	0.4045	0.6053	0.7821	0.8685	0.9048 (89)
MIT 2	17.2199	14.7256	15.5704	16.8078	17.9076	18.8394	19.2344	19.1939	18.5576	17.1659	15.5767	15.1332 (90)
Living area fraction									FLA = Living area / (4) =			0.4030 (91)
MIT	17.7812	15.5084	16.2951	17.4471	18.4844	19.3744	19.7762	19.7266	19.0935	17.7733	16.2915	15.8560 (92)
Temperature adjustment												0.0000
adjusted MIT	17.7812	15.5084	16.2951	17.4471	18.4844	19.3744	19.7762	19.7266	19.0935	17.7733	16.2915	15.8560 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8851	0.8177	0.7792	0.7133	0.6284	0.5116	0.3992	0.4305	0.5853	0.7309	0.8145	0.8671 (94)
Useful gains	561.9569	598.2362	623.7874	628.2579	584.1940	471.4489	352.6062	356.4662	452.3453	503.8807	512.6131	526.7867 (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	2047.0547	1597.0894	1461.9585	1223.3323	963.2661	652.4136	434.0261	451.2847	692.6141	1018.4837	1326.3497	1710.2261 (97)
Space heating kWh	1104.9128	671.2293	623.5993	428.4536	282.0296	0.0000	0.0000	0.0000	0.0000	382.8646	585.8904	880.4790 (98a)
Space heating requirement - total per year (kWh/year)												4959.4586
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	1104.9128	671.2293	623.5993	428.4536	282.0296	0.0000	0.0000	0.0000	0.0000	382.8646	585.8904	880.4790 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4959.4586
Space heating per m2										(98c) / (4) =		66.8391 (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 %)												334.3930 (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	1104.9128	671.2293	623.5993	428.4536	282.0296	0.0000	0.0000	0.0000	0.0000	382.8646	585.8904	880.4790 (98)
Space heating efficiency (main heating system 1)	334.3930	334.3930	334.3930	334.3930	334.3930	0.0000	0.0000	0.0000	0.0000	334.3930	334.3930	334.3930 (210)
Space heating fuel (main heating system)	330.4234	200.7307	186.4870	128.1288	84.3408	0.0000	0.0000	0.0000	0.0000	114.4954	175.2101	263.3066 (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	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064 (64)
Efficiency of water heater (217)m	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444 (216)
Fuel for water heating, kWh/month	163.0577	144.2898	153.3763	134.9108	130.8518	117.9761	116.4156	120.9538	122.2011	136.1979	144.7629	161.2718 (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	25.4826	20.4431	18.4067	13.4855	10.4166	8.5105	9.5024	12.3516	16.0435	21.0499	23.7758	26.1908 (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												1483.1228 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												160.0444
Water heating fuel used												1646.2655 (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)												205.6590 (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												3335.0472 (238)

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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	1483.1228	0.1543	228.9109 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1646.2655	0.1409	231.9001 (264)
Space and water heating			460.8110 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	205.6590	0.1443	29.6829 (268)
Total CO2, kg/year			490.4939 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.6100 (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	1483.1228	1.5713	2330.4879 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1646.2655	1.5209	2503.7450 (278)
Space and water heating			4834.2329 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	205.6590	1.5338	315.4466 (282)
Total Primary energy kWh/year			5149.6795 (286)
Dwelling Primary energy Rate (DPER)			69.4000 (287)

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

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	74.2000 (1b)	x 2.6000 (2b)	= 192.9200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	192.9200 (5)

2. Ventilation rate

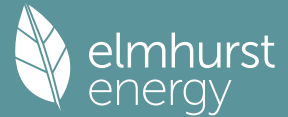
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number 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) = 0.1555 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4055 (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) = 0.3447 (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	0.4395	0.4308	0.4222	0.3791	0.3705	0.3274	0.3274	0.3188	0.3447	0.3705	0.3878	0.4050 (22b)
Effective ac	0.5966	0.5928	0.5891	0.5719	0.5686	0.5536	0.5536	0.5508	0.5594	0.5686	0.5752	0.5820 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
TER Opaque door			1.8900	1.0000	1.8900		(26)
TER Opening Type (Uw = 1.20)			12.2200	1.1450	13.9924		(27)
Floor Over Commercial			74.2000	0.1300	9.6460		(28b)
New Ext Wall	36.4000	14.1100	22.2900	0.1800	4.0122		(29a)
Flat Roof	74.2000		74.2000	0.1100	8.1620		(30)
Total net area of external elements Aum(A, m2)			184.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	37.7026		(33)
Party Wall			55.1200	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							63.4643 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							9.2400 (36)

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alpha	2.0269	2.0298	2.0326	2.0462	2.0488	2.0610	2.0610	2.0633	2.0563	2.0488	2.0436	2.0382
util living area	0.8849	0.8526	0.8100	0.7332	0.6303	0.5003	0.3892	0.4222	0.5863	0.7563	0.8505	0.8923 (86)
MIT	17.9362	18.3144	18.8602	19.5838	20.2050	20.6585	20.8553	20.8238	20.4942	19.7024	18.7231	17.8802 (87)
Th 2	19.9647	19.9673	19.9698	19.9818	19.9841	19.9946	19.9946	19.9965	19.9905	19.9841	19.9795	19.9748 (88)
util rest of house	0.8733	0.8381	0.7908	0.7055	0.5897	0.4416	0.3131	0.3458	0.5301	0.7251	0.8335	0.8814 (89)
MIT 2	16.4311	16.8989	17.5739	18.4593	19.1946	19.7065	19.9009	19.8769	19.5394	18.6220	17.4207	16.3648 (90)
Living area fraction	17.0376	17.4693	18.0922	18.9124	19.6018	20.0901	20.2855	20.2585	19.9242	19.0574	17.9455	16.9755 (92)
MIT	17.0376	17.4693	18.0922	18.9124	19.6018	20.0901	20.2855	20.2585	19.9242	19.0574	17.9455	16.9755 (93)
Temperature adjustment												0.0000
adjusted MIT	17.0376	17.4693	18.0922	18.9124	19.6018	20.0901	20.2855	20.2585	19.9242	19.0574	17.9455	16.9755 (93)

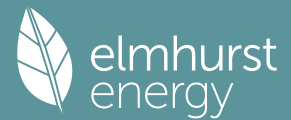
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8297	0.7936	0.7483	0.6721	0.5730	0.4475	0.3360	0.3667	0.5261	0.6918	0.7905	0.8387 (94)
Useful gains	516.0055	562.0053	572.9789	560.2797	500.4207	385.4409	277.4401	285.0708	384.4830	458.3623	485.0797	500.4141 (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	1081.7053	1064.4116	978.9564	834.5403	656.9916	451.2158	302.9037	316.4349	480.8209	703.1839	906.2589	1073.0808 (97)
Space heating kWh	420.8806	337.6170	302.0472	197.4676	116.4887	0.0000	0.0000	0.0000	0.0000	182.1473	303.2490	426.0640 (98a)
Space heating requirement - total per year (kWh/year)												2285.9614
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	420.8806	337.6170	302.0472	197.4676	116.4887	0.0000	0.0000	0.0000	0.0000	182.1473	303.2490	426.0640 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2285.9614
Space heating per m2										(98c) / (4) =		30.8081 (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	420.8806	337.6170	302.0472	197.4676	116.4887	0.0000	0.0000	0.0000	0.0000	182.1473	303.2490	426.0640 (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)	455.9920	365.7822	327.2451	213.9411	126.2067	0.0000	0.0000	0.0000	0.0000	197.3426	328.5471	461.6078 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	227.9371	201.6427	214.5882	189.7880	184.6781	167.1942	165.6806	171.8885	173.3411	192.3268	203.2853	225.6164 (64)
Efficiency of water heater (217)m	85.4157	85.2067	84.8263	84.1489	83.0559	79.8000	79.8000	79.8000	79.8000	83.9380	84.9548	79.8000 (216)
Fuel for water heating, kWh/month	266.8562	236.6513	252.9736	225.5385	222.3538	209.5166	207.6198	215.3991	217.2194	229.1297	239.2866	85.4630 (217)
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	22.4950	18.0463	16.2487	11.9045	9.1954	7.5127	8.3883	10.9035	14.1625	18.5820	20.9883	23.1202 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-57.4650	-75.6081	-101.5295	-106.4422	-108.7230	-99.4309	-98.1968	-95.5508	-90.1731	-82.6052	-61.2232	-50.3441 (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	-51.1784	-104.7754	-203.1647	-298.0984	-387.6264	-387.1232	-382.5367	-326.7793	-243.4735	-147.3166	-67.4660	-40.6904 (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												2476.6646 (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												2786.5377 (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)												181.5473 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-3667.5209 (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												1863.2287 (238)

Full SAP Calculation Printout



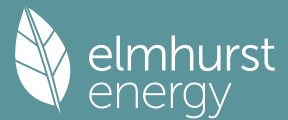
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2476.6646	0.2100	520.0996 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2786.5377	0.2100	585.1729 (264)
Space and water heating			1105.2725 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	181.5473	0.1443	26.2029 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1027.2919	0.1361	-139.7902
PV Unit electricity exported	-2640.2290	0.1266	-334.2534
Total			-474.0437 (269)
Total CO2, kg/year			669.3610 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.0200 (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	2476.6646	1.1300	2798.6310 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2786.5377	1.1300	3148.7876 (278)
Space and water heating			5947.4186 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	181.5473	1.5338	278.4634 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1027.2919	1.5030	-1544.0159
PV Unit electricity exported	-2640.2290	0.4647	-1227.0226
Total			-2771.0385 (283)
Total Primary energy kWh/year			3584.9443 (286)
Target Primary Energy Rate (TPER)			48.3100 (287)

Full SAP Calculation Printout



Property Reference	Flat 1D				Issued on Date	01/02/2024
Assessment Reference	Be Green		Prop Type Ref	Conversion		
Property						
SAP Rating	73 C	DER	6.61	TER	9.02	
Environmental	95 A	% DER < TER				26.72
CO ₂ Emissions (t/year)	0.45	DFEE	69.14	TFEE	37.62	
Compliance Check	See BREL	% DFEE < TFEE				-83.79
% DPER < TPER	-43.66	DPER	69.40	TPER	48.31	
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	74.2000 (1b)	2.6000 (2b)	192.9200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.2000		192.9200 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	192.9200 (5)

