

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 0-3	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	80 C	DER	5.68	TER	13.17
Environmental	96 A	% DER < TER			56.87
CO ₂ Emissions (t/year)	0.34	DFEE	29.79	TFEE	33.83
Compliance Check	See BREL	% DFEE < TFEE			11.93
% DPER < TPER	13.48	DPER	60.69	TPER	70.14

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Basement flat	
Which Floor	0	
2.0 Number of Storeys	2	
3.0 Date Built	2022	
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	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

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:	12.60 m	36.80 m ²	3.00 m
1st Storey:	11.60 m	33.20 m ²	2.50 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	29.40	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
LGF-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	37.97	32.42	0.00	None	5.55	Enter Gross Area
GF-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	35.39	27.11	0.00	None	8.28	Enter Gross Area

10.1 Party Ceilings				Kappa (kJ/m ² K)	Area (m ²)
Description	Construction				
Party Ceiling	Precast concrete planks floor, screed, carpeted			30.00	32.20

11.0 Heat Loss Floors								
Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
LGF-Floor	Basement Floor	Lowest occupied	Slab on ground, screed over insulation	0.09	None	0.00	110.00	36.80

12.0 Opening Types								
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Summary for Input Data

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
LGF-W-Door	Door	LGF-W-Wall	West	5.55	0
GF-W-Window	Window	GF-W-Wall	West	5.50	0
GF-W-Door	Door	GF-W-Wall	West	2.78	0

14.0 Conservatory

None

15.0 Draught Proofing

100

 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

User Input

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		12.60	0.00	0.00	No
E6 Intermediate floor within a dwelling		12.60	0.00	0.00	No
E16 Corner (normal)		12.00	0.00	0.00	No
E18 Party wall between dwellings		12.00	0.00	0.00	No

Y-value

0.05

 W/m²K

Description

Bridge

18.0 Pressure Testing

Yes

Designed AP₅₀

3.00

 m³/(h.m²) @ 50 Pa

Property Tested?

Yes

Test Method

Blower Door

As Built AP₅₀

0.10

 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Yes

Approved Installation

No

Mechanical Ventilation data Type

Database

Type

Balanced mechanical ventilation with heat recovery

MV Reference Number

500500

Configuration

2

Manufacturer SFP

0.59

Duct Type

Rigid

MVHR Efficiency

89.00

Wet Rooms

2

SFP from Installer Commissioning Certificate

No

MVHR System Location

Inside heated envelope (installed exclusively)

Duct Installation Specification

Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

Yes

Cooled Area

29

 m²

Data Source

SAP table

Energy Class

A+

22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	15

24.0 Main Heating 1

SAP table

Description

Electric Boiler

Percentage of Heat

100.00

 %

Summary for Input Data

Database Ref. No.	0
Fuel Type	Electricity
SAP Code	191
In Winter	100.00
In Summer	100.00
Controls SAP Code	2106
Delayed Start Stat	No
Burner Control	On/Off
HETAS approved System	No
Oil Pump Inside	No
Flue Type	Balanced
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	No
Electric CPSU Temperature	60.00
Combi boiler type	No Combi
Combi keep hot type	Electric, time clock

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder

Summary for Input Data

Cylinder Stat	Yes	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

0 Photovoltaic Unit	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

None	
Electricity Generated	0.00
Apportioned	0.00
Connected to dwelling's electricity meter	Yes
Electricity Generation	Annual

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

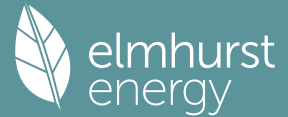
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	36.8000 (1b)	x 3.0000 (2b)	= 110.4000 (1b) - (3b)
First floor	33.2000 (1c)	x 2.5000 (2c)	= 83.0000 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 193.4000 (5)

2. Ventilation rate

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	0 * 10 =	0.0000 (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) =	
Pressure test	0.0000 / (5) =	0.0000 (8)
Pressure Test Method	Yes	
Measured/design AP50	Blower Door	
Infiltration rate		3.0000 (17)
Number of sides sheltered		0.1500 (18)
		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)	
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)	
Adj infilt rate	0.1626 0.1594 0.1562 0.1403 0.1371 0.1211 0.1211 0.1179 0.1275 0.1371 0.1434 0.1498 (22b)	
Balanced mechanical ventilation with heat recovery		
If mechanical ventilation		0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)		0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =		80.1000 (23c)
Effective ac	0.2621 0.2589 0.2557 0.2397 0.2366 0.2206 0.2206 0.2174 0.2270 0.2366 0.2429 0.2493 (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
Door			8.3300	0.9000	7.4970		(26a)
Window (Uw = 0.90)			5.5000	0.8687	4.7780		(27)
LGF-Floor			36.8000	0.0900	3.3120	110.0000	4048.0000 (28)
LGF-W-Wall	37.9700	5.5500	32.4200	0.1400	4.5388	190.0000	6159.8002 (29a)
GF-W-Wall	35.3900	8.2800	27.1100	0.1400	3.7954	190.0000	5150.8999 (29a)
Total net area of external elements Aum (A, m ²)			110.1600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.9212		(33)
Party Ceiling			32.2000			30.0000	966.0000 (32b)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		16324.7001 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							233.2100 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							5.5080 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss					(33) + (36) + (36a) =		29.4292 (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	16.7254	16.5219	16.3185	15.3013	15.0979	14.0807	14.0807	13.8773	14.4876	15.0979	15.5048	15.9116	(38)
Heat transfer coeff	46.1545	45.9511	45.7477	44.7305	44.5271	43.5099	43.5099	43.3065	43.9168	44.5271	44.9339	45.3408	(39)
Average = Sum(39)m / 12 =												44.6797	
HLP	0.6594	0.6564	0.6535	0.6390	0.6361	0.6216	0.6216	0.6187	0.6274	0.6361	0.6419	0.6477	(40)
HLP (average)												0.6383	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461 (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	26.7336	26.3365	25.7774	24.7465	23.9746	23.1187	22.6564	23.2116	23.8161	24.7319	25.7840	26.6432	(42b)
Hot water usage for other uses	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326	(42c)
Average daily hot water use (litres/day)												58.9976	(43)
Daily hot water use	64.3661	62.6006	60.6731	58.2737	56.1334	53.9090	53.4466	55.3703	57.3432	59.6276	62.0482	64.2757	(44)
Energy conte	101.9402	89.1425	93.2523	79.7738	75.5663	66.2874	64.6391	68.5600	70.7100	80.9141	88.3990	100.6403	(45)
Energy content (annual)												979.8247	
Distribution loss (46)m = 0.15 x (45)m	15.2910	13.3714	13.9878	11.9661	11.3349	9.9431	9.6959	10.2840	10.6065	12.1371	13.2598	15.0960	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												1.0140	(55)
Total storage loss	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(56)
If cylinder contains dedicated solar storage	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(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	133.3742	117.5345	124.6863	110.1938	107.0003	96.7074	96.0731	99.9940	101.1300	112.3481	118.8190	132.0743	(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	133.3742	117.5345	124.6863	110.1938	107.0003	96.7074	96.0731	99.9940	101.1300	112.3481	118.8190	132.0743	(64)
12Total per year (kWh/year)												1349.9347	(64)
Electric shower(s)	49.5554	44.1543	48.2148	46.0108	46.8741	44.7134	46.2038	46.8741	46.0108	48.2148	47.3081	49.5554	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												563.6896	(64a)
Heat gains from water heating, kWh/month	46.2840	40.6784	43.0601	38.0275	36.8443	33.2189	33.0434	34.5147	35.0137	38.9576	41.2197	45.8517	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	120.5240	133.4372	120.5240	124.5414	120.5240	124.5414	120.5240	124.5414	120.5240	124.5414	120.5240	120.5240	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(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)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Water heating gains (Table 5)	62.2096	60.5334	57.8764	52.8160	49.5219	46.1374	44.4132	46.3908	48.6302	52.3624	57.2496	61.6287	(72)
Total internal gains	439.7225	453.0069	432.2775	420.2511	399.0752	383.6774	369.2306	369.1608	380.5769	394.2749	417.0440	430.4363	(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

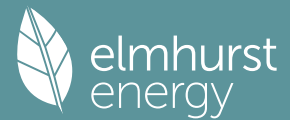
West					5.5000	19.6403	0.4000	0.7000				0.7700			20.9605 (80)

Solar gains	20.9605	41.0031	67.5263	98.4832	120.6948	123.5526	117.6271	101.0400	78.5359	48.6537	26.1353	17.2369			(83)
Total gains	460.6830	494.0100	499.8038	518.7343	519.7700	507.2300	486.8577	470.2007	459.1128	442.9286	443.1793	447.6732			(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	98.2490	98.6840	99.1228	101.3769	101.8400	104.2208	104.2208	104.7104	103.2553	101.8400	100.9179	100.0123	
alpha	7.5499	7.5789	7.6082	7.7585	7.7893	7.9481	7.9481	7.9807	7.8837	7.7893	7.7279	7.6675	
util living area	0.9916	0.9839	0.9686	0.9037	0.7648	0.5469	0.3931	0.4234	0.6513	0.9049	0.9784	0.9929	(86)

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MIT	20.4394	20.5466	20.6796	20.8701	20.9702	20.9981	20.9999	20.9998	20.9928	20.8883	20.6577	20.4321 (87)
Th 2	20.3769	20.3795	20.3821	20.3950	20.3976	20.4106	20.4106	20.4132	20.4054	20.3976	20.3924	20.3872 (88)
util rest of house	0.9894	0.9798	0.9606	0.8819	0.7243	0.4974	0.3405	0.3695	0.5987	0.8794	0.9722	0.9911 (89)
MIT 2	19.8658	19.9734	20.1049	20.2933	20.3783	20.4097	20.4106	20.4132	20.4017	20.3137	20.0942	19.8676 (90)
Living area fraction									fLA = Living area / (4) =			0.4200 (91)
MIT	20.1067	20.2141	20.3463	20.5355	20.6269	20.6568	20.6581	20.6595	20.6500	20.5550	20.3308	20.1047 (92)
Temperature adjustment												0.0000
adjusted MIT	20.1067	20.2141	20.3463	20.5355	20.6269	20.6568	20.6581	20.6595	20.6500	20.5550	20.3308	20.1047 (93)

8. Space heating requirement

Utilisation	Jan 0.9883	Feb 0.9786	Mar 0.9600	Apr 0.8873	May 0.7401	Jun 0.5182	Jul 0.3626	Aug 0.3922	Sep 0.6206	Oct 0.8866	Nov 0.9715	Dec 0.9900 (94)
Useful gains	455.2987	483.4225	479.8227	460.2693	384.7030	262.8346	176.5316	184.4017	284.9172	392.6850	430.5549	443.2137 (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	729.5503	703.7016	633.4356	520.4635	397.4882	263.5321	176.5671	184.4658	287.6538	443.2681	594.5143	721.1317 (97)
Space heating kWh	204.0432	148.0276	114.2880	43.3398	9.5122	0.0000	0.0000	0.0000	0.0000	37.6338	118.0508	206.7710 (98a)
Space heating requirement - total per year (kWh/year)												881.6664
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	204.0432	148.0276	114.2880	43.3398	9.5122	0.0000	0.0000	0.0000	0.0000	37.6338	118.0508	206.7710 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												881.6664
Space heating per m2										(98c) / (4) =		12.5952 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

Ext. temp.	Jan 4.3000	Feb 4.9000	Mar 6.5000	Apr 8.9000	May 11.7000	Jun 14.6000	Jul 16.6000	Aug 16.4000	Sep 14.1000	Oct 10.6000	Nov 7.1000	Dec 4.2000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	408.9933	321.9734	329.1293	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9674	0.9901	0.9860	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	395.6437	318.7772	324.5244	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	528.9255	508.0425	490.6342	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	95.9629	140.8134	123.5857	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fC = cooled area / (4) =			0.4143 (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	9.9390	14.5842	12.7999	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												37.3232 (107)

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 %)												100.0000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Cooling System Energy Efficiency Ratio (see Table 10c)												5.6000 (209)

Space heating requirement	Jan 204.0432	Feb 148.0276	Mar 114.2880	Apr 43.3398	May 9.5122	Jun 0.0000	Jul 0.0000	Aug 0.0000	Sep 0.0000	Oct 37.6338	Nov 118.0508	Dec 206.7710 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	204.0432	148.0276	114.2880	43.3398	9.5122	0.0000	0.0000	0.0000	0.0000	37.6338	118.0508	206.7710 (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	133.3742	117.5345	124.6863	110.1938	107.0003	96.7074	96.0731	99.9940	101.1300	112.3481	118.8190	132.0743 (64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)
Fuel for water heating, kWh/month	133.3742	117.5345	124.6863	110.1938	107.0003	96.7074	96.0731	99.9940	101.1300	112.3481	118.8190	132.0743 (219)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	1.7748	2.6043	2.2857	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	20.0348	18.0959	20.0348	19.3885	20.0348	19.3885	20.0348	20.0348	19.3885	20.0348	19.3885	20.0348 (231)
Lighting	23.9350	19.2016	17.2889	12.6666	9.7840	7.9936	8.9253	11.6015	15.0692	19.7715	22.3319	24.6003 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-10.2355	-18.7763	-35.6686	-50.9236	-63.7803	-62.9079	-61.6636	-52.8118	-39.1631	-24.6819	-12.4383	-8.2973 (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												881.6664 (211)
Space heating fuel - main system 2												0.0000 (213)