2. Ventilation rate

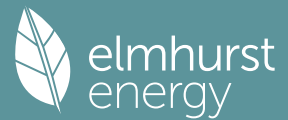
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) = 0.1555 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9055 (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) = 0.7697 (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	0.9813	0.9621	0.9429	0.8466	0.8274	0.7312	0.7312	0.7120	0.7697	0.8274	0.8659	0.9044 (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	0.9815	0.9628	0.9445	0.8584	0.8423	0.7673	0.7673	0.7534	0.7962	0.8423	0.8749	0.9089 (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)			2.5000	1.1450	2.8626		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Bifold Doors (Uw = 1.20)			5.4000	1.1450	6.1832		(27)
Floor Over Commercial			74.2000	0.2500	18.5500	20.0000	1484.0000 (28b)
New Ext Wall	36.4000	14.1100	22.2900	0.1800	4.0122	9.0000	200.6100 (29a)
Flat Roof	74.2000		74.2000	0.1400	10.3880	9.0000	667.8000 (30)
Total net area of external elements Aum(A, m ²)			184.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	48.8326		(33)
Party Wall			55.1200	0.0000	0.0000	20.0000	1102.4000 (32)
Internal Wall			139.3600			9.0000	1254.2400 (32c)
Heat capacity Cm = Sum (A x k)				(28)...(30) + (32) + (32a)...(32e) =			4709.0500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							63.4643 (35)
Thermal bridges (Default value 0.200 * total exposed area)							36.9600 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	85.7926 (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	62.4868	61.2964	60.1296	54.6492	53.6238	48.8506	48.8506	47.9666	50.6891	53.6238	55.6981	57.8667	(38)
Heat transfer coeff	148.2793	147.0890	145.9222	140.4418	139.4164	134.6431	134.6431	133.7592	136.4817	139.4164	141.4907	143.6593	(39)
Average = Sum(39)m / 12 =												140.4368	
HLP	1.9984	1.9823	1.9666	1.8927	1.8789	1.8146	1.8146	1.8027	1.8394	1.8789	1.9069	1.9361	(40)
HLP (average)												1.8927	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3436 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	27.4366	27.0291	26.4553	25.3973	24.6051	23.7267	23.2522	23.8220	24.4424	25.3823	26.4621	27.3438	(42b)
Hot water usage for other uses	38.6311	37.2263	35.8216	34.4168	33.0120	31.6073	31.6073	33.0120	34.4168	35.8216	37.2263	38.6311	(42c)
Average daily hot water use (litres/day)												60.5572	(43)
Daily hot water use	66.0677	64.2555	62.2769	59.8141	57.6171	55.3339	54.8595	56.8340	58.8592	61.2039	63.6885	65.9750	(44)
Energy conte	104.6351	91.4989	95.7173	81.8826	77.5638	68.0395	66.3478	70.3724	72.5793	83.0531	90.7359	103.3008	(45)
Energy content (annual)										Total = Sum(45)m =		1005.7264	
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	88.9398	77.7741	81.3597	69.6002	65.9292	57.8336	56.3956	59.8165	61.6924	70.5952	77.1255	87.8057	(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	88.9398	77.7741	81.3597	69.6002	65.9292	57.8336	56.3956	59.8165	61.6924	70.5952	77.1255	87.8057	(64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				854.8674	(64)
Electric shower(s)	50.8646	45.3208	49.4886	47.2264	48.1125	45.8947	47.4245	48.1125	47.2264	49.4886	48.5580	50.8646	(64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				578.5823	(64a)
Heat gains from water heating, kWh/month	34.9511	30.7737	32.7121	29.2066	28.5104	25.9321	25.9550	26.9823	27.2297	30.0209	31.4209	34.6676	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	105.8735	117.2171	105.8735	109.4026	105.8735	109.4026	105.8735	105.8735	109.4026	105.8735	109.4026	105.8735	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.8948	209.0417	203.6315	192.1139	177.5750	163.9105	154.7817	152.6348	158.0450	169.5626	184.1015	197.7660	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	(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)	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	(71)
Water heating gains (Table 5)	46.9773	45.7942	43.9678	40.5648	38.3205	36.0168	34.8858	36.2665	37.8190	40.3507	43.6401	46.5962	(72)
Total internal gains	417.9000	430.2075	411.6273	400.2357	379.9234	367.4843	353.6954	352.9292	363.4210	373.9412	395.2987	408.3902	(73)

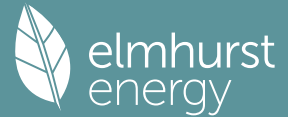
6. Solar gains

[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					1.8000	36.7938	0.6300	0.8000	0.7700			23.1319 (77)
Northwest					0.7000	11.2829	0.6300	0.8000	0.7700			2.7586 (81)
Northwest					4.3200	11.2829	0.6300	0.8000	0.7700			17.0243 (81)
Southeast					5.4000	36.7938	0.6300	0.8000	0.7700			69.3957 (77)
Solar gains	112.3105	197.8774	288.1984	386.3473	459.4443	467.8676	446.1863	389.8569	321.9051	223.4027	135.7187	95.3401 (83)
Total gains	530.2105	628.0848	699.8257	786.5831	839.3677	835.3519	799.8817	742.7862	685.3262	597.3440	531.0174	503.7302 (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	8.8217	8.8930	8.9642	9.3140	9.3825	9.7151	9.7151	9.7793	9.5842	9.3825	9.2449	9.1054	
alpha	1.5881	1.5929	1.5976	1.6209	1.6255	1.6477	1.6477	1.6520	1.6389	1.6255	1.6163	1.6070	
util living area	0.9307	0.9083	0.8789	0.8223	0.7445	0.6319	0.5271	0.5634	0.7151	0.8459	0.9091	0.9351	(86)
MIT	16.1000	16.5307	17.2464	18.2921	19.2628	20.1146	20.5468	20.4754	19.8137	18.5566	17.2030	16.0853	(87)

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Th 2	19.3344	19.3451	19.3557	19.4058	19.4153	19.4598	19.4598	19.4681	19.4426	19.4153	19.3961	19.3763 (88)
util rest of house	0.9202	0.8944	0.8594	0.7915	0.6933	0.5450	0.3939	0.4354	0.6402	0.8127	0.8932	0.9254 (89)
MIT 2	15.0309	15.4593	16.1681	17.2116	18.1383	18.9317	19.2742	19.2364	18.6797	17.4922	16.1581	15.0393 (90)
Living area fraction									fLA = Living area / (4) =			0.4030 (91)
MIT	15.4617	15.8910	16.6026	17.6470	18.5914	19.4083	19.7870	19.7357	19.1367	17.9211	16.5791	15.4608 (92)
Temperature adjustment												0.0000
adjusted MIT	15.4617	15.8910	16.6026	17.6470	18.5914	19.4083	19.7870	19.7357	19.1367	17.9211	16.5791	15.4608 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8823	0.8516	0.8133	0.7466	0.6602	0.5415	0.4261	0.4613	0.6220	0.7700	0.8518	0.8891	(94)
Useful gains	467.8274	534.8642	569.1578	587.2702	554.1923	452.3845	340.8519	342.6108	426.2760	459.9826	452.2983	447.8652	(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	1655.0487	1616.6597	1474.1998	1228.4441	960.7778	647.4087	429.1120	446.1801	687.4125	1020.6866	1341.2090	1617.7175	(97)
Space heating kWh	883.2927	726.9666	673.3513	461.6452	302.4997	0.0000	0.0000	0.0000	0.0000	417.1638	640.0157	870.3701	(98a)
Space heating requirement - total per year (kWh/year)												4975.3049	
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	883.2927	726.9666	673.3513	461.6452	302.4997	0.0000	0.0000	0.0000	0.0000	417.1638	640.0157	870.3701	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4975.3049	
Space heating per m2										(98c) / (4) =		67.0526	(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	1265.6454	996.3591	1016.5698	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.5263	0.5888	0.5591	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	666.0568	586.7011	568.4089	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	935.0590	895.7072	831.0454	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	193.6816	229.9006	195.4016	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	48.4204	57.4751	48.8504	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												154.7459	(107)
Energy for space heating												67.0526	(99)
Energy for space cooling												2.0855	(108)
Total												69.1382	(109)
Fabric Energy Efficiency (DFEE)												69.1	(109)

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

1. Overall dwelling characteristics

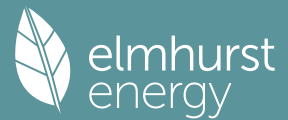
	Area (m2)	Storey height (m)	Volume (m3)	
Ground floor	74.2000 (1b)	x 2.6000 (2b)	= 192.9200 (1b) - (3b)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.2000			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	192.9200 (5)	

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) =	0.1555 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.4055	(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) =	0.3447 (21)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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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	0.4395	0.4308	0.4222	0.3791	0.3705	0.3274	0.3274	0.3188	0.3447	0.3705	0.3878	0.4050 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												
Effective ac	0.5966	0.5928	0.5891	0.5719	0.5686	0.5536	0.5536	0.5508	0.5594	0.5686	0.5752	0.5820 (23c)
												0.0000 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Opaque door			1.8900	1.0000	1.8900			(26)
TER Opening Type (Uw = 1.20)			12.2200	1.1450	13.9924			(27)
Floor Over Commercial			74.2000	0.1300	9.6460			(28b)
New Ext Wall	36.4000	14.1100	22.2900	0.1800	4.0122			(29a)
Flat Roof	74.2000		74.2000	0.1100	8.1620			(30)
Total net area of external elements Aum (A, m2)			184.8000					(31)
Fabric heat loss, W/K = Sum (A x U)								(31)
Party Wall			55.1200	0.0000	0.0000			(32)
								63.4643 (35)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								9.2400 (36)
Thermal bridges (User defined value 0.050 * total exposed area)								0.0000 (36a)
Point Thermal Bridges								(33) + (36) + (36a) =
Total fabric heat loss								46.9426 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	37.9795	37.7408	37.5068	36.4077	36.2021	35.2448	35.2448	35.0675	35.6135	36.2021	36.6181	37.0530 (38)
Heat transfer coeff	84.9221	84.6833	84.4493	83.3503	83.1446	82.1874	82.1874	82.0101	82.5561	83.1446	83.5606	83.9955 (39)
Average = Sum(39)m / 12 =												83.3493
HLP	1.1445	1.1413	1.1381	1.1233	1.1205	1.1076	1.1076	1.1053	1.1126	1.1205	1.1262	1.1320 (40)
HLP (average)												1.1233
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3436 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	27.4366	27.0291	26.4553	25.3973	24.6051	23.7267	23.2522	23.8220	24.4424	25.3823	26.4621	27.3438 (42b)
Hot water usage for other uses	38.6311	37.2263	35.8216	34.4168	33.0120	31.6073	31.6073	33.0120	34.4168	35.8216	37.2263	38.6311 (42c)
Average daily hot water use (litres/day)												60.5572 (43)
Daily hot water use	66.0677	64.2555	62.2769	59.8141	57.6171	55.3339	54.8595	56.8340	58.8592	61.2039	63.6885	65.9750 (44)
Energy conte	104.6351	91.4989	95.7173	81.8826	77.5638	68.0395	66.3478	70.3724	72.5793	83.0531	90.7359	103.3008 (45)
Energy content (annual)										Total = Sum(45)m =		1005.7264
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	88.9398	77.7741	81.3597	69.6002	65.9292	57.8336	56.3956	59.8165	61.6924	70.5952	77.1255	87.8057 (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	88.9398	77.7741	81.3597	69.6002	65.9292	57.8336	56.3956	59.8165	61.6924	70.5952	77.1255	87.8057 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		854.8674 (64)
Electric shower(s)	50.8646	45.3208	49.4886	47.2264	48.1125	45.8947	47.4245	48.1125	47.2264	49.4886	48.5580	50.8646 (64a)
Heat gains from water heating, kWh/month	34.9511	30.7737	32.7121	29.2066	28.5104	25.9321	25.9550	26.9823	27.2297	30.0209	31.4209	34.6676 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	108.2633	119.8629	108.2633	111.8721	108.2633	111.8721	108.2633	111.8721	108.2633	111.8721	108.2633	108.2633 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.8948	209.0417	203.6315	192.1139	177.5750	163.9105	154.7817	152.6348	158.0450	169.5626	184.1015	197.7660 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181 (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)	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452 (71)
Water heating gains (Table 5)	46.9773	45.7942	43.9678	40.5648	38.3205	36.0168	34.8858	36.2665	37.8190	40.3507	43.6401	46.5962 (72)
Total internal gains	420.2898	432.8533	414.0171	402.7052	382.3132	369.9538	356.0853	355.3190	365.8905	376.3311	397.7681	410.7800 (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				7.2000	36.7938	0.6300	0.7000	0.7700	80.9616 (77)			
Northwest				5.0200	11.2829	0.6300	0.7000	0.7700	17.3100 (81)			
Solar gains	98.2717	173.1427	252.1736	338.0539	402.0138	409.3842	390.4130	341.1248	281.6670	195.4774	118.7539	83.4225 (83)
Total gains	518.5615	605.9960	666.1908	740.7591	784.3270	779.3379	746.4982	696.4439	647.5575	571.8084	516.5220	494.2025 (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	15.4032	15.4466	15.4894	15.6936	15.7325	15.9157	15.9157	15.9501	15.8446	15.7325	15.6541	15.5731
alpha	2.0269	2.0298	2.0326	2.0462	2.0488	2.0610	2.0610	2.0633	2.0563	2.0488	2.0436	2.0382
util living area	0.9133	0.8828	0.8429	0.7683	0.6672	0.5355	0.4215	0.4590	0.6288	0.7974	0.8842	0.9201 (86)
MIT	17.6653	18.0711	18.6527	19.4337	20.1080	20.6099	20.8314	20.7930	20.4182	19.5413	18.4910	17.6044 (87)
Th 2	19.9647	19.9673	19.9698	19.9818	19.9841	19.9946	19.9946	19.9965	19.9905	19.9841	19.9795	19.9748 (88)
util rest of house	0.9041	0.8706	0.8260	0.7424	0.6275	0.4756	0.3414	0.3788	0.5730	0.7692	0.8701	0.9116 (89)
MIT 2	16.9234	17.3214	17.8906	18.6497	19.2824	19.7336	19.9078	19.8847	19.5778	18.7692	17.7482	16.8699 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	17.2223	17.6235	18.1977	18.9656	19.6151	20.0867	20.2800	20.2507	19.9165	19.0803	18.0475	17.1659 (92)
Temperature adjustment	0.0000											
adjusted MIT	17.2223	17.6235	18.1977	18.9656	19.6151	20.0867	20.2800	20.2507	19.9165	19.0803	18.0475	17.1659 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8713	0.8351	0.7903	0.7125	0.6116	0.4815	0.3652	0.4003	0.5685	0.7393	0.8358	0.8800 (94)
Useful gains	451.8006	506.0662	526.5006	527.8117	479.6619	375.2263	272.6238	278.7575	368.1661	422.7581	431.6994	434.8923 (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	1097.3921	1077.4704	987.8624	838.9723	658.0956	450.9403	302.4487	315.7964	480.1848	705.0950	914.7789	1089.0764 (97)
Space heating kWh	480.3201	383.9837	343.2531	224.0356	132.7547	0.0000	0.0000	0.0000	0.0000	210.0586	347.8172	486.7130 (98a)
Space heating requirement - total per year (kWh/year)												2608.9361
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)												
Space heating kWh	480.3201	383.9837	343.2531	224.0356	132.7547	0.0000	0.0000	0.0000	0.0000	210.0586	347.8172	486.7130 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2608.9361
Space heating per m2												(98c) / (4) = 35.1609 (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	772.5614	608.1866	623.2769	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7112	0.7709	0.7433	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	549.4686	468.8721	463.2814	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	866.9109	830.7436	774.3794	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	228.5585	269.2324	231.4569	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
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 (105)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	57.1396	67.3081	57.8642	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												182.3119 (107)
Energy for space heating												35.1609 (99)
Energy for space cooling												2.4570 (108)
Total												37.6179 (109)
Fabric Energy Efficiency (TFEE)												37.6 (109)

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Property Reference	Flat 1D	Issued on Date	01/02/2024
Assessment Reference	Be Green	Prop Type Ref	Conversion
Property			
SAP Rating	73 C	DER	6.61
Environmental	95 A	% DER < TER	26.72
CO ₂ Emissions (t/year)	0.45	DFEE	69.14
Compliance Check	See BREL	% DFEE < TFEE	-83.79
% DPER < TPER	-43.66	DPER	69.40
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	74.2000 (1b)	2.6000 (2b)	192.9200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.2000		192.9200 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	192.9200 (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	4 * 10 = 40.0000 (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) =	40.0000 / (5) = 0.2073 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9573 (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) = 0.8137 (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	1.0375	1.0172	0.9968	0.8951	0.8748	0.7731	0.7731	0.7527	0.8137	0.8748	0.9155	0.9561 (22b)
Effective ac	1.0375	1.0172	0.9968	0.9006	0.8826	0.7988	0.7988	0.7833	0.8311	0.8826	0.9190	0.9571 (25)

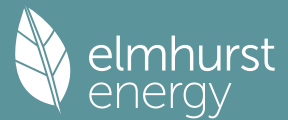
3. Heat losses and heat loss parameter

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)			2.5000	1.1450	2.8626		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Bifold Doors (Uw = 1.20)			5.4000	1.1450	6.1832		(27)
Floor Over Commercial			74.2000	0.2500	18.5500	20.0000	1484.0000 (28b)
New Ext Wall	36.4000	14.1100	22.2900	0.1800	4.0122	9.0000	200.6100 (29a)
Flat Roof	74.2000		74.2000	0.1400	10.3880	9.0000	667.8000 (30)
Total net area of external elements Aum(A, m ²)			184.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	48.8326		(33)
Party Wall			55.1200	0.0000	0.0000	20.0000	1102.4000 (32)
Internal Wall			139.3600			9.0000	1254.2400 (32c)
Heat capacity Cm = Sum(A x k)				(28)...(30) + (32) + (32a)...(32e) =			4709.0500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							63.4643 (35)
Thermal bridges (Default value 0.200 * total exposed area)							36.9600 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	85.7926 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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(38)m	66.0521	64.7569	63.4621	57.3363	56.1902	50.8548	50.8548	49.8667	52.9099	56.1902	58.5088	60.9327	(38)
Heat transfer coeff	151.8446	150.5495	149.2547	143.1289	141.9827	136.6473	136.6473	135.6593	138.7025	141.9827	144.3013	146.7253	(39)
Average = Sum(39)m / 12 =												143.1189	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0464	2.0290	2.0115	1.9290	1.9135	1.8416	1.8416	1.8283	1.8693	1.9135	1.9448	1.9774	(40)
HLP (average)												1.9288	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3436	(42)
Hot water usage for mixer showers														
63.5146	62.5601	61.1692	58.5080	56.5441	54.3539	53.1091	54.4894	56.0026	58.3541	61.0725	63.2713	63.2713	(42a)	
Hot water usage for baths														
27.4366	27.0291	26.4553	25.3973	24.6051	23.7267	23.2522	23.8220	24.4424	25.3823	26.4621	27.3438	27.3438	(42b)	
Hot water usage for other uses														
38.6311	37.2263	35.8216	34.4168	33.0120	31.6073	31.6073	33.0120	34.4168	35.8216	37.2263	38.6311	38.6311	(42c)	
Average daily hot water use (litres/day)												119.1156	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
129.5823	126.8156	123.4461	118.3221	114.1612	109.6879	107.9685	111.3234	114.8618	119.5580	124.7610	129.2462	129.2462	(44)	
Energy content	205.2268	180.5837	189.7321	161.9771	153.6830	134.8741	130.5786	137.8417	141.6360	162.2391	177.7449	202.3684	(45)	
Energy content (annual)										Total = Sum(45)m =		1978.4854		
Distribution loss (46)m = 0.15 x (45)m														
30.7840	27.0876	28.4598	24.2966	23.0524	20.2311	19.5868	20.6763	21.2454	24.3359	26.6617	30.3553	30.3553	(46)	
Water storage loss:														
Store volume												210.0000	(47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.9400	(48)	
Temperature factor from Table 2b												0.5400	(49)	
Enter (49) or (54) in (55)												1.0476	(55)	
Total storage loss														
32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	(56)	
If cylinder contains dedicated solar storage														
32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month														
260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	258.1064	(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														
260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	258.1064	(64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2634.7554	(64)	
Electric shower(s)												2635	(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														
112.8283	100.3193	107.6763	97.0094	95.6900	87.9976	88.0078	90.4228	90.2460	98.5349	102.2522	111.8779	111.8779	(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	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	105.8735	117.2171	105.8735	109.4026	105.8735	109.4026	105.8735	105.8735	109.4026	105.8735	109.4026	105.8735	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.8948	209.0417	203.6315	192.1139	177.5750	163.9105	154.7817	152.6348	158.0450	169.5626	184.1015	197.7660	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	(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)	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	(71)
Water heating gains (Table 5)	151.6509	149.2847	144.7262	134.7353	128.6156	122.2189	118.2900	121.5360	125.3416	132.4394	142.0169	150.3735	(72)
Total internal gains	522.5736	533.6979	512.3857	494.4062	470.2185	453.6864	437.0997	438.1987	450.9437	466.0299	493.6755	512.1675	(73)

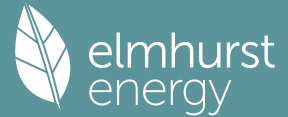
6. Solar gains

[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				1.8000	36.7938	0.6300	0.8000	0.7700	23.1319 (77)				
Northwest				0.7000	11.2829	0.6300	0.8000	0.7700	2.7586 (81)				
Northwest				4.3200	11.2829	0.6300	0.8000	0.7700	17.0243 (81)				
Southeast				5.4000	36.7938	0.6300	0.8000	0.7700	69.3957 (77)				
Solar gains	112.3105	197.8774	288.1984	386.3473	459.4443	467.8676	446.1863	389.8569	321.9051	223.4027	135.7187	95.3401	(83)
Total gains	634.8841	731.5753	800.5842	880.7536	929.6628	921.5541	883.2859	828.0556	772.8488	689.4326	629.3942	607.5075	(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	8.6145	8.6886	8.7640	9.1391	9.2129	9.5726	9.5726	9.6423	9.4308	9.2129	9.0648	8.9151		
alpha	1.5743	1.5792	1.5843	1.6093	1.6142	1.6382	1.6382	1.6428	1.6287	1.6142	1.6043	1.5943		
util living area														
0.9128	0.8897	0.8588	0.8002	0.7202	0.6046	0.4991	0.5320	0.6839	0.8194	0.8876	0.9170	(86)		