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Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	100.0000
Water heating fuel used	1349.9347 (219)
Space cooling fuel	6.6649 (221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)	
mechanical ventilation fans (SFP = 0.8260)	194.8930 (230a)
central heating pump	41.0000 (230c)
Total electricity for the above, kWh/year	235.8930 (231)
Electricity for lighting (calculated in Appendix L)	193.1694 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-441.3483 (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	2789.6698 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1 (high-rate cost)	793.4997	0.1649	130.8290 (261)
Space heating - main system 1 (low-rate cost)	88.1666	0.1384	12.2035 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	144.2756	0.1477	21.3131 (264)
Water heating - low rate cost	1205.6591	0.1240	149.4796 (264)
Energy for instantaneous electric shower(s)	563.6896	0.1436	80.9609 (264a)
Space and water heating			313.8252 (265)
Space cooling	6.6649	0.1175	0.7834 (266)
Pumps, fans and electric keep-hot	235.8930	0.1432	32.9141 (267)
Energy for lighting	193.1694	0.1490	28.7861 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-441.3483	0.1345	-59.3535
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-59.3535 (269)
Total CO2, kg/year			397.9162 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.6800 (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 (high-rate cost)	793.4997	1.4530	1281.0343 (275)
Space heating - main system 1 (low-rate cost)	88.1666	1.5015	132.3784 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	144.2756	1.5522	223.9469 (278)
Water heating - low rate cost	1205.6591	1.4436	1740.5048 (278)
Energy for instantaneous electric shower(s)	563.6896	1.5350	865.2836 (278a)
Space and water heating			3377.8644 (279)
Space cooling	6.6649	1.4391	9.5916 (280)
Pumps, fans and electric keep-hot	235.8930	1.5335	357.7374 (281)
Energy for lighting	193.1694	1.5547	300.3291 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-441.3483	1.5016	-662.7450
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-662.7450 (283)
Total Primary energy kWh/year			4248.0610 (286)
Dwelling Primary energy Rate (DPER)			60.6900 (287)

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

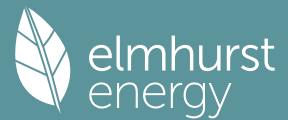
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	36.8000 (1b)	x 3.0000 (2b)	= 110.4000 (1b) - (3b)
First floor	33.2000 (1c)	x 2.5000 (2c)	= 83.0000 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 193.4000 (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	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)

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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) =
Pressure test
Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Air changes per hour
20.0000 / (5) = 0.1034 (8)
Yes
Blower Door
5.0000 (17)
0.3534 (18)
2 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3004 (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												
Effective ac	0.3830	0.3755	0.3680	0.3304	0.3229	0.2854	0.2854	0.2779	0.3004	0.3229	0.3380	0.3530 (22b)
	0.5733	0.5705	0.5677	0.5546	0.5521	0.5407	0.5407	0.5386	0.5451	0.5521	0.5571	0.5623 (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 Semi-glazed door			8.3300	1.0000	8.3300		(26a)
TER Opening Type (Uw = 1.20)			5.5000	1.1450	6.2977		(27)
LGF-Floor			36.8000	0.1300	4.7840		(28)
LGF-W-Wall	37.9700	5.5500	32.4200	0.1800	5.8356		(29a)
GF-W-Wall	35.3900	8.2800	27.1100	0.1800	4.8798		(29a)
Total net area of external elements Aum(A, m2)			110.1600				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 30.1271		(33)

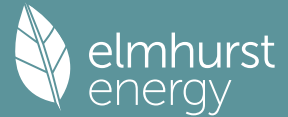
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 237.8100 (35)
List of Thermal Bridges
K1 Element Length Psi-value Total
E5 Ground floor (normal) 12.6000 0.1600 2.0160
E6 Intermediate floor within a dwelling 12.6000 0.0000 0.0000
E16 Corner (normal) 12.0000 0.0900 1.0800
E18 Party wall between dwellings 12.0000 0.0600 0.7200
Thermal bridges (Sum(L x Psi) calculated using Appendix K) 3.8160 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 33.9431 (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	36.5923	36.4105	36.2323	35.3954	35.2388	34.5099	34.5099	34.3749	34.7907	35.2388	35.5556	35.8867 (38)
Average = Sum(39)m / 12 =	70.5354	70.3536	70.1754	69.3385	69.1819	68.4530	68.4530	68.3180	68.7338	69.1819	69.4987	69.8299 (39)
												69.3378
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0076	1.0051	1.0025	0.9906	0.9883	0.9779	0.9779	0.9760	0.9819	0.9883	0.9928	0.9976 (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													2.2461 (42)
Hot water usage for mixer showers	61.8798	60.9498	59.5947	57.0020	55.0887	52.9549	51.7420	53.0869	54.5611	56.8521	59.5005	61.6427 (42a)	
Hot water usage for baths	26.7336	26.3365	25.7774	24.7465	23.9746	23.1187	22.6564	23.2116	23.8161	24.7319	25.7840	26.6432 (42b)	
Hot water usage for other uses	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326 (42c)	
Average daily hot water use (litres/day)												116.0487 (43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
126.2459	123.5505	120.2678	115.2758	111.2220	106.8639	105.1887	108.4572	111.9043	116.4797	121.5487	125.9184 (44)		
Energy content (annual)	199.9426	175.9342	184.8472	157.8067	149.7262	131.4016	127.2166	134.2926	137.9892	158.0618	173.1684	197.1578 (45)	
Distribution loss (46)m = 0.15 x (45)m	29.9914	26.3901	27.7271	23.6710	22.4589	19.7102	19.0825	20.1439	20.6984	23.7093	25.9753	29.5737 (46)	
Water storage loss:													
Store volume												150.0000 (47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.3938 (48)	
Temperature factor from Table 2b												0.5400 (49)	
Enter (49) or (54) in (55)												0.7527 (55)	
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)	
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)	
Total heat required for water heating calculated for each month	246.5375	218.0199	231.4421	202.8986	196.3211	176.4934	173.8115	180.8875	183.0811	204.6567	218.2602	243.7527 (62)	
WWHRS	-28.2888	-25.0189	-26.1983	-21.6933	-20.2173	-17.3001	-16.2161	-17.2442	-17.8994	-21.1014	-23.9053	-27.7650 (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	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878 (64)	
12Total per year (kWh/year)												2213.3143 (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	103.7568	92.1667	98.7376	88.5442	87.0599	79.7645	79.5754	81.9282	81.9549	89.8315	93.6520	102.8309 (65)	

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

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	120.5240	133.4372	120.5240	124.5414	120.5240	124.5414	120.5240	120.5240	124.5414	120.5240	124.5414	120.5240 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306 (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)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450 (71)
Water heating gains (Table 5)	139.4581	137.1528	132.7118	122.9781	117.0160	110.7840	106.9562	110.1186	113.8262	120.7412	130.0722	138.2136 (72)
Total internal gains	516.9710	529.6263	507.1129	490.4133	466.5692	448.3241	431.7736	432.8886	445.7729	462.6538	489.8666	507.0212 (73)

6. Solar gains

[Jan]	Area m ²		Solar flux Table 6a W/m ²		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
West	5.5000		19.6403		0.6300		0.7000		0.7700		33.0128 (80)	
Solar gains	33.0128	64.5800	106.3540	155.1110	190.0943	194.5954	185.2627	159.1379	123.6941	76.6296	41.1630	27.1481 (83)
Total gains	549.9838	594.2063	613.4669	645.5242	656.6635	642.9194	617.0363	592.0265	569.4670	539.2833	531.0296	534.1693 (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	65.5569	65.7263	65.8932	66.6885	66.8395	67.5512	67.5512	67.6847	67.2753	66.8395	66.5348	66.2193
alpha	5.3705	5.3818	5.3929	5.4459	5.4560	5.5034	5.5034	5.5123	5.4850	5.4560	5.4357	5.4146
util living area	0.9910	0.9850	0.9730	0.9322	0.8363	0.6528	0.4833	0.5231	0.7593	0.9385	0.9822	0.9923 (86)
MIT	19.9640	20.1035	20.3108	20.6103	20.8452	20.9697	20.9951	20.9925	20.9312	20.6494	20.2704	19.9452 (87)
Th 2	20.0770	20.0791	20.0812	20.0912	20.0931	20.1018	20.1018	20.1034	20.0984	20.0931	20.0893	20.0854 (88)
util rest of house	0.9884	0.9806	0.9648	0.9112	0.7888	0.5726	0.3872	0.4251	0.6852	0.9152	0.9762	0.9900 (89)
MIT 2	18.8813	19.0594	19.3218	19.6955	19.9609	20.0839	20.1001	20.1006	20.0518	19.7490	19.2797	18.8637 (90)
Living area fraction	FLA = Living area / (4) =											
MIT	19.3360	19.4979	19.7371	20.0797	20.3323	20.4559	20.4760	20.4752	20.4212	20.1272	19.6958	19.3180 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.3360	19.4979	19.7371	20.0797	20.3323	20.4559	20.4760	20.4752	20.4212	20.1272	19.6958	19.3180 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9856	0.9771	0.9610	0.9109	0.8024	0.6052	0.4276	0.4663	0.7134	0.9162	0.9729	0.9875 (94)
Useful gains	542.0779	580.6182	589.5470	587.9963	526.8788	389.0993	263.8622	276.0861	406.2419	494.1061	516.6512	527.4859 (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	1060.5713	1027.0171	928.9223	775.1835	597.2017	400.8542	265.3218	278.4077	434.4767	659.1074	875.3883	1055.6847 (97)
Space heating kWh	385.7591	299.9801	252.4952	134.7748	52.3202	0.0000	0.0000	0.0000	0.0000	122.7610	258.2907	392.9799 (98a)
Space heating requirement - total per year (kWh/year)	1899.3610											
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	385.7591	299.9801	252.4952	134.7748	52.3202	0.0000	0.0000	0.0000	0.0000	122.7610	258.2907	392.9799 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1899.3610											
Space heating per m ²	(98c) / (4) = 27.1337 (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	385.7591	299.9801	252.4952	134.7748	52.3202	0.0000	0.0000	0.0000	0.0000	122.7610	258.2907	392.9799 (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)	417.9405	325.0055	273.5593	146.0182	56.6850	0.0000	0.0000	0.0000	0.0000	133.0022	279.8382	425.7637 (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	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878 (64)
Efficiency of water heater												
(217)m	85.3229	85.0449	84.5256	83.4056	81.6965	79.8000	79.8000	79.8000	79.8000	83.1786	84.6984	79.8000 (216)
Fuel for water heating, kWh/month												

Full SAP Calculation Printout



	255.7914	226.9401	242.8185	217.2581	215.5584	199.4903	197.4880	205.0668	206.9946	220.6763	229.4670	252.9590	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	(231)
Lighting	25.0425	20.0900	18.0888	13.2527	10.2367	8.3635	9.3383	12.1383	15.7664	20.6864	23.3652	25.7385	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-18.8080	-27.8834	-42.1105	-49.8148	-55.8763	-52.9470	-52.3225	-48.3473	-41.6752	-32.9929	-21.1657	-16.1064	(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	-6.8154	-14.6599	-29.7514	-45.5958	-61.1873	-61.8063	-61.0581	-51.2588	-37.0150	-21.2339	-9.1855	-5.3640	(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												2057.8126	(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												2670.5085	(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)												202.1073	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-864.9813	(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												4151.4470	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2057.8126	0.2100	432.1406 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2670.5085	0.2100	560.8068 (264)
Space and water heating			992.9474 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	202.1073	0.1443	29.1703 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-460.0501	0.1335	-61.4383
PV Unit electricity exported	-404.9313	0.1253	-50.7439
Total			-112.1821 (269)
Total CO2, kg/year			921.8649 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.1700 (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	2057.8126	1.1300	2325.3282 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2670.5085	1.1300	3017.6746 (278)
Space and water heating			5343.0028 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	202.1073	1.5338	309.9989 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-460.0501	1.4935	-687.0883
PV Unit electricity exported	-404.9313	0.4600	-186.2537
Total			-873.3420 (283)
Total Primary energy kWh/year			4909.7605 (286)
Target Primary Energy Rate (TPER)			70.1400 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	70

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

80

80

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 0.14 W/m ² K	Very Good
Floor	Average thermal transmittance 0.09 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 52 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: **0.3** 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

£441

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 0-4	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	82 B	DER	4.96	TER	11.21
Environmental	96 A	% DER < TER			55.75
CO ₂ Emissions (t/year)	0.36	DFEE	27.26	TFEE	30.98
Compliance Check	See BREL	% DFEE < TFEE			12.00
% DPER < TPER	9.57	DPER	53.24	TPER	58.87

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Basement flat	
Which Floor	0	
2.0 Number of Storeys	2	
3.0 Date Built	2022	
3.0 Property Age Band	L	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

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:	10.80 m	25.80 m ²	3.00 m
1st Storey:	17.55 m	59.40 m ²	2.50 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	36.00	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	LGF-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	11.40	8.62	0.00	None	2.78	Enter Gross Area
	GF-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	29.40	15.80	0.00	None	13.60	Enter Gross Area
	GF-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	32.40	29.62	0.00	None	2.78	Enter Gross Area
	LGF-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	7.50	4.72	0.00	None	2.78	Enter Gross Area

10.1 Party Ceilings	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Party Ceiling	Precast concrete planks floor, screed, carpeted	30.00	59.40

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
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Summary for Input Data

LGF-Floor Basement Floor Lowest occupied Slab on ground, screed over insulation 0.09 None 0.00 110.00 25.80

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Triple glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Triple glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
LGF-S-Door	Door	LGF-S-Wall	South	2.78	0
LGF-E-Door	Door	LGF-E-Wall	East	2.78	0
GF-E-Doors	Door	GF-E-Wall	East	5.55	0
GF-E-Window	Window	GF-E-Wall	East	8.05	0
GF-S-Windows	Window	GF-S-Wall	South	2.78	0

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

User Input

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		10.80	0.00	0.00	No
E6 Intermediate floor within a dwelling		28.35	0.00	0.00	No
E16 Corner (normal)		12.00	0.00	0.00	No
E18 Party wall between dwellings		12.00	0.00	0.00	No

Y-value 0.04 W/m²K

Description Bridge

18.0 Pressure Testing

Yes

Designed AP₅₀ 3.00 m³/(h.m²) @ 50 Pa

Property Tested? Yes

Test Method Blower Door

As Built AP₅₀ 0.10 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present Yes

Approved Installation No

Mechanical Ventilation data Type Database

Type Balanced mechanical ventilation with heat recovery

MV Reference Number 500500

Configuration 2

Manufacturer SFP 0.59

Duct Type Rigid

MVHR Efficiency 89.00

Wet Rooms 2

SFP from Installer Commissioning Certificate No

MVHR System Location Inside heated envelope (installed exclusively)