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Living	16.2512	16.6682	17.3687	18.3943	19.3389	20.1671	20.5791	20.5159	19.8876	18.6732	17.3506	16.2478
Non living	14.2226	14.7256	15.5704	16.8078	17.9076	18.8394	19.2344	19.1939	18.5576	17.1659	15.5767	14.2312
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10
MIT	18.6129	16.6682	17.3687	18.3943	19.3389	20.1671	20.5791	20.5159	19.8876	18.6732	17.3506	16.9269 (87)
Th 2	19.3026	19.3141	19.3257	19.3811	19.3916	19.4410	19.4410	19.4503	19.4219	19.3916	19.3704	19.3484 (88)
util rest of house	0.8997	0.8733	0.8366	0.7666	0.6662	0.5160	0.3672	0.4045	0.6053	0.7821	0.8685	0.9048 (89)
MIT 2	17.2199	14.7256	15.5704	16.8078	17.9076	18.8394	19.2344	19.1939	18.5576	17.1659	15.5767	15.1332 (90)
Living area fraction									FLA = Living area / (4) =			0.4030 (91)
MIT	17.7812	15.5084	16.2951	17.4471	18.4844	19.3744	19.7762	19.7266	19.0935	17.7733	16.2915	15.8560 (92)
Temperature adjustment												0.0000
adjusted MIT	17.7812	15.5084	16.2951	17.4471	18.4844	19.3744	19.7762	19.7266	19.0935	17.7733	16.2915	15.8560 (93)

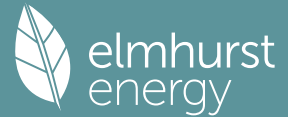
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8851	0.8177	0.7792	0.7133	0.6284	0.5116	0.3992	0.4305	0.5853	0.7309	0.8145	0.8671 (94)
Useful gains	561.9569	598.2362	623.7874	628.2579	584.1940	471.4489	352.6062	356.4662	452.3453	503.8807	512.6131	526.7867 (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	2047.0547	1597.0894	1461.9585	1223.3323	963.2661	652.4136	434.0261	451.2847	692.6141	1018.4837	1326.3497	1710.2261 (97)
Space heating kWh	1104.9128	671.2293	623.5993	428.4536	282.0296	0.0000	0.0000	0.0000	0.0000	382.8646	585.8904	880.4790 (98a)
Space heating requirement - total per year (kWh/year)												4959.4586
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	1104.9128	671.2293	623.5993	428.4536	282.0296	0.0000	0.0000	0.0000	0.0000	382.8646	585.8904	880.4790 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4959.4586
Space heating per m2										(98c) / (4) =		66.8391 (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 %)												334.3930 (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	1104.9128	671.2293	623.5993	428.4536	282.0296	0.0000	0.0000	0.0000	0.0000	382.8646	585.8904	880.4790 (98)
Space heating efficiency (main heating system 1)	334.3930	334.3930	334.3930	334.3930	334.3930	0.0000	0.0000	0.0000	0.0000	334.3930	334.3930	334.3930 (210)
Space heating fuel (main heating system)	330.4234	200.7307	186.4870	128.1288	84.3408	0.0000	0.0000	0.0000	0.0000	114.4954	175.2101	263.3066 (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	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064 (64)
Efficiency of water heater	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444 (216)
Fuel for water heating, kWh/month	163.0577	144.2898	153.3763	134.9108	130.8518	117.9761	116.4156	120.9538	122.2011	136.1979	144.7629	161.2718 (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	25.4826	20.4431	18.4067	13.4855	10.4166	8.5105	9.5024	12.3516	16.0435	21.0499	23.7758	26.1908 (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												1483.1228 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												160.0444
Water heating fuel used												1646.2655 (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)												205.6590 (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												3335.0472 (238)

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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	1483.1228	0.1543	228.9109 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1646.2655	0.1409	231.9001 (264)
Space and water heating			460.8110 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	205.6590	0.1443	29.6829 (268)
Total CO2, kg/year			490.4939 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.6100 (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	1483.1228	1.5713	2330.4879 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1646.2655	1.5209	2503.7450 (278)
Space and water heating			4834.2329 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	205.6590	1.5338	315.4466 (282)
Total Primary energy kWh/year			5149.6795 (286)
Dwelling Primary energy Rate (DPER)			69.4000 (287)

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

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	74.2000 (1b)	x 2.6000 (2b)	= 192.9200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 192.9200 (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) = 0.1555 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4055 (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) = 0.3447 (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	0.4395	0.4308	0.4222	0.3791	0.3705	0.3274	0.3274	0.3188	0.3447	0.3705	0.3878	0.4050 (22b)
Effective ac	0.5966	0.5928	0.5891	0.5719	0.5686	0.5536	0.5536	0.5508	0.5594	0.5686	0.5752	0.5820 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
TER Opaque door			1.8900	1.0000	1.8900		(26)
TER Opening Type (Uw = 1.20)			12.2200	1.1450	13.9924		(27)
Floor Over Commercial			74.2000	0.1300	9.6460		(28b)
New Ext Wall	36.4000	14.1100	22.2900	0.1800	4.0122		(29a)
Flat Roof	74.2000		74.2000	0.1100	8.1620		(30)
Total net area of external elements Aum(A, m2)			184.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	37.7026		(33)
Party Wall			55.1200	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							63.4643 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							9.2400 (36)

$$\begin{aligned} (33) + (36) + (36a) &= 46.9426 \quad (37) \end{aligned}$$
[illegible]

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3436	(42)
Hot water usage for mixer showers	63.5146	62.5601	61.1692	58.5080	56.5441	54.3539	53.1091	54.4894	56.0026	58.3541	61.0725	63.2713	(42a)
Hot water usage for baths	27.4366	27.0291	26.4553	25.3973	24.6051	23.7267	23.2522	23.8220	24.4424	25.3823	26.4621	27.3438	(42b)
Hot water usage for other uses	38.6311	37.2263	35.8216	34.4168	33.0120	31.6073	31.6073	33.0120	34.4168	35.8216	37.2263	38.6311	(42c)
Average daily hot water use (litres/day)												119.1156	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.5823	126.8156	123.4461	118.3221	114.1612	109.6879	107.9685	111.3234	114.8618	119.5580	124.7610	129.2462	(44)
Energy conte	205.2268	180.5837	189.7321	161.9771	153.6830	134.8741	130.5786	137.8417	141.6360	162.2391	177.7449	202.3684	(45)
Energy content (annual)	Total = Sum(45)m =											1978.4854	
Distribution loss (46)m = 0.15 x (45)m	30.7840	27.0876	28.4598	24.2966	23.0524	20.2311	19.5868	20.6763	21.2454	24.3359	26.6617	30.3553	(46)
Water storage loss:													
Store volume												210.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7016	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.9188	(55)
Total storage loss	28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842	(56)
If cylinder contains dedicated solar storage	28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	256.9733	227.3226	241.4787	212.0544	205.4296	184.9514	182.3252	189.5883	191.7134	213.9857	227.8222	254.1150	(62)
VVHRS	-29.0362	-25.6799	-26.8905	-22.2664	-20.7515	-17.7572	-16.6445	-17.6998	-18.3723	-21.6589	-24.5369	-28.4985	(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	227.9371	201.6427	214.5882	189.7880	184.6781	167.1942	165.6806	171.8885	173.3411	192.3268	203.2853	225.6164	(64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											2317.9672	(64)
Electric shower(s)												2318	(64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =											0.0000	(64a)
Heat gains from water heating, kWh/month	109.6352	97.4352	104.4832	93.9193	92.4969	84.9075	84.8146	87.2296	87.1559	95.3418	99.1621	108.6848	(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	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815	117.1815 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	108.2633	119.8629	108.2633	111.8721	108.2633	111.8721	108.2633	108.2633	111.8721	108.2633	111.8721	108.2633 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.8948	209.0417	203.6315	192.1139	177.5750	163.9105	154.7817	152.6348	158.0450	169.5626	184.1015	197.7660 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181	34.7181 (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)	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452 (71)
Water heating gains (Table 5)	147.3591	144.9928	140.4344	130.4434	124.3237	117.9271	113.9982	117.2441	121.0498	128.1476	137.7251	146.0817 (72)
Total internal gains	523.6716	535.0519	513.4837	495.5839	471.3165	451.8641	435.1977	436.2967	449.1213	467.1279	494.8531	513.2654 (73)

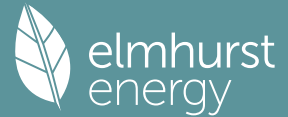
6. Solar gains

[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
						7.2000	36.7938	0.6300	0.7000	0.7700			80.9616 (77)
						5.0200	11.2829	0.6300	0.7000	0.7700			17.3100 (81)
Solar gains	98.2717	173.1427	252.1736	338.0539	402.0138	409.3842	390.4130	341.1248	281.6670	195.4774	118.7539	83.4225 (84)	
Total gains	621.9433	708.1946	765.6573	833.6378	873.3302	861.2482	825.6106	777.4215	730.7883	662.6053	613.6070	596.6880 (83)	

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	15.4032	15.4466	15.4894	15.6936	15.7325	15.9157	15.9157	15.9501	15.8446	15.7325	15.6541	15.5731

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alpha	2.0269	2.0298	2.0326	2.0462	2.0488	2.0610	2.0610	2.0633	2.0563	2.0488	2.0436	2.0382
util living area	0.8849	0.8526	0.8100	0.7332	0.6303	0.5003	0.3892	0.4222	0.5863	0.7563	0.8505	0.8923 (86)
MIT	17.9362	18.3144	18.8602	19.5838	20.2050	20.6585	20.8553	20.8238	20.4942	19.7024	18.7231	17.8802 (87)
Th 2	19.9647	19.9673	19.9698	19.9818	19.9841	19.9946	19.9946	19.9965	19.9905	19.9841	19.9795	19.9748 (88)
util rest of house	0.8733	0.8381	0.7908	0.7055	0.5897	0.4416	0.3131	0.3458	0.5301	0.7251	0.8335	0.8814 (89)
MIT 2	16.4311	16.8989	17.5739	18.4593	19.1946	19.7065	19.9009	19.8769	19.5394	18.6220	17.4207	16.3648 (90)
Living area fraction	17.0376	17.4693	18.0922	18.9124	19.6018	20.0901	20.2855	20.2585	19.9242	19.0574	17.9455	16.9755 (92)
MIT	17.0376	17.4693	18.0922	18.9124	19.6018	20.0901	20.2855	20.2585	19.9242	19.0574	17.9455	16.9755 (93)
Temperature adjustment												0.0000
adjusted MIT	17.0376	17.4693	18.0922	18.9124	19.6018	20.0901	20.2855	20.2585	19.9242	19.0574	17.9455	16.9755 (93)