Duct Installation Specification Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

Yes

Cooled Area 36 m²

Data Source SAP table

Energy Class A+

22.0 Lighting

No Fixed Lighting No

Name	Efficacy	Power	Capacity	Count
LEDs	95.00	12	1140	15

Summary for Input Data

24.0 Main Heating 1

.0 Main Heating 1		SAP table	
Description		Electric Boiler	
Percentage of Heat		100.00	%
Database Ref. No.		0	
Fuel Type		Electricity	
SAP Code		191	
In Winter		100.00	
In Summer		100.00	
Controls SAP Code		2106	
Delayed Start Stat		No	
Burner Control		On/Off	
HETAS approved System		No	
Oil Pump Inside		No	
Flue Type		Balanced	
Fan Assisted Flue		No	
Is MHS Pumped		Pump in heated space	
Heating Pump Age		2013 or later	
Heat Emitter		Radiators	
Flow Temperature		Unknown	
Boiler Interlock		No	
Electric CPSU Temperature		60.00	
Combi boiler type		No Combi	
Combi keep hot type		Electric, time clock	

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

Summary for Input Data

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	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	225.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

One Dwelling	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

None	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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

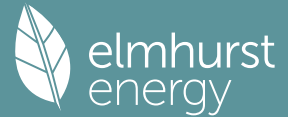
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023
Assessment Reference	Flat 0-4	Prop Type Ref	22403			
Property	Braemar Avenue, London, Greater London, N22 7BY					
SAP Rating	82 B	DER	4.96	TER	11.21	
Environmental	96 A	% DER < TER				55.75
CO ₂ Emissions (t/year)	0.36	DFEE	27.26	TFEE	30.98	
Compliance Check	See BREL	% DFEE < TFEE				12.00
% DPER < TPER	9.57	DPER	53.24	TPER	58.87	
Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	25.8000 (1b)	x 3.0000 (2b)	= 77.4000 (1b) - (3b)
First floor	59.4000 (1c)	x 2.5000 (2c)	= 148.5000 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 225.9000 (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	0 * 10 = 0.0000 (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) = 0.0000 / (5) = 0.0000 (8)											
Pressure test	Yes											
Pressure Test Method	Blower Door											
Measured/design AP50	3.0000 (17)											
Infiltration rate	0.1500 (18)											
Number of sides sheltered	3 (19)											
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)											
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1162 (21)											
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2477	0.2448	0.2419	0.2274	0.2245	0.2099	0.2099	0.2070	0.2157	0.2245	0.2303	0.2361 (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
Door			11.1100	0.9000	9.9900		(26a)
Window (Uw = 0.90)			10.8300	0.8687	9.4083		(27)
LGF-Floor			25.8000	0.0900	2.3220	110.0000	2838.0000 (28)
LGF-E-Wall	11.4000	2.7800	8.6200	0.1400	1.2068	190.0000	1637.7999 (29a)
GF-E-Wall	29.4000	13.6000	15.8000	0.1400	2.2120	190.0000	3001.9999 (29a)
GF-S-Wall	32.4000	2.7800	29.6200	0.1400	4.1468	190.0000	5627.8003 (29a)
LGF-S-Wall	7.5000	2.7800	4.7200	0.1400	0.6608	190.0000	896.8000 (29a)
Total net area of external elements Aum(A, m ²)			106.5000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		29.9557		(33)
Party Ceiling			59.4000			30.0000	1782.0000 (32b)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =				15784.4001 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							185.2629 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							4.2600 (36)

$$\begin{aligned} (33) + (36) + (36a) &= 34.2157 \quad (37) \end{aligned}$$
[illegible]

4. Water heating energy requirements (kWh/year)

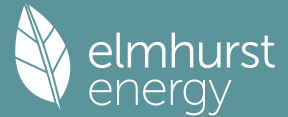
assumed occupancy												2.5542 (42)
Hot water usage for mixer showers												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths												
28.9546	28.5246	27.9190	26.8025	25.9665	25.0394	24.5387	25.1400	25.7947	26.7867	27.9262	28.8567	(42b)
Hot water usage for other uses												
40.7872	39.3040	37.8208	36.3377	34.8545	33.3713	33.3713	34.8545	36.3377	37.8208	39.3040	40.7872	(42c)
Average daily hot water use (litres/day)												63.9247 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
69.7418	67.8286	65.7399	63.1402	60.8210	58.4108	57.9100	59.9945	62.1324	64.6075	67.2302	69.6439	(44)
Energy content (annual)	110.4540	96.5870	101.0398	86.4358	81.8767	71.8228	70.0371	74.2857	76.6155	87.6718	95.7818	109.0455 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1061.6535
16.5681	14.4881	15.1560	12.9654	12.2815	10.7734	10.5056	11.1429	11.4923	13.1508	14.3673	16.3568	(46)
Water storage loss:												
Store volume												225.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												1.0140 (55)
Total storage loss												
31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(56)
If cylinder contains dedicated solar storage												
31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month												
141.8880	124.9790	132.4738	116.8558	113.3107	102.2428	101.4711	105.7197	107.0355	119.1058	126.2018	140.4795	(62)
WWHRS	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	(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	(63c)
FGHRS	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												
141.8880	124.9790	132.4738	116.8558	113.3107	102.2428	101.4711	105.7197	107.0355	119.1058	126.2018	140.4795	(64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				1431.7635 (64)
Electric shower(s)												1432 (64)
53.6916	47.8396	52.2391	49.8511	50.7865	48.4454	50.0603	50.7865	49.8511	52.2391	51.2568	53.6916	(64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				610.7387 (64a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	130.9153	144.9420	130.9153	135.2792	130.9153	135.2792	130.9153	130.9153	135.2792	130.9153	135.2792	130.9153
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	229.9650	232.3513	226.3378	213.5359	197.3758	182.1876	172.0409	169.6546	175.6681	188.4700	204.6301	219.8183
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708
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
Losses e.g. evaporation (negative values) (Table 5)	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665
Water heating gains (Table 5)	67.4044	65.5879	62.7090	57.2259	53.6568	49.9895	48.1215	50.2643	52.6909	56.7347	62.0300	66.7749
Total internal gains	492.5971	507.1936	484.2746	470.3535	446.2604	428.7687	412.3902	412.1467	424.9505	440.4325	466.2517	481.8210

[Jan]						Area	Solar flux	g	FF	Access	Gains	
						m2	Table 6a	Specific data	Specific data	factor	W	
							W/m2	or Table 6b	or Table 6c	Table 6d		
East						8.0500	19.6403	0.4000	0.7000	0.7700	30.6785 (76)	
South						2.7800	46.7521	0.4000	0.7000	0.7700	25.2195 (78)	
Solar gains	55.8980	101.3168	151.4468	203.6074	238.6183	240.4690	230.4283	204.4691	169.9083	115.7606	68.1462	47.0205 (83)
Total gains	548.4951	608.5104	635.7214	673.9609	684.8787	669.2377	642.8185	616.6158	594.8588	556.1930	534.3980	528.8415 (84)

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	83.2262	83.5699	83.9164	85.6930	86.0574	87.9269	87.9269	88.3106	87.1695	86.0574	85.3317	84.6181

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alpha	6.5484	6.5713	6.5944	6.7129	6.7372	6.8618	6.8618	6.8874	6.8113	6.7372	6.6888	6.6412
util living area	0.9824	0.9646	0.9313	0.8306	0.6729	0.4753	0.3412	0.3701	0.5772	0.8487	0.9595	0.9853 (86)
MIT	20.3859	20.5355	20.7013	20.8926	20.9765	20.9981	20.9998	20.9997	20.9932	20.8953	20.6356	20.3689 (87)
Th 2	20.4135	20.4158	20.4181	20.4295	20.4318	20.4433	20.4433	20.4456	20.4387	20.4318	20.4272	20.4227 (88)
util rest of house	0.9790	0.9581	0.9190	0.8058	0.6367	0.4346	0.2981	0.3256	0.5324	0.8210	0.9509	0.9824 (89)
MIT 2	19.8516	19.9993	20.1602	20.3447	20.4158	20.4423	20.4432	20.4455	20.4348	20.3516	20.1078	19.8428 (90)
Living area fraction	20.0773	20.2259	20.3888	20.5762	20.6527	20.6771	20.6784	20.6796	20.6708	20.5813	20.3308	0.4225 (91)
MIT	20.0773	20.2259	20.3888	20.5762	20.6527	20.6771	20.6784	20.6796	20.6708	20.5813	20.3308	20.0651 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0773	20.2259	20.3888	20.5762	20.6527	20.6771	20.6784	20.6796	20.6708	20.5813	20.3308	20.0651 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9766	0.9557	0.9183	0.8124	0.6510	0.4517	0.3163	0.3444	0.5510	0.8286	0.9493	0.9803 (94)
Useful gains	535.6751	581.5295	583.7881	547.5261	445.8377	302.3181	203.3215	212.3908	327.7945	460.8752	507.2871	518.4066 (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	831.1878	804.0825	725.6779	597.4239	456.1345	303.0417	203.3732	212.4815	330.5039	508.5390	679.8313	822.0616 (97)
Space heating kWh	219.8614	149.5556	105.5660	35.9265	7.6608	0.0000	0.0000	0.0000	0.0000	35.4619	124.2318	225.9193 (98a)
Space heating requirement - total per year (kWh/year)												904.1833
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	219.8614	149.5556	105.5660	35.9265	7.6608	0.0000	0.0000	0.0000	0.0000	35.4619	124.2318	225.9193 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												904.1833
Space heating per m ²										(98c) / (4) =		10.6125 (99)

8c. Space cooling requirement

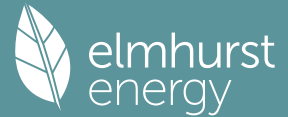
Calculated for June, July and August. See Table 10b

	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	468.7396	369.0078	377.3344	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9806	0.9936	0.9908	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	459.6380	366.6318	373.8757	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	717.0778	689.1460	660.6693	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	185.3567	239.9506	213.3744	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			0.4225 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	19.5799	25.3469	22.5396	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												67.4664 (107)

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 %)												100.0000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Cooling System Energy Efficiency Ratio (see Table 10c)												5.6000 (209)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	219.8614	149.5556	105.5660	35.9265	7.6608	0.0000	0.0000	0.0000	0.0000	35.4619	124.2318	225.9193 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	219.8614	149.5556	105.5660	35.9265	7.6608	0.0000	0.0000	0.0000	0.0000	35.4619	124.2318	225.9193 (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	141.8880	124.9790	132.4738	116.8558	113.3107	102.2428	101.4711	105.7197	107.0355	119.1058	126.2018	140.4795 (64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)
Fuel for water heating, kWh/month	141.8880	124.9790	132.4738	116.8558	113.3107	102.2428	101.4711	105.7197	107.0355	119.1058	126.2018	140.4795 (219)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	3.4964	4.5262	4.0249	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	22.8163	20.6083	22.8163	22.0803	22.8163	22.0803	22.8163	22.8163	22.0803	22.8163	22.0803	22.8163 (231)
Lighting	25.7092	20.6249	18.5704	13.6055	10.5093	8.5862	9.5869	12.4614	16.1862	21.2371	23.9873	26.4238 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-10.2526	-18.8253	-35.8029	-51.3133	-64.6556	-63.9429	-62.6513	-53.5198	-39.5548	-24.7974	-12.4665	-8.3096 (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)

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Annual totals kWh/year	
Space heating fuel - main system 1	904.1833 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	100.0000
Water heating fuel used	1431.7635 (219)
Space cooling fuel	12.0476 (221)
Electricity for pumps and fans:	
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)	
mechanical ventilation fans (SFP = 0.8260)	227.6439 (230a)
central heating pump	41.0000 (230c)
Total electricity for the above, kWh/year	268.6439 (231)
Electricity for lighting (calculated in Appendix L)	207.4882 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-446.0920 (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	2988.7732 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1 (high-rate cost)	813.7650	0.1653	134.5462 (261)
Space heating - main system 1 (low-rate cost)	90.4183	0.1388	12.5505 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	26.1415	0.1478	3.8630 (264)
Water heating - low rate cost	1405.6220	0.1240	174.3270 (264)
Energy for instantaneous electric shower(s)	610.7387	0.1436	87.7184 (264a)
Space and water heating			325.2868 (265)
Space cooling	12.0476	0.1177	1.4183 (266)
Pumps, fans and electric keep-hot	268.6439	0.1432	37.4586 (267)
Energy for lighting	207.4882	0.1490	30.9198 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-446.0920	0.1344	-59.9573
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-59.9573 (269)
Total CO2, kg/year			422.8445 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.9600 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1 (high-rate cost)	813.7650	1.4545	1315.0974 (275)
Space heating - main system 1 (low-rate cost)	90.4183	1.5030	135.8982 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	26.1415	1.5524	40.5818 (278)
Water heating - low rate cost	1405.6220	1.4438	2029.3976 (278)
Energy for instantaneous electric shower(s)	610.7387	1.5350	937.5056 (278a)
Space and water heating			3520.9750 (279)
Space cooling	12.0476	1.4398	17.3466 (280)
Pumps, fans and electric keep-hot	268.6439	1.5335	407.2880 (281)
Energy for lighting	207.4882	1.5547	322.5912 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-446.0920	1.5014	-669.7434
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-669.7434 (283)
Total Primary energy kWh/year			4535.9629 (286)
Dwelling Primary energy Rate (DPER)			53.2400 (287)

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

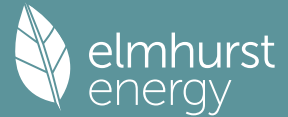
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	25.8000 (1b)	x 3.0000 (2b)	= 77.4000 (1b) - (3b)
First floor	59.4000 (1c)	x 2.5000 (2c)	= 148.5000 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	225.9000 (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)

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Number of blocked chimneys
Number of intermittent extract fans
Number of passive vents
Number of flueless gas fires

0 * 20 = 0.0000 (6f)
3 * 10 = 30.0000 (7a)
0 * 10 = 0.0000 (7b)
0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =
Pressure Test
Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Air changes per hour
30.0000 / (5) = 0.1328 (8)
Yes
Blower Door
5.0000 (17)
0.3828 (18)
3 (19)