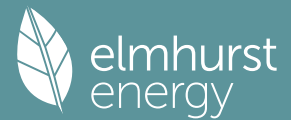
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8297	0.7936	0.7483	0.6721	0.5730	0.4475	0.3360	0.3667	0.5261	0.6918	0.7905	0.8387 (94)
Useful gains	516.0055	562.0053	572.9789	560.2797	500.4207	385.4409	277.4401	285.0708	384.4830	458.3623	485.0797	500.4141 (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	1081.7053	1064.4116	978.9564	834.5403	656.9916	451.2158	302.9037	316.4349	480.8209	703.1839	906.2589	1073.0808 (97)
Space heating kWh	420.8806	337.6170	302.0472	197.4676	116.4887	0.0000	0.0000	0.0000	0.0000	182.1473	303.2490	426.0640 (98a)
Space heating requirement - total per year (kWh/year)												2285.9614
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	420.8806	337.6170	302.0472	197.4676	116.4887	0.0000	0.0000	0.0000	0.0000	182.1473	303.2490	426.0640 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2285.9614
Space heating per m2										(98c) / (4) =		30.8081 (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	420.8806	337.6170	302.0472	197.4676	116.4887	0.0000	0.0000	0.0000	0.0000	182.1473	303.2490	426.0640 (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)	455.9920	365.7822	327.2451	213.9411	126.2067	0.0000	0.0000	0.0000	0.0000	197.3426	328.5471	461.6078 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	227.9371	201.6427	214.5882	189.7880	184.6781	167.1942	165.6806	171.8885	173.3411	192.3268	203.2853	225.6164 (64)
Efficiency of water heater (217)m	85.4157	85.2067	84.8263	84.1489	83.0559	79.8000	79.8000	79.8000	79.8000	83.9380	84.9548	79.8000 (216)
Fuel for water heating, kWh/month	266.8562	236.6513	252.9736	225.5385	222.3538	209.5166	207.6198	215.3991	217.2194	229.1297	239.2866	85.4630 (217)
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	22.4950	18.0463	16.2487	11.9045	9.1954	7.5127	8.3883	10.9035	14.1625	18.5820	20.9883	23.1202 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-57.4650	-75.6081	-101.5295	-106.4422	-108.7230	-99.4309	-98.1968	-95.5508	-90.1731	-82.6052	-61.2232	-50.3441 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)	-51.1784	-104.7754	-203.1647	-298.0984	-387.6264	-387.1232	-382.5367	-326.7793	-243.4735	-147.3166	-67.4660	-40.6904 (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												2476.6646 (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												2786.5377 (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)												181.5473 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-3667.5209 (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												1863.2287 (238)

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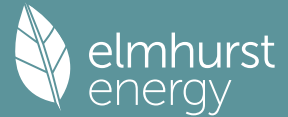
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2476.6646	0.2100	520.0996 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2786.5377	0.2100	585.1729 (264)
Space and water heating			1105.2725 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	181.5473	0.1443	26.2029 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1027.2919	0.1361	-139.7902
PV Unit electricity exported	-2640.2290	0.1266	-334.2534
Total			-474.0437 (269)
Total CO2, kg/year			669.3610 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.0200 (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	2476.6646	1.1300	2798.6310 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2786.5377	1.1300	3148.7876 (278)
Space and water heating			5947.4186 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	181.5473	1.5338	278.4634 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1027.2919	1.5030	-1544.0159
PV Unit electricity exported	-2640.2290	0.4647	-1227.0226
Total			-2771.0385 (283)
Total Primary energy kWh/year			3584.9443 (286)
Target Primary Energy Rate (TPER)			48.3100 (287)

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Property Reference	Flat 1D	Issued on Date	01/02/2024
Assessment Reference	Be Green	Prop Type Ref	Conversion
Property			
SAP Rating	73 C	DER	6.61
Environmental	95 A	% DER < TER	26.72
CO ₂ Emissions (t/year)	0.45	DFEE	69.14
Compliance Check	See BREL	% DFEE < TFEE	-83.79
% DPER < TPER	-43.66	DPER	69.40
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.2000		
Dwelling volume			

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	4 * 10 = 40.0000 (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) =	40.0000 / (5) = 0.2073 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9573 (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) = 0.8137 (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	1.0375	1.0172	0.9968	0.8951	0.8748	0.7731	0.7731	0.7527	0.8137	0.8748	0.9155	0.9561 (22b)
Effective ac	1.0375	1.0172	0.9968	0.9006	0.8826	0.7988	0.7988	0.7833	0.8311	0.8826	0.9190	0.9571 (25)

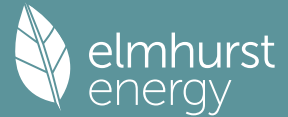
3. Heat losses and heat loss parameter

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)			2.5000	1.1450	2.8626		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Bifold Doors (Uw = 1.20)			5.4000	1.1450	6.1832		(27)
Floor Over Commercial			74.2000	0.2500	18.5500	20.0000	1484.0000 (28b)
New Ext Wall	36.4000	14.1100	22.2900	0.1800	4.0122	9.0000	200.6100 (29a)
Flat Roof	74.2000		74.2000	0.1400	10.3880	9.0000	667.8000 (30)
Total net area of external elements Aum(A, m ²)			184.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	48.8326		(33)
Party Wall			55.1200	0.0000	0.0000	20.0000	1102.4000 (32)
Internal Wall			139.3600			9.0000	1254.2400 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	4709.0500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							63.4643 (35)
Thermal bridges (Default value 0.200 * total exposed area)							36.9600 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	85.7926 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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(38)m 66.0521 64.7569 63.4621 57.3363 56.1902 50.8548 50.8548 49.8667 52.9099 56.1902 58.5088 60.9327 (38)
 Heat transfer coeff 151.8446 150.5495 149.2547 143.1289 141.9827 136.6473 136.6473 135.6593 138.7025 141.9827 144.3013 146.7253 (39)
 Average = Sum(39)m / 12 = 143.1189

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0464	2.0290	2.0115	1.9290	1.9135	1.8416	1.8416	1.8283	1.8693	1.9135	1.9448	1.9774	(40)
HLP (average)												1.9288	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.3436 (42)
 Hot water usage for mixer showers 63.5146 62.5601 61.1692 58.5080 56.5441 54.3539 53.1091 54.4894 56.0026 58.3541 61.0725 63.2713 (42a)
 Hot water usage for baths 27.4366 27.0291 26.4553 25.3973 24.6051 23.7267 23.2522 23.8220 24.4424 25.3823 26.4621 27.3438 (42b)
 Hot water usage for other uses 38.6311 37.2263 35.8216 34.4168 33.0120 31.6073 31.6073 33.0120 34.4168 35.8216 37.2263 38.6311 (42c)
 Average daily hot water use (litres/day) 119.1156 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.5823	126.8156	123.4461	118.3221	114.1612	109.6879	107.9685	111.3234	114.8618	119.5580	124.7610	129.2462	(44)
Energy conte	205.2268	180.5837	189.7321	161.9771	153.6830	134.8741	130.5786	137.8417	141.6360	162.2391	177.7449	202.3684	(45)
Energy content (annual)										Total = Sum(45)m =		1978.4854	
Distribution loss (46)m = 0.15 x (45)m	30.7840	27.0876	28.4598	24.2966	23.0524	20.2311	19.5868	20.6763	21.2454	24.3359	26.6617	30.3553	(46)
Water storage loss:													
Store volume												210.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.9400	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												1.0476	(55)
Total storage loss	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	(56)
If cylinder contains dedicated solar storage	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	(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	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	(64)
								Total per year (kWh/year) = Sum(64)m =				2634.7554	(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	112.8283	100.3193	107.6763	97.0094	95.6900	87.9976	88.0078	90.4228	90.2460	98.5349	102.2522	111.8779	(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	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.1132	25.8580	21.0292	15.9204	11.9007	10.0471	10.8562	14.1113	18.9402	24.0489	28.0687	29.9223	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	308.7982	312.0025	303.9277	286.7372	265.0373	244.6425	231.0175	227.8131	235.8880	253.0785	274.7784	295.1732	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	(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)	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	(71)
Water heating gains (Table 5)	151.6509	149.2847	144.7262	134.7353	128.6156	122.2189	118.2900	121.5360	125.3416	132.4394	142.0169	150.3735	(72)
Total internal gains	587.8403	585.4232	567.9611	535.6709	503.8316	475.1865	458.4417	461.7384	478.4479	507.8448	543.1419	573.7470	(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	1.8000	36.7938	0.6300	0.8000	0.7700	23.1319 (77)
Northwest	0.7000	11.2829	0.6300	0.8000	0.7700	2.7586 (81)
Northwest	4.3200	11.2829	0.6300	0.8000	0.7700	17.0243 (81)
Southeast	5.4000	36.7938	0.6300	0.8000	0.7700	69.3957 (77)

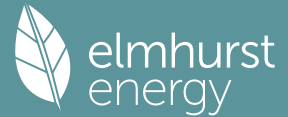
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	112.3105	197.8774	288.1984	386.3473	459.4443	467.8676	446.1863	389.8569	321.9051	223.4027	135.7187	95.3401	(83)
Total gains	700.1508	783.3006	856.1595	922.0182	963.2759	943.0541	904.6280	851.5954	800.3530	731.2475	678.8607	669.0870	(84)

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 from living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	8.6145	8.6886	8.7640	9.1391	9.2129	9.5726	9.5726	9.6423	9.4308	9.2129	9.0648	8.9151	
alpha	1.5743	1.5792	1.5843	1.6093	1.6142	1.6382	1.6382	1.6428	1.6287	1.6142	1.6043	1.5943	
util living area	0.9009	0.8798	0.8470	0.7899	0.7105	0.5974	0.4916	0.5231	0.6737	0.8069	0.8763	0.9057	(86)

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Living	16.3756	16.7617	17.4612	18.4538	19.3767	20.1833	20.5892	20.5289	19.9152	18.7373	17.4419	16.3696
Non living	14.3696	14.8350	15.6766	16.8736	17.9460	18.8530	19.2402	19.2020	18.5827	17.2360	15.6829	14.3756
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10
MIT	18.6755	16.7617	17.4612	18.4538	19.3767	20.1833	20.5892	20.5289	19.9152	18.7373	17.4419	17.0313 (87)
Th 2	19.3026	19.3141	19.3257	19.3811	19.3916	19.4410	19.4410	19.4503	19.4219	19.3916	19.3704	19.3484 (88)
util rest of house												
	0.8864	0.8622	0.8234	0.7552	0.6556	0.5087	0.3605	0.3963	0.5943	0.7680	0.8557	0.8921 (89)
MIT 2	17.2802	14.8350	15.6766	16.8736	17.9460	18.8530	19.2402	19.2020	18.5827	17.2360	15.6829	15.2521 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	17.8424	15.6114	16.3957	17.5104	18.5225	19.3890	19.7838	19.7367	19.1197	17.8410	16.3917	15.9691 (92)
Temperature adjustment												0.0000
adjusted MIT	17.8424	15.6114	16.3957	17.5104	18.5225	19.3890	19.7838	19.7367	19.1197	17.8410	16.3917	15.9691 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.8710	0.8054	0.7655	0.7026	0.6192	0.5052	0.3929	0.4229	0.5759	0.7175	0.8004	0.8523	(94)
Useful gains	609.8283	630.8382	655.4204	647.8432	596.4592	476.4607	355.4438	360.1632	460.9234	524.6430	543.3753	570.2511	(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	2056.3479	1612.5906	1476.9847	1232.3918	968.6796	654.4091	435.0552	452.6531	696.2416	1028.0924	1340.8089	1726.8195	(97)
Space heating kWh	1076.2105	659.7376	611.2438	420.8750	276.9320	0.0000	0.0000	0.0000	0.0000	374.5663	574.1522	860.4869	(98a)
Space heating requirement - total per year (kWh/year)												4854.2045	
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	1076.2105	659.7376	611.2438	420.8750	276.9320	0.0000	0.0000	0.0000	0.0000	374.5663	574.1522	860.4869	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4854.2045	
Space heating per m2										(98c) / (4) =		65.4205	(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 %)													334.3930	(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	1076.2105	659.7376	611.2438	420.8750	276.9320	0.0000	0.0000	0.0000	0.0000	374.5663	574.1522	860.4869	(98)	
Space heating efficiency (main heating system 1)	334.3930	334.3930	334.3930	334.3930	334.3930	0.0000	0.0000	0.0000	0.0000	334.3930	334.3930	334.3930	(210)	
Space heating fuel (main heating system)	321.8400	197.2941	182.7921	125.8624	82.8163	0.0000	0.0000	0.0000	0.0000	112.0138	171.6998	257.3280	(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	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	(64)	
Efficiency of water heater	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	(216)	
Fuel for water heating, kWh/month	163.0577	144.2898	153.3763	134.9108	130.8518	117.9761	116.4156	120.9538	122.2011	136.1979	144.7629	161.2718	(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	25.4826	20.4431	18.4067	13.4855	10.4166	8.5105	9.5024	12.3516	16.0435	21.0499	23.7758	26.1908	(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													1451.6466	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													160.0444	
Water heating fuel used													1646.2655	(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)													205.6590	(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													3303.5710	(238)