Shelter factor
Infiltration rate adjusted to include shelter factor

(20) = 1 - [0.075 x (19)] = 0.7750 (20)
(21) = (18) x (20) = 0.2967 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000
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
Adj infilt rate												
Effective ac	0.3783	0.3708	0.3634	0.3263	0.3189	0.2818	0.2818	0.2744	0.2967	0.3189	0.3338	0.3486
	0.5715	0.5688	0.5660	0.5532	0.5509	0.5397	0.5397	0.5377	0.5440	0.5509	0.5557	0.5608

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 Semi-glazed door			11.1100	1.0000	11.1100		(26a)
TER Opening Type (Uw = 1.20)			10.1900	1.1450	11.6679		(27)
LGF-Floor			25.8000	0.1300	3.3540		(28)
LGF-E-Wall	11.4000	2.7800	8.6200	0.1800	1.5516		(29a)
GF-E-Wall	29.4000	13.1200	16.2800	0.1800	2.9304		(29a)
GF-S-Wall	32.4000	2.6200	29.7800	0.1800	5.3604		(29a)
LGF-S-Wall	7.5000	2.7800	4.7200	0.1800	0.8496		(29a)
Total net area of external elements Aum(A, m2)			106.5000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	36.8239		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							192.2347 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E5 Ground floor (normal)	10.8000	0.1600	1.7280
E6 Intermediate floor within a dwelling	28.3500	0.0000	0.0000
E16 Corner (normal)	12.0000	0.0900	1.0800
E18 Party wall between dwellings	12.0000	0.0600	0.7200
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			3.5280 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 40.3519 (37)

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

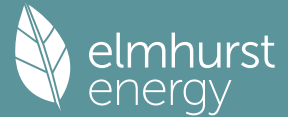
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	42.0665	42.3994	42.1964	41.2430	41.0646	40.2342	40.2342	40.0805	40.5541	41.0646	41.4255	41.8028
Average = Sum(39)m / 12 =	82.9585	82.7514	82.5484	81.5950	81.4166	80.5862	80.5862	80.4324	80.9060	81.4166	81.7774	82.1547
												81.5941

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9737	0.9713	0.9689	0.9577	0.9556	0.9458	0.9458	0.9440	0.9496	0.9556	0.9598	0.9643
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.5542 (42)
Hot water usage for mixer showers													
	67.0446	66.0371	64.5689	61.7598	59.6867	57.3748	56.0608	57.5178	59.1151	61.5973	64.4668	66.7878	(42a)
Hot water usage for baths													
	28.9546	28.5246	27.9190	26.8025	25.9665	25.0394	24.5387	25.1400	25.7947	26.7867	27.9262	28.8567	(42b)
Hot water usage for other uses													
	40.7872	39.3040	37.8208	36.3377	34.8545	33.3713	33.3713	34.8545	36.3377	37.8208	39.3040	40.7872	(42c)
Average daily hot water use (litres/day)													125.7377 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	136.7864	133.8657	130.3088	124.8999	120.5077	115.7856	113.9708	117.5123	121.2475	126.2049	131.6970	136.4317	(44)
Energy conte	216.6363	190.6230	200.2797	170.9818	162.2265	142.3719	137.8378	145.5048	149.5103	171.2588	187.6266	213.6190	(45)
Energy content (annual)													Total = Sum(45)m = 2088.4764
Distribution loss (46)m = 0.15 x (45)m													
	32.4954	28.5934	30.0420	25.6473	24.3340	21.3558	20.6757	21.8257	22.4265	25.6888	28.1440	32.0429	(46)
Water storage loss:													
Store volume													225.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.7737 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.9578 (55)
Total storage loss													
	29.6910	26.8177	29.6910	28.7332	29.6910	28.7332	29.6910	29.6910	28.7332	29.6910	28.7332	29.6910	(56)
If cylinder contains dedicated solar storage													
	29.6910	26.8177	29.6910	28.7332	29.6910	28.7332	29.6910	29.6910	28.7332	29.6910	28.7332	29.6910	(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													
	269.5897	238.4518	253.2331	222.2270	215.1798	193.6171	190.7911	198.4582	200.7555	224.2122	238.8718	266.5724	(62)
WWHRS	-30.6500	-27.1071	-28.3850	-23.5039	-21.9048	-18.7441	-17.5696	-18.6835	-19.3934	-22.8626	-25.9006	-30.0824	(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													
	238.9397	211.3447	224.8481	198.7231	193.2750	174.8730	173.2215	179.7747	181.3621	201.3495	212.9712	236.4900	(64)
12Total per year (kWh/year)													Total per year (kWh/year) = Sum(64)m = 2427.1726 (64)
Electric shower(s)													2427 (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													

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114.3943 101.6452 108.9557 97.8476 96.3030 88.3348 88.1938 90.7431 90.7083 99.3063 103.3820 113.3910 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	127.7081	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	128.8407	142.6451	128.8407	133.1354	128.8407	133.1354	128.8407	128.8407	133.1354	128.8407	133.1354	128.8407	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	229.9650	232.3513	226.3378	213.5359	197.3758	182.1876	172.0409	169.6546	175.6681	188.4700	204.6301	219.8183	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	35.7708	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	-102.1665	(71)
Water heating gains (Table 5)	153.7557	151.2578	146.4459	135.8995	129.4395	122.6872	118.5400	121.9665	125.9838	133.4761	143.5861	152.4073	(72)
Total internal gains	576.8739	590.5666	565.9369	546.8832	519.9685	499.3227	480.7341	481.7743	496.0997	515.0993	545.6640	565.3788	(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	
East					7.5700	19.6403	0.6300	0.7000	0.7700		45.4376 (76)	
South					2.6200	46.7521	0.6300	0.7000	0.7700		37.4347 (78)	
Solar gains	82.8722	150.1938	224.4777	301.7545	353.6169	356.3502	341.4746	303.0213	251.8285	171.5969	101.0281	69.7126 (83)
Total gains	659.7461	740.7604	790.4146	848.6377	873.5854	855.6729	822.2088	784.7956	747.9282	686.6962	646.6922	635.0914 (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	54.8414	54.9786	55.1138	55.7578	55.8800	56.4558	56.4558	56.5637	56.2326	55.8800	55.6334	55.3779	
alpha	4.6561	4.6652	4.6743	4.7172	4.7253	4.7637	4.7637	4.7709	4.7488	4.7253	4.7089	4.6919	
util living area	0.9832	0.9702	0.9461	0.8812	0.7616	0.5800	0.4268	0.4645	0.6884	0.8995	0.9685	0.9857	(86)
MIT	19.8195	20.0163	20.2795	20.6149	20.8522	20.9687	20.9940	20.9912	20.9301	20.6314	20.1795	19.7889	(87)
Th 2	20.1053	20.1074	20.1093	20.1187	20.1205	20.1287	20.1287	20.1302	20.1255	20.1205	20.1169	20.1132	(88)
util rest of house	0.9793	0.9635	0.9337	0.8548	0.7132	0.5093	0.3444	0.3799	0.6193	0.8713	0.9601	0.9823	(89)
MIT 2	18.7378	18.9867	19.3160	19.7267	19.9913	20.1085	20.1263	20.1263	20.0753	19.7555	19.2020	18.7049	(90)
Living area fraction	19.1949	19.4217	19.7231	20.1020	20.3551	20.4720	20.4929	20.4917	20.4365	20.1256	19.6150	19.1629	(91)
MIT	19.1949	19.4217	19.7231	20.1020	20.3551	20.4720	20.4929	20.4917	20.4365	20.1256	19.6150	19.1629	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1949	19.4217	19.7231	20.1020	20.3551	20.4720	20.4929	20.4917	20.4365	20.1256	19.6150	19.1629	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9742	0.9571	0.9273	0.8542	0.7268	0.5378	0.3791	0.4155	0.6450	0.8715	0.9543	0.9777	(94)
Useful gains	642.7001	708.9739	732.9893	724.9417	634.9279	460.1870	311.7379	326.0635	482.3792	598.4607	617.1329	620.9117	(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	1235.6540	1201.6934	1091.5440	914.0243	704.6681	473.1986	313.7156	329.1080	512.6592	775.5405	1023.4460	1229.2726	(97)
Space heating kWh	441.1577	331.1075	266.7646	136.1395	51.8866	0.0000	0.0000	0.0000	0.0000	131.7474	292.5455	452.6205	(98a)
Space heating requirement - total per year (kWh/year)												2103.9694	
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	441.1577	331.1075	266.7646	136.1395	51.8866	0.0000	0.0000	0.0000	0.0000	131.7474	292.5455	452.6205	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2103.9694	
Space heating per m ²										(98c) / (4) =		24.6945	(99)

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

Fraction of space heat from secondary/supplementary system (Table 11)

0.0000 (201)

Efficiency of main space heating system 1 (in %)

1.0000 (202)

Efficiency of main space heating system 2 (in %)

92.3000 (206)

Efficiency of secondary/supplementary heating system, %

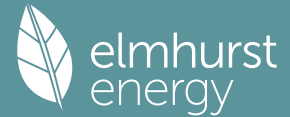
0.0000 (207)

Efficiency of secondary/supplementary heating system, %

0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	441.1577	331.1075	266.7646	136.1395	51.8866	0.0000	0.0000	0.0000	0.0000	131.7474	292.5455	452.6205	(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)	477.9607	358.7297	289.0191	147.4967	56.2152	0.0000	0.0000	0.0000	0.0000	142.7382	316.9507	490.3798	(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)

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Water heating												
Water heating requirement												
	238.9397	211.3447	224.8481	198.7231	193.2750	174.8730	173.2215	179.7747	181.3621	201.3495	212.9712	236.4900 (64)
Efficiency of water heater												79.8000 (216)
(217)m	85.4155	85.0623	84.4441	83.2294	81.5493	79.8000	79.8000	79.8000	79.8000	83.1325	84.7721	85.4911 (217)
Fuel for water heating, kWh/month												
	279.7380	248.4588	266.2685	238.7653	237.0041	219.1391	217.0696	225.2816	227.2708	242.2031	251.2279	276.6253 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	26.7706	21.4763	19.3371	14.1672	10.9431	8.9406	9.9827	12.9759	16.8544	22.1138	24.9775	27.5146 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-28.7323	-41.6727	-61.5903	-71.2507	-78.5356	-73.9065	-72.9995	-68.0884	-59.6872	-48.5571	-32.0005	-24.7063 (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	-12.8509	-27.3690	-55.0312	-83.5870	-111.4417	-112.3217	-111.0009	-93.5582	-68.0158	-39.4453	-17.2552	-10.1370 (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												2279.4901 (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												2929.0520 (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)												216.0537 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1403.7412 (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												4106.8547 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2279.4901	0.2100	478.6929 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2929.0520	0.2100	615.1009 (264)
Space and water heating			1093.7939 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	216.0537	0.1443	31.1832 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-661.7271	0.1340	-88.6723
PV Unit electricity exported	-742.0140	0.1256	-93.1716
Total			-181.8439 (269)
Total CO2, kg/year			955.0625 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.2100 (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	2279.4901	1.1300	2575.8239 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2929.0520	1.1300	3309.8288 (278)
Space and water heating			5885.6527 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	216.0537	1.5338	331.3904 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-661.7271	1.4952	-989.4232
PV Unit electricity exported	-742.0140	0.4609	-341.9919
Total			-1331.4151 (283)
Total Primary energy kWh/year			5015.7288 (286)
Target Primary Energy Rate (TPER)			58.8700 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	85

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

Energy Rating

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

Most energy efficient - lower running costs

CURRENT

POTENTIAL

(92 plus)

A

(81-91)

B

(69-80)

C

(55-68)

D

(39-54)

E

(21-38)

F

(1-20)

G

82

82

Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
-----------	------	---------	------	-----------

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.14 W/m ² K	Very Good
Floor	Average thermal transmittance 0.09 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 46 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

£459

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 0-5	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	86 B	DER	4.50	TER	11.43
Environmental	97 A	% DER < TER			60.63
CO ₂ Emissions (t/year)	0.24	DFEE	14.01	TFEE	19.65
Compliance Check	See BREL	% DFEE < TFEE			28.73
% DPER < TPER	18.06	DPER	49.88	TPER	60.88

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Basement flat	
Which Floor	0	
2.0 Number of Storeys	1	
3.0 Date Built	2022	
3.0 Property Age Band	L	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

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:	18.50 m	55.60 m ²	2.50 m
1st Storey:	17.55 m	59.40 m ²	3.00 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	24.00	m ²
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9.0 External Walls										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
GF-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	19.50	11.17	0.00	None	8.33	Enter Gross Area
GF-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	5.70	5.70	0.00	None	0.00	Enter Gross Area

10.1 Party Ceilings				
Description	Construction	Kappa (kJ/m ² K)	Area (m ²)	
Party Ceiling	Precast concrete planks floor, screed, carpeted	30.00	55.60	

11.1 Party Floors				
Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Floor	Lowest occupied	Precast concrete planks floor, screed, carpeted	30.00	55.60

Summary for Input Data

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Triple glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Triple glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
GF-E-Doors	Door	GF-E-Wall	East	2.78	0
GF-E-Window	Window	GF-E-Wall	East	5.55	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		18.85	0.00	0.00	No
E6 Intermediate floor within a dwelling		18.85	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value W/m²K

Description

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

Cooled Area m²

Data Source

Energy Class

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	15

24.0 Main Heating 1

Description

Summary for Input Data

Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	191	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2105	
Delayed Start Stat	No	
Burner Control	On/Off	
HETAS approved System	No	
Oil Pump Inside	No	
Flue Type	Balanced	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	No	
Electric CPSU Temperature	60.00	
Combi boiler type	No Combi	
Combi keep hot type	Electric, time clock	

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

28.3 Waste Water Heat Recovery System

Summary for Input Data

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

One Dwelling	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

None	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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