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10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1451.6466	16.4900	239.3765 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1646.2655	16.4900	271.4692 (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	205.6590	16.4900	33.9132 (250)
Additional standing charges			0.0000 (251)
Total energy cost			544.7589 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):	0.3600 (256)
Energy cost factor (ECF)	1.6452 (257)
SAP value	73.3306
SAP rating (Section 12)	73 (258)
SAP band	C

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1451.6466	0.1543	224.0293 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1646.2655	0.1409	231.9001 (264)
Space and water heating			455.9293 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	205.6590	0.1443	29.6829 (268)
Total CO2, kg/year			485.6123 (272)
CO2 emissions per m2			6.5400 (273)
EI value			94.5409
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	74.2000 (1b)	x 2.6000 (2b)	= 192.9200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 192.9200 (5)

2. Ventilation rate

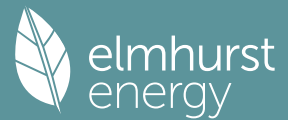
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.2073 (8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000 (17)	
Infiltration rate		0.9573 (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) =	0.8137 (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	0.8544	0.8137	0.8137	0.7527	0.7527	0.6713	0.6917	0.6510	0.6713	0.7120	0.7120	0.7731 (22b)
Effective ac	0.8650	0.8311	0.8311	0.7833	0.7833	0.7253	0.7392	0.7119	0.7253	0.7535	0.7535	0.7988 (25)

3. Heat losses and heat loss parameter

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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)			2.5000	1.1450	2.8626			(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466			(27)
Bifold Doors (Uw = 1.20)			5.4000	1.1450	6.1832			(27)
Floor Over Commercial			74.2000	0.2500	18.5500	20.0000	1484.0000	(28b)
New Ext Wall	36.4000	14.1100	22.2900	0.1800	4.0122	9.0000	200.6100	(29a)
Flat Roof	74.2000		74.2000	0.1400	10.3880	9.0000	667.8000	(30)
Total net area of external elements Aum(A, m2)			184.8000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	48.8326			(33)
Party Wall			55.1200	0.0000	0.0000	20.0000	1102.4000	(32)
Internal Wall			139.3600			9.0000	1254.2400	(32c)
Heat capacity Cm = Sum(A x k)				(28)...(30) + (32) + (32a)...(32e) =			4709.0500	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							63.4643	(35)
Thermal bridges (Default value 0.200 * total exposed area)							36.9600	(36)
Point Thermal bridges							0.0000	(36a)
Total fabric heat loss							(33) + (36) + (36a) =	85.7926 (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	55.0704	52.9099	52.9099	49.8667	49.8667	46.1781	47.0607	45.3218	46.1781	47.9697	47.9697	50.8548	(38)
Average = Sum(39)m / 12 =	140.8630	138.7025	138.7025	135.6593	135.6593	131.9706	132.8533	131.1143	131.9706	133.7623	133.7623	136.6473	(39)
												135.1389	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.8984	1.8693	1.8693	1.8283	1.8283	1.7786	1.7905	1.7670	1.7786	1.8027	1.8027	1.8416	(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													2.3436 (42)
Hot water usage for mixer showers													63.2713 (42a)
Hot water usage for baths													27.3438 (42b)
Hot water usage for other uses													38.6311 (42c)
Average daily hot water use (litres/day)													119.1156 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.5823	126.8156	123.4461	118.3221	114.1612	109.6879	107.9685	111.3234	114.8618	119.5580	124.7610	129.2462	(44)
Energy conte	205.2268	180.5837	189.7321	161.9771	153.6830	134.8741	130.5786	137.8417	141.6360	162.2391	177.7449	202.3684	(45)
Energy content (annual)										Total = Sum(45)m =			1978.4854
Distribution loss (46)m = 0.15 x (45)m													
	30.7840	27.0876	28.4598	24.2966	23.0524	20.2311	19.5868	20.6763	21.2454	24.3359	26.6617	30.3553	(46)
Water storage loss:													
Store volume													210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.9400 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													1.0476 (55)
Total storage loss													
	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	(56)
If cylinder contains dedicated solar storage													
	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	(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													
	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	(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													
	112.8283	100.3193	107.6763	97.0094	95.6900	87.9976	88.0078	90.4228	90.2460	98.5349	102.2522	111.8779	(65)

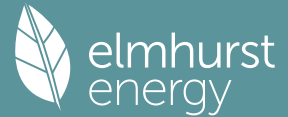
5. Internal gains (see Table 5 and 5a)

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	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	29.1132	25.8580	21.0292	15.9204	11.9007	10.0471	10.8562	14.1113	18.9402	24.0489	28.0687	29.9223	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	308.7982	312.0025	303.9277	286.7372	265.0373	244.6425	231.0175	227.8131	235.8880	253.0785	274.7784	295.1732	(68)
Pumps, fans	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	(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)	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	(71)
Total internal gains	151.6509	149.2847	144.7262	134.7353	128.6156	122.2189	118.2900	121.5360	125.3416	132.4394	142.0169	150.3735	(72)
	587.8403	585.4232	567.9611	535.6709	503.8316	475.1865	458.4417	461.7384	478.4479	507.8448	543.1419	573.7470	(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
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Southeast			1.8000		40.4699		0.6300		0.8000		0.7700		25.4430 (77)
Northwest			0.7000		12.9236		0.6300		0.8000		0.7700		3.1597 (81)
Northwest			4.3200		12.9236		0.6300		0.8000		0.7700		19.4998 (81)
Southeast			5.4000		40.4699		0.6300		0.8000		0.7700		76.3290 (77)

Solar gains	124.4315	197.6721	285.6419	396.8676	461.5626	503.6782	474.8856	423.1208	346.6198	238.6233	154.1208	104.5679	(83)
Total gains	712.2718	783.0954	853.6030	932.5385	965.3942	978.8647	933.3274	884.8593	825.0677	746.4681	697.2627	678.3148	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
alpha	9.2861	9.4308	9.4308	9.6423	9.6423	9.9118	9.8460	9.9766	9.9118	9.7791	9.7791	9.5726	
util living area	1.6191	1.6287	1.6287	1.6428	1.6428	1.6608	1.6564	1.6651	1.6608	1.6519	1.6519	1.6382	
	0.8877	0.8669	0.8281	0.7587	0.6575	0.4985	0.3695	0.3908	0.6006	0.7708	0.8547	0.8929	(86)
Living	16.8736	17.2170	17.9379	18.8940	19.8114	20.5375	20.8207	20.8006	20.2738	19.1825	17.9542	16.8874	
Non living	14.9992	15.4157	16.2794	17.4166	18.4593	19.2182	19.4306	19.4362	18.9872	17.7854	16.3291	15.0282	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	18.9217	17.2170	17.9379	18.8940	19.8114	20.5375	20.8207	20.8006	20.2738	19.1825	17.9542	17.4737	(87)
Th 2	19.4019	19.4219	19.4219	19.4503	19.4503	19.4850	19.4767	19.4932	19.4850	19.4681	19.4681	19.4410	(88)
util rest of house	0.8715	0.8479	0.8019	0.7188	0.5908	0.3878	0.2095	0.2316	0.5038	0.7243	0.8308	0.8775	(89)
MIT 2	17.5998	15.4157	16.2794	17.4166	18.4593	19.2182	19.4306	19.4362	18.9872	17.7854	16.3291	15.8070	(90)
Living area fraction									fLA = Living area / (4) =			0.4030	(91)
MIT	18.1325	16.1416	16.9477	18.0119	19.0041	19.7498	19.9908	19.9860	19.5057	18.3484	16.9839	16.4786	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1325	16.1416	16.9477	18.0119	19.0041	19.7498	19.9908	19.9860	19.5057	18.3484	16.9839	16.4786	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.8558	0.7917	0.7462	0.6720	0.5680	0.4094	0.2684	0.2886	0.5053	0.6806	0.7764	0.8369	(94)
Ext temp.	609.5479	619.9525	636.9226	626.6454	548.3901	400.7179	250.4662	255.4122	416.9194	508.0411	541.3632	567.6581	(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)
	1835.7938	1462.1402	1324.2962	1100.4613	814.5144	494.8694	277.7631	286.6147	568.2216	902.6789	1201.7123	1554.8598	(97)
Space heating kWh	912.3269	565.9502	511.4060	341.1474	197.9964	0.0000	0.0000	0.0000	0.0000	293.6105	475.4514	734.4781	(98a)
Space heating requirement - total per year (kWh/year)												4032.3670	
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	912.3269	565.9502	511.4060	341.1474	197.9964	0.0000	0.0000	0.0000	0.0000	293.6105	475.4514	734.4781	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4032.3670	
Space heating per m2										(98c) / (4) =		54.3446	(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 %)													330.1763 (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	912.3269	565.9502	511.4060	341.1474	197.9964	0.0000	0.0000	0.0000	0.0000	293.6105	475.4514	734.4781	(98)
Space heating efficiency (main heating system 1)	330.1763	330.1763	330.1763	330.1763	330.1763	0.0000	0.0000	0.0000	0.0000	330.1763	330.1763	330.1763	(210)
Space heating fuel (main heating system)	276.3151	171.4085	154.8888	103.3228	59.9669	0.0000	0.0000	0.0000	0.0000	88.9254	143.9993	222.4503	(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	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	(64)
Efficiency of water heater (217)m	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	(216)
Fuel for water heating, kWh/month	162.5232	143.8168	152.8735	134.4685	130.4229	117.5893	116.0340	120.5573	121.8006	135.7515	144.2884	160.7431	(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	25.4826	20.4431	18.4067	13.4855	10.4166	8.5105	9.5024	12.3516	16.0435	21.0499	23.7758	26.1908	(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)													

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(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												1221.2770	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												160.5707	
Water heating fuel used												1640.8691	(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)												205.6590	(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												3067.8051	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1221.2770	25.1600	307.2733	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1640.8691	25.1600	412.8427	(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	205.6590	25.1600	51.7438	(250)
Additional standing charges			0.0000	(251)
Total energy cost			771.8598	(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	1221.2770	0.1547	188.9506	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1640.8691	0.1409	231.1399	(264)
Space and water heating			420.0905	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	205.6590	0.1443	29.6829	(268)
Total CO2, kg/year			449.7735	(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	1221.2770	1.5727	1920.7357	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1640.8691	1.5209	2495.5378	(278)
Space and water heating			4416.2735	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	205.6590	1.5338	315.4466	(282)
Total Primary energy kWh/year			4731.7201	(286)

SAP 10 EPC IMPROVEMENTS

Be Green

Current energy efficiency rating: C 73
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: SAP change Cost change CO2 change
(none)