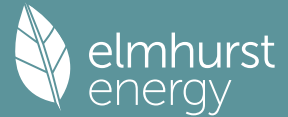
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023
Assessment Reference	Flat 0-5	Prop Type Ref	22403			
Property	Braemar Avenue, London, Greater London, N22 7BY					
SAP Rating	86 B	DER	4.50	TER	11.43	
Environmental	97 A	% DER < TER				60.63
CO ₂ Emissions (t/year)	0.24	DFEE	14.01	TFEE	19.65	
Compliance Check	See BREL	% DFEE < TFEE				28.73
% DPER < TPER	18.06	DPER	49.88	TPER	60.88	
Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	55.6000 (1b)	2.5000 (2b)	139.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.6000		139.0000 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	139.0000 (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	0 * 10 = 0.0000 (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)	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.1500 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1162 (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	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2477	0.2448	0.2419	0.2274	0.2245	0.2099	0.2099	0.2070	0.2157	0.2245	0.2303	0.2361 (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
Door			2.7800	0.9000	2.5020		(26a)
Window (Uw = 0.90)			5.5500	0.8687	4.8214		(27)
GF-E-Wall	19.5000	8.3300	11.1700	0.1400	1.5638	190.0000	2122.3000 (29a)
GF-S-Wall	5.7000		5.7000	0.1400	0.7980	190.0000	1083.0000 (29a)
Total net area of external elements Aum(A, m ²)			25.2000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 9.6852		(33)
Party Floor			55.6000			40.0000	2224.0000 (32d)
Party Ceiling			55.6000			30.0000	1668.0000 (32b)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 7097.3000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							127.6493 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							1.0080 (36)
Point Thermal bridges							(36a) = 0.0000
Total fabric heat loss							(33) + (36) + (36a) = 10.6932 (37)

Full SAP Calculation Printout



Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 11.3629	Feb 11.2295	Mar 11.0962	Apr 10.4297	May 10.2964	Jun 9.6298	Jul 9.6298	Aug 9.4965	Sep 9.8965	Oct 10.2964	Nov 10.5630	Dec 10.8296 (38)
Heat transfer coeff	22.0561	21.9228	21.7895	21.1229	20.9896	20.3231	20.3231	20.1898	20.5897	20.9896	21.2562	21.5228 (39)
Average = Sum(39)m / 12 =												21.0896
HLP	Jan 0.3967	Feb 0.3943	Mar 0.3919	Apr 0.3799	May 0.3775	Jun 0.3655	Jul 0.3655	Aug 0.3631	Sep 0.3703	Oct 0.3775	Nov 0.3823	Dec 0.3871 (40)
HLP (average)												0.3793
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

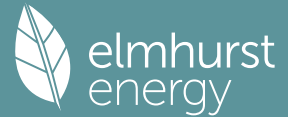
4. Water heating energy requirements (kWh/year)												
Assumed occupancy												1.8549 (42)
Hot water usage for mixer showers												0.0000 (42a)
Hot water usage for baths												23.9128 (42b)
Hot water usage for other uses												33.6262 (42c)
Average daily hot water use (litres/day)												52.7402 (43)
Daily hot water use	Jan 57.5390	Feb 55.9611	Mar 54.2382	Apr 52.0933	May 50.1801	Jun 48.1917	Jul 47.7782	Aug 49.4975	Sep 51.2610	Oct 53.3030	Nov 55.4669	Dec 57.4582 (44)
Energy conte	91.1277	79.6879	83.3621	71.3132	67.5521	59.2573	57.7835	61.2883	63.2100	72.3317	79.0228	89.9656 (45)
Energy content (annual)												Total = Sum(45)m = 875.9023
Distribution loss (46)m = 0.15 x (45)m												13.6692
Water storage loss:												150.0000 (47)
Store volume												1.6900 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.6000 (49)
Temperature factor from Table 2b												1.0140 (55)
Enter (49) or (54) in (55)												1.0140 (55)
Total storage loss	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340 (56)
If cylinder contains dedicated solar storage	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340 (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	122.5617	108.0799	114.7961	101.7332	98.9861	89.6773	89.2175	92.7223	93.6300	103.7657	109.4428	121.3996 (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	122.5617	108.0799	114.7961	101.7332	98.9861	89.6773	89.2175	92.7223	93.6300	103.7657	109.4428	121.3996 (64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 1246.0123 (64)
Electric shower(s)	44.3024	39.4738	43.1039	41.1335	41.9054	39.9737	41.3061	41.9054	41.1335	43.1039	42.2934	44.3024 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												503.9374 (64a)
Heat gains from water heating, kWh/month	41.3756	36.3647	38.4939	33.9950	32.9374	29.6965	29.5396	30.8547	31.3007	34.8263	36.8484	40.9892 (65)

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts	Jan 92.7459	Feb 92.7459	Mar 92.7459	Apr 92.7459	May 92.7459	Jun 92.7459	Jul 92.7459	Aug 92.7459	Sep 92.7459	Oct 92.7459	Nov 92.7459	Dec 92.7459 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	96.8277	107.2021	96.8277	100.0553	96.8277	100.0553	96.8277	96.8277	100.0553	96.8277	100.0553	96.8277 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	161.7305	163.4087	159.1796	150.1762	138.8111	128.1295	120.9935	119.3152	123.5444	132.5478	143.9129	154.5945 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746 (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)	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967 (71)
Water heating gains (Table 5)	55.6123	54.1141	51.7391	47.2153	44.2707	41.2451	39.7037	41.4714	43.4732	46.8095	51.1784	55.0930 (72)
Total internal gains	367.9942	378.5486	361.5701	351.2705	333.7332	320.2536	308.3486	308.4380	317.8966	330.0087	348.9703	360.3389 (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						
East	5.5500	19.6403	0.4000	0.7000	0.7700	21.1510 (76)						
Solar gains	21.1510	41.3759	68.1402	99.3785	121.7920	124.6758	118.6965	101.9585	79.2499	49.0960	26.3729	17.3936 (83)
Total gains	389.1453	419.9246	429.7103	450.6490	455.5252	444.9294	427.0451	410.3965	397.1465	379.1047	375.3431	377.7325 (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 89.3845	Feb 89.9280	Mar 90.4782	Apr 93.3333	May 93.9261	Jun 97.0067	Jul 97.0067	Aug 97.6472	Sep 95.7505	Oct 93.9261	Nov 92.7480	Dec 91.5990
tau	6.9590	6.9952	7.0319	7.2222	7.2617	7.4671	7.4671	7.5098	7.3834	7.2617	7.1832	7.1066
util living area	0.8491	0.7876	0.7108	0.5630	0.4280	0.2923	0.2094	0.2263	0.3576	0.5713	0.7522	0.8567 (86)

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MIT	20.8463	20.9098	20.9573	20.9924	20.9990	21.0000	21.0000	21.0000	20.9998	20.9931	20.9465	20.8455 (87)
Th 2	20.6164	20.6187	20.6209	20.6321	20.6344	20.6456	20.6456	20.6479	20.6411	20.6344	20.6299	20.6254 (88)
util rest of house												
	0.8377	0.7741	0.6952	0.5466	0.4113	0.2761	0.1925	0.2090	0.3390	0.5521	0.7364	0.8457 (89)
MIT 2	20.4791	20.5395	20.5846	20.6260	20.6336	20.6456	20.6456	20.6479	20.6410	20.6290	20.5843	20.4869 (90)
Living area fraction									fLA = Living area / (4) =			0.4317 (91)
MIT	20.6376	20.6993	20.7455	20.7842	20.7914	20.7986	20.7986	20.7999	20.7959	20.7861	20.7406	20.6417 (92)
Temperature adjustment												0.0000
adjusted MIT	20.6376	20.6993	20.7455	20.7842	20.7914	20.7986	20.7986	20.7999	20.7959	20.7861	20.7406	20.6417 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8383	0.7770	0.7004	0.5534	0.4185	0.2831	0.1998	0.2165	0.3470	0.5601	0.7412	0.8462	(94)
Useful gains	326.2233	326.2853	300.9554	249.3904	190.6242	125.9663	85.3277	88.8314	137.8295	212.3339	278.1992	319.6474	(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													
	360.3436	346.3654	310.4012	251.0285	190.8243	125.9736	85.3281	88.8321	137.8659	213.8030	289.9487	353.8721	(97)
Space heating kWh													
	25.3855	13.4938	7.0277	1.1795	0.1488	0.0000	0.0000	0.0000	0.0000	1.0930	8.4596	25.4632	(98a)
Space heating requirement - total per year (kWh/year)												82.2512	
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													
	25.3855	13.4938	7.0277	1.1795	0.1488	0.0000	0.0000	0.0000	0.0000	1.0930	8.4596	25.4632	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												82.2512	
Space heating per m2												1.4793	(99)
										(98c) / (4) =			

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	191.0368	150.3907	153.4421	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9993	0.9998	0.9997	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	190.9019	150.3637	153.4021	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	470.8724	452.3020	434.4573	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	201.5787	224.6421	209.1051	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction									fC = cooled area / (4) =			0.4317	(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	21.7531	24.2420	22.5653	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												68.5604	(107)

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 %)												100.0000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Cooling System Energy Efficiency Ratio (see Table 10c)												5.6000 (209)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	25.3855	13.4938	7.0277	1.1795	0.1488	0.0000	0.0000	0.0000	0.0000	1.0930	8.4596	25.4632 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	25.3855	13.4938	7.0277	1.1795	0.1488	0.0000	0.0000	0.0000	0.0000	1.0930	8.4596	25.4632 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	122.5617	108.0799	114.7961	101.7332	98.9861	89.6773	89.2175	92.7223	93.6300	103.7657	109.4428	121.3996 (64)
Efficiency of water heater	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)
Fuel for water heating, kWh/month	122.5617	108.0799	114.7961	101.7332	98.9861	89.6773	89.2175	92.7223	93.6300	103.7657	109.4428	121.3996 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	3.8845	4.3289	4.0295	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	15.3788	13.8905	15.3788	14.8827	15.3788	14.8827	15.3788	15.3788	14.8827	15.3788	14.8827	15.3788 (231)
Lighting	19.2291	15.4263	13.8897	10.1762	7.8604	6.4220	7.1705	9.3205	12.1064	15.8843	17.9412	19.7636 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-8.7386	-15.0227	-26.6874	-36.0315	-43.7769	-42.8103	-42.0926	-36.9504	-28.6087	-19.1739	-10.3388	-7.1777 (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												82.2512 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)

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Efficiency of water heater	100.0000	
Water heating fuel used	1246.0123	(219)
Space cooling fuel	12.2429	(221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)		
mechanical ventilation fans (SFP = 0.8260)	140.0731	(230a)
central heating pump	41.0000	(230c)
Total electricity for the above, kWh/year	181.0731	(231)
Electricity for lighting (calculated in Appendix L)	155.1902	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-317.4094	(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	1863.2977	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1 (high-rate cost)	74.0261	0.1676	12.4055	(261)
Space heating - main system 1 (low-rate cost)	8.2251	0.1407	1.1570	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating - high rate cost	117.5704	0.1477	17.3600	(264)
Water heating - low rate cost	1128.4419	0.1239	139.8407	(264)
Energy for instantaneous electric shower(s)	503.9374	0.1436	72.3789	(264a)
Space and water heating			170.7633	(265)
Space cooling	12.2429	0.1179	1.4439	(266)
Pumps, fans and electric keep-hot	181.0731	0.1432	25.3075	(267)
Energy for lighting	155.1902	0.1490	23.1264	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-317.4094	0.1353	-42.9593	
PV Unit electricity exported	0.0000	0.0000	0.0000	
Total			-42.9593	(269)
Total CO2, kg/year			250.0607	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5000	(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 (high-rate cost)	74.0261	1.4616	120.2213	(275)
Space heating - main system 1 (low-rate cost)	8.2251	1.5104	12.4231	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating - high rate cost	117.5704	1.5520	182.4653	(278)
Water heating - low rate cost	1128.4419	1.4434	1628.7707	(278)
Energy for instantaneous electric shower(s)	503.9374	1.5350	773.5618	(278a)
Space and water heating			1943.8804	(279)
Space cooling	12.2429	0.1407	17.6379	(280)
Pumps, fans and electric keep-hot	181.0731	1.5335	274.7972	(281)
Energy for lighting	155.1902	1.5547	241.2812	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-317.4094	1.5048	-477.6312	
PV Unit electricity exported	0.0000	0.0000	0.0000	
Total			-477.6312	(283)
Total Primary energy kWh/year			2773.5272	(286)
Dwelling Primary energy Rate (DPER)			49.8800	(287)

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

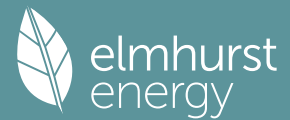
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Ground floor	55.6000	(1b)	x	2.5000 (2b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.6000			
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	139.0000 (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	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

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Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 20.0000 / (5) = 0.1439 (8)

Pressure test
 Pressure Test Method
 Measured/design AP50
 Infiltration rate
 Number of sides sheltered

Blower Door
 Yes
 5.0000 (17)
 0.3939 (18)
 3 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 0.7750 (20)

Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3053 (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													
Effective ac	0.3892	0.3816	0.3739	0.3358	0.3282	0.2900	0.2900	0.2824	0.3053	0.3282	0.3434	0.3587	(22b)
	0.5757	0.5728	0.5699	0.5564	0.5538	0.5420	0.5420	0.5399	0.5466	0.5538	0.5590	0.5643	(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 Semi-glazed door			2.7800	1.0000	2.7800			(26a)
TER Opening Type (Uw = 1.20)			5.5500	1.1450	6.3550			(27)
GF-E-Wall	19.5000	8.3300	11.1700	0.1800	2.0106			(29a)
GF-S-Wall	5.7000		5.7000	0.1800	1.0260			(29a)
Total net area of external elements Aum(A, m2)			25.2000					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 12.1716			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 137.6493 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E5 Ground floor (normal)	18.8500	0.1600	3.0160	
E6 Intermediate floor within a dwelling	18.8500	0.0000	0.0000	
E16 Corner (normal)	6.0000	0.0900	0.5400	
E18 Party wall between dwellings	6.0000	0.0600	0.3600	

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 3.9160 (36)

Point Thermal bridges (36a) = 0.0000

Total fabric heat loss (33) + (36) + (36a) = 16.0876 (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	26.4093	26.2743	26.1421	25.5210	25.4048	24.8638	24.8638	24.7636	25.0722	25.4048	25.6399	25.8856	(38)
Heat transfer coeff	42.4968	42.3619	42.2297	41.6085	41.4923	40.9514	40.9514	40.8512	41.1597	41.4923	41.7274	41.9732	(39)
Average = Sum(39)m / 12 =													41.6080

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.7643	0.7619	0.7595	0.7484	0.7463	0.7365	0.7365	0.7347	0.7403	0.7463	0.7505	0.7549	(40)
HLP (average)													0.7483
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

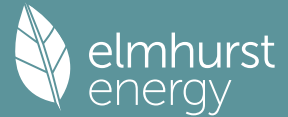
Assumed occupancy													1.8549 (42)
Hot water usage for mixer showers	55.3204	54.4890	53.2776	50.9597	49.2491	47.3416	46.2573	47.4596	48.7775	50.8257	53.1933	55.1084	(42a)
Hot water usage for baths	23.9128	23.5577	23.0576	22.1354	21.4450	20.6794	20.2658	20.7624	21.3031	22.1224	23.0635	23.8320	(42b)
Hot water usage for other uses	33.6262	32.4034	31.1807	29.9579	28.7351	27.5123	27.5123	28.7351	29.9579	31.1807	32.4034	33.6262	(42c)
Average daily hot water use (litres/day)													103.7438 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	112.8594	110.4501	107.5158	103.0530	99.4292	95.5333	94.0354	96.9571	100.0385	104.1287	108.6603	112.5666	(44)
Energy conte	178.7417	157.2795	165.2478	141.0744	133.8509	117.4693	113.7277	120.0532	123.3575	141.3017	154.8065	176.2521	(45)
Energy content (annual)													Total = Sum(45)m = 1723.1623
Distribution loss (46)m = 0.15 x (45)m	26.8113	23.5919	24.7872	21.1612	20.0776	17.6204	17.0592	18.0080	18.5036	21.1953	23.2210	26.4378	(46)
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	225.3366	199.3652	211.8427	186.1663	180.4458	162.5611	160.3226	166.6481	168.4493	187.8966	199.8983	222.8470	(62)
WWHRS	-25.2902	-22.3668	-23.4213	-19.3937	-18.0743	-15.4663	-14.4972	-15.4163	-16.0020	-18.8646	-21.3713	-24.8218	(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	200.0464	176.9984	188.4214	166.7726	162.3715	147.0949	145.8255	151.2318	152.4473	169.0320	178.5270	198.0252	(64)
12Total per year (kWh/year)													Total per year (kWh/year) = Sum(64)m = 2036.7940 (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	96.7075	85.9640	92.2208	82.9807	81.7813	75.1320	75.0904	77.1936	77.0898	84.2587	87.5466	95.8797	(65)

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

Metabolic gains (Table 5), Watts

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	92.7459	92.7459	92.7459	92.7459	92.7459	92.7459	92.7459	92.7459	92.7459	92.7459	92.7459	92.7459	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	94.2317	104.3279	94.2317	97.3727	94.2317	97.3727	94.2317	94.2317	97.3727	94.2317	97.3727	94.2317	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	161.7305	163.4087	159.1796	150.1762	138.8111	128.1295	120.9935	119.3152	123.5444	132.5478	143.9129	154.5945	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	32.2746	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	-74.1967	(71)
Water heating gains (Table 5)	129.9833	127.9226	123.9527	115.2510	109.9212	104.3500	100.9279	103.7548	107.0692	113.2510	121.5925	128.8706	(72)
Total internal gains	439.7692	449.4831	431.1877	416.6237	396.7877	380.6760	366.9769	368.1255	378.8101	393.8542	416.7019	431.5206	(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

East				5.5500	19.6403	0.6300	0.7000			0.7700		33.3129 (76)
Solar gains	33.3129	65.1671	107.3209	156.5211	191.8224	196.3644	186.9469	160.5846	124.8186	77.3262	41.5372	27.3949 (83)
Total gains	473.0820	514.6501	538.5086	573.1448	588.6101	577.0404	553.9238	528.7101	503.6287	471.1804	458.2391	458.9155 (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	50.0253	50.1846	50.3418	51.0933	51.2364	51.9132	51.9132	52.0405	51.6504	51.2364	50.9477	50.6494		
alpha	4.3350	4.3456	4.3561	4.4062	4.4158	4.4609	4.4609	4.4694	4.4434	4.4158	4.3965	4.3766		
util living area	0.9351	0.9072	0.8615	0.7587	0.6166	0.4468	0.3238	0.3532	0.5437	0.7778	0.8965	0.9408	(86)	
MIT	20.1028	20.2775	20.5012	20.7685	20.9226	20.9855	20.9972	20.9960	20.9656	20.7805	20.4296	20.0798	(87)	
Th 2	20.2844	20.2865	20.2885	20.2983	20.3001	20.3087	20.3087	20.3103	20.3054	20.3001	20.2964	20.2926	(88)	
util rest of house	0.9260	0.8949	0.8436	0.7308	0.5782	0.4008	0.2736	0.3011	0.4946	0.7460	0.8810	0.9325	(89)	
MIT 2	19.2456	19.4623	19.7365	20.0584	20.2286	20.2979	20.3072	20.3079	20.2780	20.0794	19.6609	19.2235	(90)	
Living area fraction									fLA = Living area / (4) =			0.4317	(91)	
MIT	19.6156	19.8142	20.0666	20.3649	20.5282	20.5947	20.6051	20.6049	20.5748	20.3820	19.9927	19.5931	(92)	
Temperature adjustment												0.0000		
adjusted MIT	19.6156	19.8142	20.0666	20.3649	20.5282	20.5947	20.6051	20.6049	20.5748	20.3820	19.9927	19.5931	(93)	

8. Space heating requirement

Utilisation	0.9162	0.8858	0.8376	0.7335	0.5910	0.4200	0.2952	0.3235	0.5140	0.7499	0.8736	0.9229	(94)	
Useful gains	433.4442	455.8709	451.0424	420.4163	347.8521	242.3443	163.5052	171.0124	258.8418	353.3571	400.3224	423.5438	(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	650.8649	631.7921	572.9137	477.0380	366.3022	245.4901	164.0123	171.7763	266.5009	405.8791	537.9798	646.0968	(97)	
Space heating kWh	161.7610	118.2191	90.6722	40.7676	13.7269	0.0000	0.0000	0.0000	0.0000	39.0764	99.1133	165.5795	(98a)	
Space heating requirement - total per year (kWh/year)												728.9160		
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	161.7610	118.2191	90.6722	40.7676	13.7269	0.0000	0.0000	0.0000	0.0000	39.0764	99.1133	165.5795	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												728.9160		
Space heating per m ²										(98c) / (4) =		13.1100	(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	161.7610	118.2191	90.6722	40.7676	13.7269	0.0000	0.0000	0.0000	0.0000	39.0764	99.1133	165.5795	(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)	175.2557	128.0813	98.2364	44.1686	14.8720	0.0000	0.0000	0.0000	0.0000	42.3363	107.3817	179.3927	(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	200.0464	176.9984	188.4214	166.7726	162.3715	147.0949	145.8255	151.2318	152.4473	169.0320	178.5270	198.0252	(64)	
Efficiency of water heater (217)m	83.5876	83.1758	82.5170	81.4210	80.4355	79.8000	79.8000	79.8000	79.8000	81.3481	82.7956	79.8000	(216)	
Fuel for water heating, kWh/month	239.3254	212.8005	228.3424	204.8275	201.8656	184.3294	182.7387	189.5135	191.0368	207.7884	215.6237	236.6987	(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)	

Full SAP Calculation Printout



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	19.5795	15.7074	14.1428	10.3616	8.0036	6.5390	7.3011	9.4903	12.3270	16.1736	18.2681	20.1237	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-15.0394	-22.3535	-33.8527	-40.1729	-45.1882	-42.8816	-42.3865	-39.1061	-33.6166	-26.5099	-16.9475	-12.8736	(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	-5.3129	-11.4380	-23.2261	-35.6103	-47.7937	-48.2653	-47.6700	-40.0096	-28.8859	-16.5617	-7.1600	-4.1801	(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												789.7248	(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												2494.8906	(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)												158.0176	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-687.0423	(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												2841.5907	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	789.7248	0.2100	165.8422	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2494.8906	0.2100	523.9270	(264)
Space and water heating			689.7692	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	158.0176	0.1443	22.8068	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-370.9286	0.1335	-49.5116	
PV Unit electricity exported	-316.1137	0.1253	-39.6120	
Total			-89.1237	(269)
Total CO2, kg/year			635.3816	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.4300	(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	789.7248	1.1300	892.3890	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2494.8906	1.1300	2819.2264	(278)
Space and water heating			3711.6154	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	158.0176	1.5338	242.3727	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-370.9286	1.4933	-553.8919	
PV Unit electricity exported	-316.1137	0.4599	-145.3948	
Total			-699.2867	(283)
Total Primary energy kWh/year			3384.8022	(286)
Target Primary Energy Rate (TPER)			60.8800	(287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	56

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

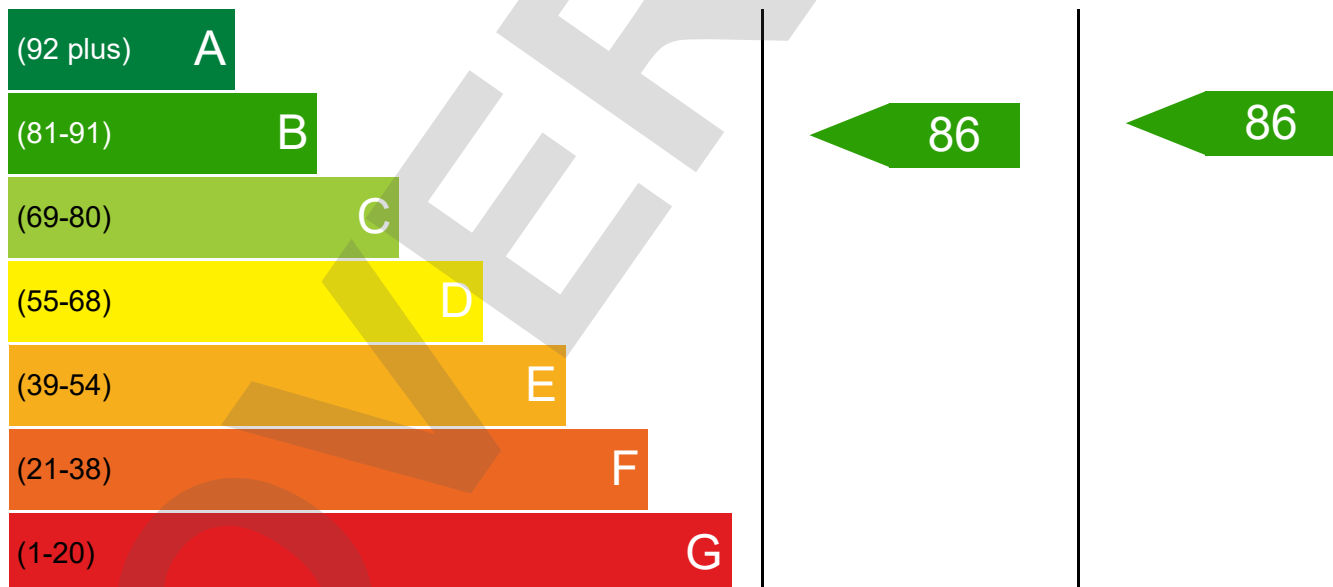
Energy Rating

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



Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor

Poor

Average

Good

Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.14 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer and at least two room thermostats	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 48 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: **0.2** per year

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

Recommendations

Overview Report

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

Recommended measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
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Estimated energy use and potential savings

Estimated energy cost for this property over a year

£304

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details	
Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details	
Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 1-1	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	83 B	DER	6.00	TER	14.84
Environmental	96 A	% DER < TER			59.57
CO ₂ Emissions (t/year)	0.25	DFEE	29.59	TFEE	34.68
Compliance Check	See BREL	% DFEE < TFEE			14.68
% DPER < TPER	18.70	DPER	64.33	TPER	79.12

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2022	
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	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements			
	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m²	0.00 m
Ground floor:	11.81 m	50.00 m²	2.50 m
1st Storey:	11.60 m	31.40 m²	3.00 m
2nd Storey:	0.00 m	0.00 m²	0.00 m
3rd Storey:	0.00 m	0.00 m²	0.00 m
4th Storey:	0.00 m	0.00 m²	0.00 m
5th Storey:	0.00 m	0.00 m²	0.00 m
6th Storey:	0.00 m	0.00 m²	0.00 m
7th Storey:	0.00 m	0.00 m²	0.00 m

8.0 Living Area	29.00	m²
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9.0 External Walls										
Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
1st-N-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	23.85	18.30	0.00	None	5.55	Enter Gross Area
1st-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	16.20	7.87	0.00	None	8.33	Enter Gross Area

10.1 Party Ceilings			
Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling	Precast concrete planks floor, screed, carpeted	30.00	55.00

11.0 Heat Loss Floors								
Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
LGF-Floor	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.09	None	0.00	110.00	55.00

12.0 Opening Types								
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Summary for Input Data

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door Window	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Door Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
1st-W-Door	Door	1st-W-Wall	West	2.78	0
1st-W-Window	Window	1st-W-Wall	West	5.55	0
1st-N-Window	Window	1st-N-Wall	North	5.55	0

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

User Input

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		11.81	0.00	0.00	No
E6 Intermediate floor within a dwelling		11.81	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value: 0.04 W/m²K

Description: Bridge

18.0 Pressure Testing

Yes

Designed AP₅₀: 3.00 m³/(h.m²) @ 50 Pa

Property Tested?: Yes

Test Method: Blower Door

As Built AP₅₀: 0.10 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present: Yes

Approved Installation: No

Mechanical Ventilation data Type: Database

Type: Balanced mechanical ventilation with heat recovery

MV Reference Number: 500500

Configuration: 2

Manufacturer SFP: 0.59

Duct Type: Rigid

MVHR Efficiency: 89.00

Wet Rooms: 2

SFP from Installer Commissioning Certificate: No

MVHR System Location: Inside heated envelope (installed exclusively)