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

Potential energy efficiency rating: C 73
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	Potential	Saving
Electricity	£772	£772	£0
Space heating	£307	£307	£0
Water heating	£413	£413	£0
Lighting	£52	£52	£0

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Total cost of fuels	£772	£772	£0
Total cost of uses	£772	£772	£0
Delivered energy	41 kWh/m²	41 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.4 tonnes	0.4 tonnes	0.0 tonnes
CO2 emissions per m²	6 kg/m²	6 kg/m²	0 kg/m²
Primary energy	64 kWh/m²	64 kWh/m²	0 kWh/m²

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

1. Overall dwelling characteristics

	Area (m²)	Storey height (m)	Volume (m³)
Ground floor	74.2000 (1b)	x 2.6000 (2b)	= 192.9200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 192.9200 (5)

2. Ventilation rate

	m³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.2073 (8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9573	(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) =	0.8137	(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	1.0375	1.0172	0.9968	0.8951	0.8748	0.7731	0.7731	0.7527	0.8137	0.8748	0.9155	0.9561 (22b)
Effective ac	1.0375	1.0172	0.9968	0.9006	0.8826	0.7988	0.7988	0.7833	0.8311	0.8826	0.9190	0.9571 (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)			2.5000	1.1450	2.8626		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Bifold Doors (Uw = 1.20)			5.4000	1.1450	6.1832		(27)
Floor Over Commercial			74.2000	0.2500	18.5500	20.0000	1484.0000 (28b)
New Ext Wall	36.4000	14.1100	22.2900	0.1800	4.0122	9.0000	200.6100 (29a)
Flat Roof	74.2000		74.2000	0.1400	10.3880	9.0000	667.8000 (30)
Total net area of external elements Aum(A, m²)			184.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	48.8326		(33)
Party Wall			55.1200	0.0000	0.0000	20.0000	1102.4000 (32)
Internal Wall			139.3600			9.0000	1254.2400 (32c)

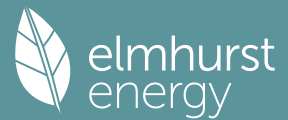
Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	4709.0500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K		63.4643 (35)
Thermal bridges (Default value 0.200 * total exposed area)		36.9600 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	85.7926 (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	66.0521	64.7569	63.4621	57.3363	56.1902	50.8548	50.8548	49.8667	52.9099	56.1902	58.5088	60.9327 (38)
Average = Sum(39)m / 12 =	151.8446	150.5495	149.2547	143.1289	141.9827	136.6473	136.6473	135.6593	138.7025	141.9827	144.3013	146.7253 (39)
												143.1189

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	2.0464	2.0290	2.0115	1.9290	1.9135	1.8416	1.8416	1.8283	1.8693	1.9135	1.9448	1.9774 (40)
HLP (average)												1.9288
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

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Assumed occupancy												2.3436 (42)
Hot water usage for mixer showers												
63.5146	62.5601	61.1692	58.5080	56.5441	54.3539	53.1091	54.4894	56.0026	58.3541	61.0725	63.2713	(42a)
Hot water usage for baths												
27.4366	27.0291	26.4553	25.3973	24.6051	23.7267	23.2522	23.8220	24.4424	25.3823	26.4621	27.3438	(42b)
Hot water usage for other uses												
38.6311	37.2263	35.8216	34.4168	33.0120	31.6073	31.6073	33.0120	34.4168	35.8216	37.2263	38.6311	(42c)
Average daily hot water use (litres/day)												119.1156 (43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.5823	126.8156	123.4461	118.3221	114.1612	109.6879	107.9685	111.3234	114.8618	119.5580	124.7610	129.2462 (44)
Energy content	205.2268	180.5837	189.7321	161.9771	153.6830	134.8741	130.5786	137.8417	141.6360	162.2391	177.7449	202.3684 (45)
Energy content (annual)												Total = Sum(45)m = 1978.4854
Distribution loss (46)m = 0.15 x (45)m												
30.7840	27.0876	28.4598	24.2966	23.0524	20.2311	19.5868	20.6763	21.2454	24.3359	26.6617	30.3553	(46)
Water storage loss:												
Store volume												210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.9400 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0476 (55)
Total storage loss	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756 (56)
If cylinder contains dedicated solar storage	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064 (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	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064 (64)
Total per year (kWh/year) = Sum(64)m =												2634.7554 (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	112.8283	100.3193	107.6763	97.0094	95.6900	87.9976	88.0078	90.4228	90.2460	98.5349	102.2522	111.8779 (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	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.1132	25.8580	21.0292	15.9204	11.9007	10.0471	10.8562	14.1113	18.9402	24.0489	28.0687	29.9223	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	308.7982	312.0025	303.9277	286.7372	265.0373	244.6425	231.0175	227.8131	235.8880	253.0785	274.7784	295.1732	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	(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)	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	(71)
Water heating gains (Table 5)	151.6509	149.2847	144.7262	134.7353	128.6156	122.2189	118.2900	121.5360	125.3416	132.4394	142.0169	150.3735	(72)
Total internal gains	587.8403	585.4232	567.9611	535.6709	503.8316	475.1865	458.4417	461.7384	478.4479	507.8448	543.1419	573.7470	(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				
				1.8000	36.7938	0.6300	0.8000	0.7700	23.1319 (77)				
				0.7000	11.2829	0.6300	0.8000	0.7700	2.7586 (81)				
				4.3200	11.2829	0.6300	0.8000	0.7700	17.0243 (81)				
				5.4000	36.7938	0.6300	0.8000	0.7700	69.3957 (77)				
Solar gains	112.3105	197.8774	288.1984	386.3473	459.4443	467.8676	446.1863	389.8569	321.9051	223.4027	135.7187	95.3401	(83)
Total gains	700.1508	783.3006	856.1595	922.0182	963.2759	943.0541	904.6280	851.5954	800.3530	731.2475	678.8607	669.0870	(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	8.6145	8.6886	8.7640	9.1391	9.2129	9.5726	9.5726	9.6423	9.4308	9.2129	9.0648	8.9151
alpha	1.5743	1.5792	1.5843	1.6093	1.6142	1.6382	1.6382	1.6428	1.6287	1.6142	1.6043	1.5943
util living area	0.9009	0.8798	0.8470	0.7899	0.7105	0.5974	0.4916	0.5231	0.6737	0.8069	0.8763	0.9057 (86)
Living	16.3756	16.7617	17.4612	18.4538	19.3767	20.1833	20.5892	20.5289	19.9152	18.7373	17.4419	16.3696
Non living	14.3696	14.8350	15.6766	16.8736	17.9460	18.8530	19.2402	19.2020	18.5827	17.2360	15.6829	14.3756
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10
MIT	18.6755	16.7617	17.4612	18.4538	19.3767	20.1833	20.5892	20.5289	19.9152	18.7373	17.4419	17.0313 (87)
Th 2	19.3026	19.3141	19.3257	19.3811	19.3916	19.4410	19.4410	19.4503	19.4219	19.3916	19.3704	19.3484 (88)
util rest of house	0.8864	0.8622	0.8234	0.7552	0.6556	0.5087	0.3605	0.3963	0.5943	0.7680	0.8557	0.8921 (89)
MIT 2	17.2802	14.8350	15.6766	16.8736	17.9460	18.8530	19.2402	19.2020	18.5827	17.2360	15.6829	15.2521 (90)
Living area fraction	17.8424	15.6114	16.3957	17.5104	18.5225	19.3890	19.7838	19.7367	fLA = Living area / (4) = 19.1197	17.8410	16.3917	0.4030 (91)
MIT	17.8424	15.6114	16.3957	17.5104	18.5225	19.3890	19.7838	19.7367	19.1197	17.8410	16.3917	15.9691 (92)
Temperature adjustment												0.0000
adjusted MIT	17.8424	15.6114	16.3957	17.5104	18.5225	19.3890	19.7838	19.7367	19.1197	17.8410	16.3917	15.9691 (93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8710	0.8054	0.7655	0.7026	0.6192	0.5052	0.3929	0.4229	0.5759	0.7175	0.8004	0.8523	(94)
Useful gains	609.8283	630.8382	655.4204	647.8432	596.4592	476.4607	355.4438	360.1632	460.9234	524.6430	543.3753	570.2511	(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	2056.3479	1612.5906	1476.9847	1232.3918	968.6796	654.4091	435.0552	452.6531	696.2416	1028.0924	1340.8089	1726.8195	(97)
Space heating kWh	1076.2105	659.7376	611.2438	420.8750	276.9320	0.0000	0.0000	0.0000	0.0000	374.5663	574.1522	860.4869	(98a)
Space heating requirement - total per year (kWh/year)												4854.2045	
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	1076.2105	659.7376	611.2438	420.8750	276.9320	0.0000	0.0000	0.0000	0.0000	374.5663	574.1522	860.4869	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4854.2045	
Space heating per m2										(98c) / (4) =		65.4205	(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 %)													334.3930	(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	1076.2105	659.7376	611.2438	420.8750	276.9320	0.0000	0.0000	0.0000	0.0000	374.5663	574.1522	860.4869	(98)	
Space heating efficiency (main heating system 1)	334.3930	334.3930	334.3930	334.3930	334.3930	0.0000	0.0000	0.0000	0.0000	334.3930	334.3930	334.3930	(210)	
Space heating fuel (main heating system)	321.8400	197.2941	182.7921	125.8624	82.8163	0.0000	0.0000	0.0000	0.0000	112.0138	171.6998	257.3280	(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	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064	(64)	
Efficiency of water heater	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	160.0444	(216)	
Fuel for water heating, kWh/month	163.0577	144.2898	153.3763	134.9108	130.8518	117.9761	116.4156	120.9538	122.2011	136.1979	144.7629	161.2718	(217)	
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	(219)	
(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	25.4826	20.4431	18.4067	13.4855	10.4166	8.5105	9.5024	12.3516	16.0435	21.0499	23.7758	26.1908	(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)	
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)	
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)	
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)	
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)	
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)	
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)	
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)	
Electricity generated by PVs (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)	
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)	
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)	
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)	
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)	
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)	
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)	
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)	
Annual totals kWh/year														
Space heating fuel - main system 1													1451.6466	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													160.0444	
Water heating fuel used													1646.2655	(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)													205.6590	(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													3303.5710	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1451.6466	16.4900	239.3765	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1646.2655	16.4900	271.4692	(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	205.6590	16.4900	33.9132	(250)
Additional standing charges			0.0000	(251)
Total energy cost			544.7589	(255)

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11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.6452 (257)
SAP value		73.3306
SAP rating (Section 12)		73 (258)
SAP band		C

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1451.6466	0.1543	224.0293 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1646.2655	0.1409	231.9001 (264)
Space and water heating			455.9293 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	205.6590	0.1443	29.6829 (268)
Total CO2, kg/year			485.6123 (272)
CO2 emissions per m2			6.5400 (273)
EI value			94.5409
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 FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	74.2000 (1b)	x 2.6000 (2b)	= 192.9200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	192.9200 (5)

2. Ventilation rate

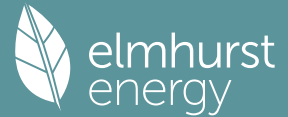
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.2073 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9573 (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) = 0.8137 (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	0.8544	0.8137	0.8137	0.7527	0.7527	0.6713	0.6917	0.6510	0.6713	0.7120	0.7120	0.7731 (22b)
Effective ac	0.8650	0.8311	0.8311	0.7833	0.7833	0.7253	0.7392	0.7119	0.7253	0.7535	0.7535	0.7988 (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)			2.5000	1.1450	2.8626		(27)
Patio Doors (Uw = 1.20)			4.3200	1.1450	4.9466		(27)
Bifold Doors (Uw = 1.20)			5.4000	1.1450	6.1832		(27)
Floor Over Commercial			74.2000	0.2500	18.5500	20.0000	1484.0000 (28b)
New Ext Wall	36.4000	14.1100	22.2900	0.1800	4.0122	9.0000	200.6100 (29a)
Flat Roof	74.2000		74.2000	0.1400	10.3880	9.0000	667.8000 (30)
Total net area of external elements Aum(A, m2)			184.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		48.8326		(33)
Party Wall			55.1200	0.0000	0.0000	20.0000	1102.4000 (32)
Internal Wall			139.3600			9.0000	1254.2400 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		4709.0500 (34)

Full SAP Calculation Printout



Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 63.4643 (35)
Thermal bridges (Default value 0.200 * total exposed area) 36.9600 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 85.7926 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	55.0704	52.9099	52.9099	49.8667	49.8667	46.1781	47.0607	45.3218	46.1781	47.9697	47.9697	50.8548 (38)
Heat transfer coeff	140.8630	138.7025	138.7025	135.6593	135.6593	131.9706	132.8533	131.1143	131.9706	133.7623	133.7623	136.6473 (39)
Average = Sum(39)m / 12 =												135.1389
HLP	1.8984	1.8693	1.8693	1.8283	1.8283	1.7786	1.7905	1.7670	1.7786	1.8027	1.8027	1.8416 (40)
HLP (average)												1.8213
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.3436 (42)											
Hot water usage for mixer showers	63.5146	62.5601	61.1692	58.5080	56.5441	54.3539	53.1091	54.4894	56.0026	58.3541	61.0725	63.2713 (42a)
Hot water usage for baths	27.4366	27.0291	26.4553	25.3973	24.6051	23.7267	23.2522	23.8220	24.4424	25.3823	26.4621	27.3438 (42b)
Hot water usage for other uses	38.6311	37.2263	35.8216	34.4168	33.0120	31.6073	31.6073	33.0120	34.4168	35.8216	37.2263	38.6311 (42c)
Average daily hot water use (litres/day)												119.1156 (43)
Daily hot water use	129.5823	126.8156	123.4461	118.3221	114.1612	109.6879	107.9685	111.3234	114.8618	119.5580	124.7610	129.2462 (44)
Energy conte	205.2268	180.5837	189.7321	161.9771	153.6830	134.8741	130.5786	137.8417	141.6360	162.2391	177.7449	202.3684 (45)
Energy content (annual)										Total = Sum(45)m =		1978.4854
Distribution loss (46)m = 0.15 x (45)m	30.7840	27.0876	28.4598	24.2966	23.0524	20.2311	19.5868	20.6763	21.2454	24.3359	26.6617	30.3553 (46)
Water storage loss:												210.0000 (47)
Store volume												1.94000 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.54000 (49)
Temperature factor from Table 2b												1.0476 (55)
Enter (49) or (54) in (55)												
Total storage loss	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756 (56)
If cylinder contains dedicated solar storage	32.4756	29.3328	32.4756	31.4280	32.4756	31.4280	32.4756	32.4756	31.4280	32.4756	31.4280	32.4756 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	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	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064 (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	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064 (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	112.8283	100.3193	107.6763	97.0094	95.6900	87.9976	88.0078	90.4228	90.2460	98.5349	102.2522	111.8779 (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	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178	140.6178 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.1132	25.8580	21.0292	15.9204	11.9007	10.0471	10.8562	14.1113	18.9402	24.0489	28.0687	29.9223 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	308.7982	312.0025	303.9277	286.7372	265.0373	244.6425	231.0175	227.8131	235.8880	253.0785	274.7784	295.1732 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054	51.4054 (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)	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452	-93.7452 (71)
Water heating gains (Table 5)	151.6509	149.2847	144.7262	134.7353	128.6156	122.2189	118.2900	121.5360	125.3416	132.4394	142.0169	150.3735 (72)
Total internal gains	587.8403	585.4232	567.9611	535.6709	503.8316	475.1865	458.4417	461.7384	478.4479	507.8448	543.1419	573.7470 (73)

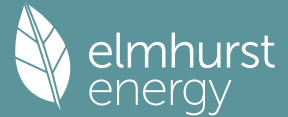
6. Solar gains

[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				1.8000	40.4699	0.6300	0.8000	0.7700		25.4430	(77)	
Northwest				0.7000	12.9236	0.6300	0.8000	0.7700		3.1597	(81)	
Northwest				4.3200	12.9236	0.6300	0.8000	0.7700		19.4998	(81)	
Southeast				5.4000	40.4699	0.6300	0.8000	0.7700		76.3290	(77)	
Solar gains	124.4315	197.6721	285.6419	396.8676	461.5626	503.6782	474.8856	423.1208	346.6198	238.6233	154.1208	104.5679 (83)
Total gains	712.2718	783.0954	853.6030	932.5385	965.3942	978.8647	933.3274	884.8593	825.0677	746.4681	697.2627	678.3148 (84)

7. Mean internal temperature (heating season)

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

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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	9.2861	9.4308	9.4308	9.6423	9.6423	9.9118	9.8460	9.9766	9.9118	9.7791	9.7791	9.5726
alpha	1.6191	1.6287	1.6287	1.6428	1.6428	1.6608	1.6564	1.6651	1.6608	1.6519	1.6519	1.6382
util living area	0.8877	0.8669	0.8281	0.7587	0.6575	0.4985	0.3695	0.3908	0.6006	0.7708	0.8547	0.8929 (86)
Living	16.8736	17.2170	17.9379	18.8940	19.8114	20.5375	20.8207	20.8006	20.2738	19.1825	17.9542	16.8874
Non living	14.9992	15.4157	16.2794	17.4166	18.4593	19.2182	19.4306	19.4362	18.9872	17.7854	16.3291	15.0282
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10
MIT	18.9217	17.2170	17.9379	18.8940	19.8114	20.5375	20.8207	20.8006	20.2738	19.1825	17.9542	17.4737 (87)
Th 2	19.4019	19.4219	19.4219	19.4503	19.4503	19.4850	19.4767	19.4932	19.4850	19.4681	19.4681	19.4410 (88)
util rest of house	0.8715	0.8479	0.8019	0.7188	0.5908	0.3878	0.2095	0.2316	0.5038	0.7243	0.8308	0.8775 (89)
MIT 2	17.5998	15.4157	16.2794	17.4166	18.4593	19.2182	19.4306	19.4362	18.9872	17.7854	16.3291	15.8070 (90)
Living area fraction									fLA = Living area / (4) =			
MIT	18.1325	16.1416	16.9477	18.0119	19.0041	19.7498	19.9908	19.9860	19.5057	18.3484	16.9839	16.4786 (92)
Temperature adjustment												0.0000
adjusted MIT	18.1325	16.1416	16.9477	18.0119	19.0041	19.7498	19.9908	19.9860	19.5057	18.3484	16.9839	16.4786 (93)

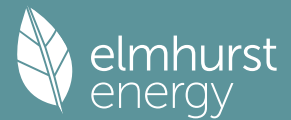
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8558	0.7917	0.7462	0.6720	0.5680	0.4094	0.2684	0.2886	0.5053	0.6806	0.7764	0.8369 (94)
Useful gains	609.5479	619.9525	636.9226	626.6454	548.3901	400.7179	250.4662	255.4122	416.9194	508.0411	541.3632	567.6581 (95)
Ext temp.	5.1000	5.6000	7.4200	9.9000	13.0000	16.0000	17.9000	17.8000	15.2000	11.6000	8.0000	5.1000 (96)
Heat loss rate W	1835.7938	1462.1402	1324.2962	1100.4613	814.5144	494.8694	277.7631	286.6147	568.2216	902.6789	1201.7123	1554.8598 (97)
Space heating kWh	912.3269	565.9502	511.4060	341.1474	197.9964	0.0000	0.0000	0.0000	0.0000	293.6105	475.4514	734.4781 (98a)
Space heating requirement - total per year (kWh/year)												4032.3670
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	912.3269	565.9502	511.4060	341.1474	197.9964	0.0000	0.0000	0.0000	0.0000	293.6105	475.4514	734.4781 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4032.3670
Space heating per m2										(98c) / (4) =		54.3446 (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 %)												330.1763 (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	912.3269	565.9502	511.4060	341.1474	197.9964	0.0000	0.0000	0.0000	0.0000	293.6105	475.4514	734.4781 (98)
Space heating efficiency (main heating system 1)	330.1763	330.1763	330.1763	330.1763	330.1763	0.0000	0.0000	0.0000	0.0000	330.1763	330.1763	330.1763 (210)
Space heating fuel (main heating system)	276.3151	171.4085	154.8888	103.3228	59.9669	0.0000	0.0000	0.0000	0.0000	88.9254	143.9993	222.4503 (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	260.9648	230.9277	245.4701	215.9171	209.4210	188.8141	186.3166	193.5797	195.5760	217.9771	231.6849	258.1064 (64)
Efficiency of water heater	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707	160.5707 (216)
Fuel for water heating, kWh/month	162.5232	143.8168	152.8735	134.4685	130.4229	117.5893	116.0340	120.5573	121.8006	135.7515	144.2884	160.7431 (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	25.4826	20.4431	18.4067	13.4855	10.4166	8.5105	9.5024	12.3516	16.0435	21.0499	23.7758	26.1908 (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												1221.2770 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												160.5707
Water heating fuel used												1640.8691 (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)												205.6590 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												0.0000 (233)
Wind generation												0.0000 (234)

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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	3067.8051 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1221.2770	25.1600	307.2733 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1640.8691	25.1600	412.8427 (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	205.6590	25.1600	51.7438 (250)
Additional standing charges			0.0000 (251)
Total energy cost			771.8598 (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	1221.2770	0.1547	188.9506 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1640.8691	0.1409	231.1399 (264)
Space and water heating			420.0905 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	205.6590	0.1443	29.6829 (268)
Total CO2, kg/year			449.7735 (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	1221.2770	1.5727	1920.7357 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1640.8691	1.5209	2495.5378 (278)
Space and water heating			4416.2735 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	205.6590	1.5338	315.4466 (282)
Total Primary energy kWh/year			4731.7201 (286)

Overview Report

Dwelling Address	
Report Date	01/02/2024
Property Type	Flat, Semi-Detached
Floor Area [m ²]	74

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

Energy Rating

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

Most energy efficient - lower running costs

CURRENT

POTENTIAL

(92 plus)

A

(81-91)

B

(69-80)

C

(55-68)

D

(39-54)

E

(21-38)

F

(1-20)

G

73

73

Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
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Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.14 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	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Good lighting efficiency	Good
Air tightness	(not tested)	

Primary Energy use

The primary energy use for this property per year is 64 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

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

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

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

Recommendations

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

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

Estimated energy use and potential savings

Estimated energy cost for this property over a year

£772

Over a year you could save

£0

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

Contacting the assessor and the accreditation scheme

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

Accreditation scheme contact details

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

Assessment details

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