Duct Installation Specification: Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

No

22.0 Lighting

No Fixed Lighting: No

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	7

24.0 Main Heating 1

SAP table

Description: Electric Boiler

Percentage of Heat: 100.00 %

Database Ref. No.: 0

Fuel Type: Electricity

SAP Code: 191

Summary for Input Data

In Winter	100.00
In Summer	100.00
Controls SAP Code	2105
Delayed Start Stat	No
Burner Control	On/Off
HETAS approved System	No
Oil Pump Inside	No
Flue Type	Balanced
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	No
Electric CPSU Temperature	60.00
Combi boiler type	No Combi
Combi keep hot type	Electric, time clock

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	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	No
Independent Time Control	No

Summary for Input Data

Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

32.0 Photovoltaic Unit

Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	5.80

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

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

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

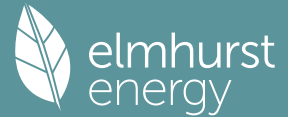
Lower cost measures

None

Further measures to achieve even higher standards

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

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Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023
Assessment Reference	Flat 1-1	Prop Type Ref	22403			
Property	Braemar Avenue, London, Greater London, N22 7BY					
SAP Rating	83 B	DER	6.00	TER	14.84	
Environmental	96 A	% DER < TER				59.57
CO ₂ Emissions (t/year)	0.25	DFEE	29.59	TFEE	34.68	
Compliance Check	See BREL	% DFEE < TFEE				14.68
% DPER < TPER	18.70	DPER	64.33	TPER	79.12	
Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	50.0000 (1b)	2.5000 (2b)	125.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	125.0000 (5)

2. Ventilation rate

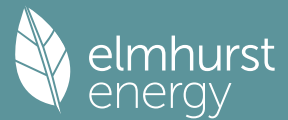
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (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) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.1500 (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) = 0.1275 (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	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (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
Door			2.7800	0.9000	2.5020		(26a)
Window (Uw = 0.90)			11.1000	0.8687	9.6429		(27)
LGF-Floor			55.0000	0.0900	4.9500	110.0000	6050.0000 (28a)
1st-N-Wall	23.8500	5.5500	18.3000	0.1400	2.5620	190.0000	3477.0001 (29a)
1st-W-Wall	16.2000	8.3300	7.8700	0.1400	1.1018	190.0000	1495.3001 (29a)
Total net area of external elements Aum (A, m ²)			95.0500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	20.7587		(33)
Party Ceiling			55.0000			30.0000	1650.0000 (32b)
Heat capacity Cm = Sum (A x k)						(28)...(30) + (32) + (32a)...(32e) =	12672.3002 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							253.4460 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							3.8020 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	24.5607 (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	10.8101	10.6786	10.5471	9.8897	9.7582	9.1008	9.1008	8.9693	9.3637	9.7582	10.0212	10.2841	(38)
Heat transfer coeff	35.3707	35.2393	35.1078	34.4503	34.3189	33.6614	33.6614	33.5300	33.9244	34.3189	34.5818	34.8448	(39)
Average = Sum(39)m / 12 =												34.4175	
HLP	0.7074	0.7048	0.7022	0.6890	0.6864	0.6732	0.6732	0.6706	0.6785	0.6864	0.6916	0.6969	(40)
HLP (average)												0.6883	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.6901 (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	22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476	(42b)
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383	(42c)
Average daily hot water use (litres/day)												50.1040	(43)
Daily hot water use	54.6627	53.1639	51.5272	49.4895	47.6720	45.7830	45.3900	47.0234	48.6986	50.6385	52.6942	54.5859	(44)
Energy conte	86.5724	75.7046	79.1954	67.7487	64.1757	56.2956	54.8953	58.2247	60.0502	68.7160	75.0726	85.4684	(45)
Energy content (annual)										Total = Sum(45)m =		832.1197	
Distribution loss (46)m = 0.15 x (45)m	12.9859	11.3557	11.8793	10.1623	9.6263	8.4443	8.2343	8.7337	9.0075	10.3074	11.2609	12.8203	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												1.0140	(55)
Total storage loss	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(56)
If cylinder contains dedicated solar storage	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(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	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024	(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	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		1202.2297	(64)
Electric shower(s)	42.0893	37.5019	40.9507	39.0787	39.8120	37.9768	39.2427	39.8120	39.0787	40.9507	40.1807	42.0893	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												478.7637	(64a)
Heat gains from water heating, kWh/month	39.3077	34.5473	36.5701	32.2961	31.2914	28.2125	28.0634	29.3127	29.7364	33.0857	35.0068	38.9406	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	74.2695	82.2270	74.2695	76.7452	74.2695	76.7452	74.2695	74.2695	76.7452	74.2695	76.7452	74.2695	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	(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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	(71)
Water heating gains (Table 5)	52.8329	51.4096	49.1534	44.8557	42.0584	39.1840	37.7196	39.3988	41.3005	44.4701	48.6206	52.3395	(72)
Total internal gains	325.6879	333.7499	319.6862	309.6678	294.0483	280.9254	270.4890	270.6404	278.8679	290.7581	307.7307	318.6981	(73)

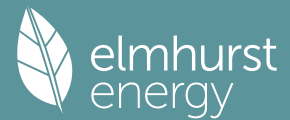
6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
North	5.5500	10.6334	0.4000	0.7000	0.7700	11.4513	(74)
West	5.5500	19.6403	0.4000	0.7000	0.7700	21.1510	(80)
Solar gains	32.6024	63.2600	105.3266	159.1094	202.2550	210.8138	(83)
Total gains	358.2902	397.0099	425.0128	468.7771	496.3033	491.7393	(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	99.5197	99.8910	100.2651	102.1785	102.5699	104.5732	104.5732	104.9832	103.7626	102.5699	101.7900	101.0218	
alpha	7.6346	7.6594	7.6843	7.8119	7.8380	7.9715	7.9715	7.9989	7.9175	7.8380	7.7860	7.7348	
util living area	0.9912	0.9796	0.9479	0.8282	0.6357	0.4378	0.3154	0.3534	0.5778	0.8755	0.9762	0.9930	(86)

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MIT	20.4572	20.5885	20.7550	20.9338	20.9915	20.9996	21.0000	20.9999	20.9969	20.9154	20.6746	20.4407 (87)
Th 2	20.3343	20.3366	20.3389	20.3506	20.3529	20.3645	20.3645	20.3669	20.3599	20.3529	20.3482	20.3436 (88)
util rest of house	0.9887	0.9741	0.9348	0.7972	0.5940	0.3945	0.2698	0.3048	0.5256	0.8436	0.9689	0.9910 (89)
MIT 2	19.8437	19.9740	20.1347	20.3025	20.3479	20.3644	20.3645	20.3669	20.3584	20.2926	20.0691	19.8355 (90)
Living area fraction									fLA = Living area / (4) =			0.5800 (91)
MIT	20.1995	20.3304	20.4944	20.6686	20.7212	20.7328	20.7331	20.7340	20.7287	20.6538	20.4203	20.1865 (92)
Temperature adjustment												0.0000
adjusted MIT	20.1995	20.3304	20.4944	20.6686	20.7212	20.7328	20.7331	20.7340	20.7287	20.6538	20.4203	20.1865 (93)

8. Space heating requirement

Utilisation	Jan 0.9881	Feb 0.9740	Mar 0.9381	Apr 0.8128	May 0.6179	Jun 0.4196	Jul 0.2962	Aug 0.3330	Sep 0.5558	Oct 0.8591	Nov 0.9698	Dec 0.9904 (94)
Useful gains	354.0424	386.7026	398.7195	381.0130	306.6698	206.3208	139.1198	145.3058	223.8870	314.3625	337.7053	342.3158 (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	562.3768	543.7571	491.3135	405.4336	309.5978	206.4393	139.1258	145.3204	224.8755	345.0360	460.6400	557.0471 (97)
Space heating kWh	155.0007	105.5406	68.8900	17.5828	2.1784	0.0000	0.0000	0.0000	0.0000	22.8211	88.5130	159.7601 (98a)
Space heating requirement - total per year (kWh/year)												620.2868
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	155.0007	105.5406	68.8900	17.5828	2.1784	0.0000	0.0000	0.0000	0.0000	22.8211	88.5130	159.7601 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												620.2868
Space heating per m2										(98c) / (4) =		12.4057 (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 %)												100.0000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	Jan 155.0007	Feb 105.5406	Mar 68.8900	Apr 17.5828	May 2.1784	Jun 0.0000	Jul 0.0000	Aug 0.0000	Sep 0.0000	Oct 22.8211	Nov 88.5130	Dec 159.7601 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	155.0007	105.5406	68.8900	17.5828	2.1784	0.0000	0.0000	0.0000	0.0000	22.8211	88.5130	159.7601 (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	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024 (64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)
Fuel for water heating, kWh/month	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024 (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	14.1806	12.8083	14.1806	13.7232	14.1806	13.7232	14.1806	14.1806	13.7232	14.1806	13.7232	14.1806 (231)
Lighting	14.7493	11.8324	10.6538	7.8054	6.0291	4.9259	5.5000	7.1491	9.2859	12.1837	13.7614	15.1592 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-10.3865	-19.2442	-36.9863	-53.5772	-68.0874	-67.6191	-66.2440	-56.3940	-41.3743	-25.5739	-12.6872	-8.4043 (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												620.2868 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												100.0000
Water heating fuel used												1202.2297 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)												
mechanical ventilation fans (SFP = 0.8260)												125.9650 (230a)
central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												166.9650 (231)
Electricity for lighting (calculated in Appendix L)												119.0353 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-466.5783 (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												2120.7021 (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 (high-rate cost)	558.2581	0.1658	92.5495 (261)
Space heating - main system 1 (low-rate cost)	62.0287	0.1392	8.6331 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	107.0985	0.1476	15.8103 (264)
Water heating - low rate cost	1095.1312	0.1239	135.6828 (264)
Energy for instantaneous electric shower(s)	478.7637	0.1436	68.7632 (264a)
Space and water heating			252.6756 (265)
Pumps, fans and electric keep-hot	166.9650	0.1432	23.3499 (267)
Energy for lighting	119.0353	0.1490	17.7386 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-466.5783	0.1342	-62.6247
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-62.6247 (269)
Total CO2, kg/year			299.9026 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.0000 (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 (high-rate cost)	558.2581	1.4559	903.0711 (275)
Space heating - main system 1 (low-rate cost)	62.0287	1.5045	93.3206 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	107.0985	1.5518	166.2006 (278)
Water heating - low rate cost	1095.1312	1.4433	1580.5703 (278)
Energy for instantaneous electric shower(s)	478.7637	1.5350	734.9193 (278a)
Space and water heating			2743.1625 (279)
Pumps, fans and electric keep-hot	166.9650	1.5335	253.4523 (281)
Energy for lighting	119.0353	1.5547	185.0694 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-466.5783	1.5007	-700.1856
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-700.1856 (283)
Total Primary energy kWh/year			3216.4180 (286)
Dwelling Primary energy Rate (DPER)			64.3300 (287)

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	50.0000 (1b)	2.5000 (2b)	125.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	125.0000 (5)

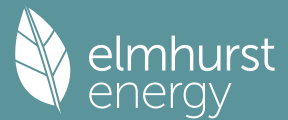
2. Ventilation rate

	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	2 * 10 = 20.0000 (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) =	20.0000 / (5) = 0.1600 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4100 (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) = 0.3485 (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	0.4443	0.4356	0.4269	0.3834	0.3746	0.3311	0.3311	0.3224	0.3485	0.3746	0.3921	0.4095 (22b)
Effective ac	0.5987	0.5949	0.5911	0.5735	0.5702	0.5548	0.5548	0.5520	0.5607	0.5702	0.5769	0.5838 (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						
TER Semi-glazed door			2.7800	1.0000	2.7800			(26a)					
TER Opening Type (Uw = 1.20)			9.7200	1.1450	11.1298			(27)					
LGF-Floor			55.0000	0.1300	7.1500			(28a)					
1st-N-Wall	23.8500	4.8600	18.9900	0.1800	3.4182			(29a)					
1st-W-Wall	16.2000	7.6400	8.5600	0.1800	1.5408			(29a)					
Total net area of external elements Aum(A, m2)			95.0500					(31)					
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		26.0188			(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							264.4460	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value		Total						
E5 Ground floor (normal)				11.8100	0.1600		1.8896						
E6 Intermediate floor within a dwelling				11.8100	0.0000		0.0000						
E16 Corner (normal)				6.0000	0.0900		0.5400						
E18 Party wall between dwellings				6.0000	0.0600		0.3600						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								2.7896 (36)					
Point Thermal bridges						(36a) =	0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	28.8084	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 24.6971	Feb 24.5390	Mar 24.3840	Apr 23.6560	May 23.5198	Jun 22.8857	Jul 22.8857	Aug 22.7683	Sep 23.1300	Oct 23.5198	Nov 23.7953	Dec 24.0834	(38)
Heat transfer coeff	53.5055	53.3474	53.1924	52.4644	52.3282	51.6941	51.6941	51.5767	51.9383	52.3282	52.6037	52.8918	(39)
Average = Sum(39)m / 12 =												52.4637	
HLP	Jan 1.0701	Feb 1.0669	Mar 1.0638	Apr 1.0493	May 1.0466	Jun 1.0339	Jul 1.0339	Aug 1.0315	Sep 1.0388	Oct 1.0466	Nov 1.0521	Dec 1.0578	(40)
HLP (average)												1.0493	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)													

Assumed occupancy													1.6901 (42)
Hot water usage for mixer showers													
52.5569	51.7671	50.6162	48.4141	46.7890	44.9767	43.9465	45.0888	46.3409	48.2867	50.5361	52.3556	52.3556	(42a)
Hot water usage for baths													
22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476	22.6476	(42b)
Hot water usage for other uses													
31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383	31.9383	(42c)
Average daily hot water use (litres/day)													98.5597 (43)
Daily hot water use	Jan 107.2197	Feb 104.9310	Mar 102.1434	Apr 97.9036	May 94.4609	Jun 90.7597	Jul 89.3366	Aug 92.1121	Sep 95.0395	Oct 98.9252	Nov 103.2304	Dec 106.9415	(44)
Energy conte	169.8097	149.4203	156.9906	134.0251	127.1626	111.5996	108.0448	114.0541	117.1932	134.2406	147.0706	167.4445	(45)
Energy content (annual)										Total = Sum(45)m =		1637.0557	
Distribution loss (46)m = 0.15 x (45)m	25.4715	22.4130	23.5486	20.1038	19.0744	16.7399	16.2067	17.1081	17.5790	20.1361	22.0606	25.1167	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	216.4047	191.5060	203.5855	179.1170	173.7575	156.6915	154.6398	160.6490	162.2850	180.8355	192.1624	214.0394	(62)
WWHRS	-24.0268	-21.2495	-22.2513	-18.4249	-17.1714	-14.6937	-13.7730	-14.6462	-15.2026	-17.9222	-20.3037	-23.5819	(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	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		1962.4258	(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	93.7377	83.3508	89.4753	80.6368	79.5575	73.1803	73.2008	75.1989	75.0402	81.9109	84.9744	92.9512	(65)

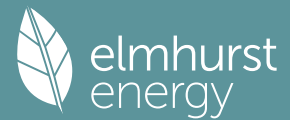
5. Internal gains (see Table 5 and 5a)													

Metabolic gains (Table 5), Watts													
(66)m	Jan 84.5050	Feb 84.5050	Mar 84.5050	Apr 84.5050	May 84.5050	Jun 84.5050	Jul 84.5050	Aug 84.5050	Sep 84.5050	Oct 84.5050	Nov 84.5050	Dec 84.5050	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	75.0263	83.0649	75.0263	77.5272	75.0263	77.5272	75.0263	75.0263	77.5272	75.0263	77.5272	75.0263	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	(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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	(71)
Water heating gains (Table 5)	125.9915	124.0340	120.2625	111.9956	106.9321	101.6394	98.3882	101.0738	104.2225	110.0953	118.0201	124.9344	(72)
Total internal gains	399.6033	407.2121	391.5520	377.5897	359.6789	344.1628	331.9144	333.0722	342.5719	357.1402	377.9122	392.0499	(73)

6. Solar gains													

[Jan]	Area	Solar flux	g	FF	Access	Gains							

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					m2	Table 6a	Specific data		Specific data		factor		W
						W/m2	or Table 6b		or Table 6c		Table 6d		
North					4.8600	10.6334	0.6300		0.7000		0.7700		15.7936 (74)
West					4.8600	19.6403	0.6300		0.7000		0.7700		29.1713 (80)
Solar gains	44.9648	87.2475	145.2654	219.4419	278.9479	290.7522	274.6204	228.6174	170.9643	103.6407	55.8565	37.1553 (83)	
Total gains	444.5681	494.4596	536.8174	597.0316	638.6268	634.9150	606.5349	561.6896	513.5362	460.7809	433.7687	429.2052 (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	68.6446	68.8480	69.0487	70.0068	70.1890	71.0499	71.0499	71.2117	70.7158	70.1890	69.8213	69.4411	
alpha	5.5763	5.5899	5.6032	5.6671	5.6793	5.7367	5.7367	5.7474	5.7144	5.6793	5.6548	5.6294	
util living area	0.9897	0.9801	0.9561	0.8748	0.7158	0.5151	0.3742	0.4207	0.6682	0.9112	0.9781	0.9913 (86)	
MIT	20.0569	20.2214	20.4629	20.7652	20.9383	20.9920	20.9989	20.9980	20.9682	20.7404	20.3598	20.0350 (87)	
Th 2	20.0253	20.0279	20.0305	20.0425	20.0447	20.0552	20.0552	20.0571	20.0512	20.0447	20.0402	20.0354 (88)	
util rest of house	0.9863	0.9739	0.9426	0.8409	0.6567	0.4418	0.2943	0.3354	0.5883	0.8784	0.9701	0.9886 (89)	
MIT 2	18.9504	19.1591	19.4596	19.8215	19.9983	20.0512	20.0549	20.0565	20.0324	19.8050	19.3446	18.9304 (90)	
Living area fraction	fLA = Living area / (4) =											0.5800 (91)	
MIT	19.5922	19.7752	20.0415	20.3688	20.5435	20.5969	20.6024	20.6026	20.5751	20.3475	19.9334	19.5711 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.5922	19.7752	20.0415	20.3688	20.5435	20.5969	20.6024	20.6026	20.5751	20.3475	19.9334	19.5711 (93)	
8. Space heating requirement													
Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9845	0.9720	0.9427	0.8533	0.6884	0.4841	0.3407	0.3849	0.6335	0.8899	0.9691	0.9869 (94)	
Useful gains	437.6794	480.6043	506.0769	509.4487	439.6157	307.3856	206.6167	216.1937	325.3361	410.0443	420.3500	423.5655 (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	818.2154	793.5530	720.3041	601.7033	462.7649	310.0025	206.9021	216.7537	336.3082	510.0690	675.0841	813.0040 (97)	
Space heating kWh	283.1188	210.3016	159.3850	66.4234	17.2230	0.0000	0.0000	0.0000	0.0000	74.4184	183.4086	289.7423 (98a)	
Space heating requirement - total per year (kWh/year)												1284.0210	
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	283.1188	210.3016	159.3850	66.4234	17.2230	0.0000	0.0000	0.0000	0.0000	74.4184	183.4086	289.7423 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												1284.0210	
Space heating per m2	(98c) / (4) =											25.6804 (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	283.1188	210.3016	159.3850	66.4234	17.2230	0.0000	0.0000	0.0000	0.0000	74.4184	183.4086	289.7423 (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)	306.7376	227.8457	172.6815	71.9647	18.6598	0.0000	0.0000	0.0000	0.0000	80.6266	198.7092	313.9136 (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	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)	
Efficiency of water heater (217)m	84.9249	84.5346	83.7717	82.2377	80.6096	79.8000	79.8000	79.8000	79.8000	82.4193	84.2059	79.8000 (216)	
Fuel for water heating, kWh/month	226.5270	201.4044	216.4623	195.3995	194.2525	177.9421	176.5248	182.9609	184.3137	197.6640	204.0934	84.9979 (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	15.5890	12.5061	11.2603	8.2498	6.3724	5.2063	5.8131	7.5561	9.8146	12.8773	14.5449	16.0223 (232)	
Electricity generated by PVs (Appendix M) (negative quantity)	-13.5448	-20.1482	-30.5464	-36.3011	-40.8904	-38.8328	-38.3821	-35.3747	-30.3634	-23.9074	-15.2675	-11.5923 (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)	-4.7577	-10.2399	-20.7835	-31.8493	-42.7264	-43.1339	-42.6040	-35.7726	-25.8439	-14.8261	-6.4119	-3.7437 (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												1391.1387 (211)	
Space heating fuel - main system 2												0.0000 (213)	
Space heating fuel - secondary												0.0000 (215)	

Full SAP Calculation Printout



Efficiency of water heater	79.8000	
Water heating fuel used	2381.6179	(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)	125.8121	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-617.8438	(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	3366.7248	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1391.1387	0.2100	292.1391 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2381.6179	0.2100	500.1398 (264)
Space and water heating			792.2789 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	125.8121	0.1443	18.1586 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-335.1512	0.1335	-44.7267
PV Unit electricity exported	-282.6926	0.1253	-35.4284
Total			-80.1551 (269)
Total CO2, kg/year			742.2116 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.8400 (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	1391.1387	1.1300	1571.9867 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2381.6179	1.1300	2691.2282 (278)
Space and water heating			4263.2149 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	125.8121	1.5338	192.9748 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-335.1512	1.4932	-500.4318
PV Unit electricity exported	-282.6926	0.4600	-130.0391
Total			-630.4709 (283)
Total Primary energy kWh/year			3955.8195 (286)
Target Primary Energy Rate (TPER)			79.1200 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	50

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

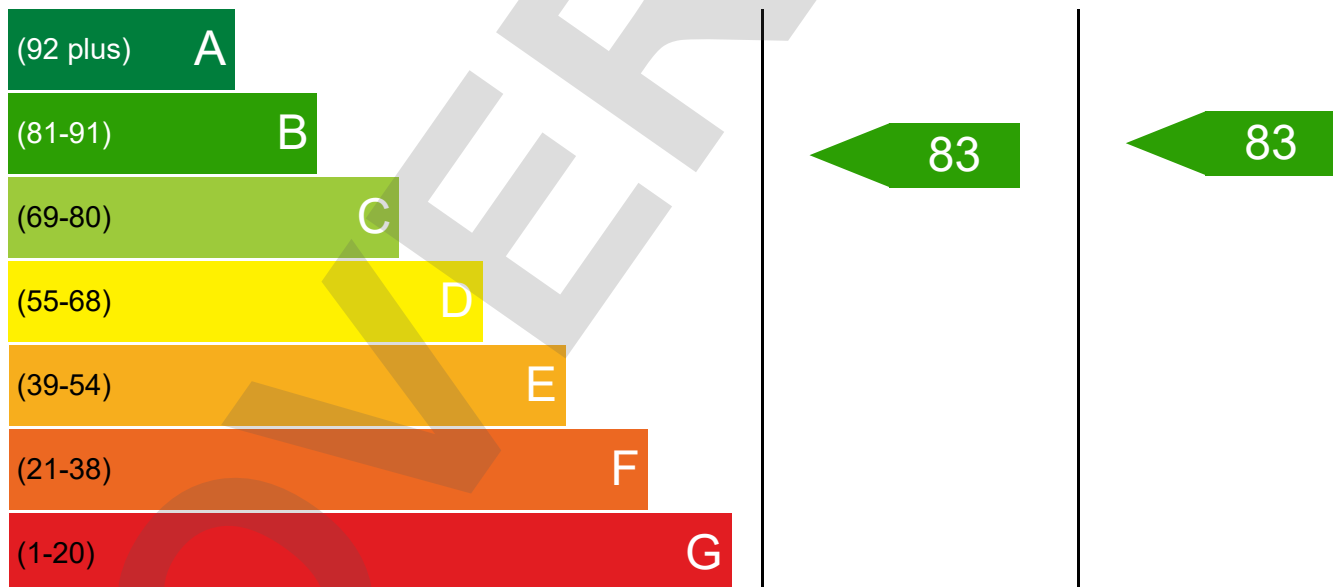
Energy Rating

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



Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
-----------	------	---------	------	-----------

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.14 W/m ² K	Very Good
Floor	Average thermal transmittance 0.09 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer and at least two room thermostats	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 54 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: **0.2** 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

£310

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 1-2	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	86 B	DER	3.96	TER	9.90
Environmental	97 A	% DER < TER			60.00
CO ₂ Emissions (t/year)	0.27	DFEE	17.37	TFEE	22.20
Compliance Check	See BREL	% DFEE < TFEE			21.76
% DPER < TPER	16.59	DPER	43.42	TPER	52.06

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2022	
3.0 Property Age Band	L	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

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:	20.30 m	74.00 m ²	2.50 m
1st Storey:	11.60 m	31.40 m ²	3.00 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	27.20	m ²
-----------------	-------	----------------

9.0 External Walls										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
1st-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	33.06	33.06	0.00	None	0.00	Enter Gross Area
1st-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	26.40	18.07	0.00	None	8.33	Enter Gross Area
1st-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	7.20	7.20	0.00	None	0.00	Enter Gross Area

10.1 Party Ceilings				
Description	Construction	Kappa (kJ/m ² K)	Area (m ²)	
Party Ceiling	Precast concrete planks floor, screed, carpeted	30.00	74.00	

11.1 Party Floors				
Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)

Summary for Input Data

Party Floor Lowest occupied Precast concrete planks floor, screed, carpeted 30.00 74.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
1st-W-Door	Door	1st-S-Wall	West	2.78	0
1st-W-Window	Window	1st-S-Wall	West	5.55	0

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

User Input

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		20.30	0.00	0.00	No
E6 Intermediate floor within a dwelling		20.30	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value 0.04 W/m²K

Description Bridge

18.0 Pressure Testing

Yes

Designed AP₅₀ 3.00 m³/(h.m²) @ 50 Pa

Property Tested? Yes

Test Method Blower Door

As Built AP₅₀ 0.10 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present Yes

Approved Installation No

Mechanical Ventilation data Type Database

Type Balanced mechanical ventilation with heat recovery

MV Reference Number 500500

Configuration 2

Manufacturer SFP 0.59

Duct Type Rigid

MVHR Efficiency 89.00

Wet Rooms 2

SFP from Installer Commissioning Certificate No

MVHR System Location Inside heated envelope (installed exclusively)

Duct Installation Specification Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

No

22.0 Lighting

No Fixed Lighting No

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	12

24.0 Main Heating 1

SAP table

Description Electric Boiler

Percentage of Heat 100.00 %

Database Ref. No. 0

Summary for Input Data

Fuel Type	Electricity
SAP Code	191
In Winter	100.00
In Summer	100.00
Controls SAP Code	2106
Delayed Start Stat	No
Burner Control	On/Off
HETAS approved System	No
Oil Pump Inside	No
Flue Type	Balanced
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	No
Electric CPSU Temperature	60.00
Combi boiler type	No Combi
Combi keep hot type	Electric, time clock

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									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes

Summary for Input Data

Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

Export Capable Meter?
Connected To Dwelling
Diverter
Battery Capacity [kWh]

One Dwelling

No

Yes

No

3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

Electricity Generated
Apportioned
Connected to dwelling's electricity meter
Electricity Generation

None

0.00

0.00

Yes

Annual

kWh/Year

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

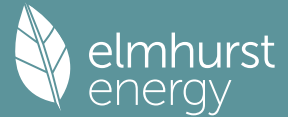
Lower cost measures

None

Further measures to achieve even higher standards

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

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2			Issued on Date	20/10/2023
Assessment Reference	Flat 1-2	Prop Type Ref	22403		
Property	Braemar Avenue, London, Greater London, N22 7BY				
SAP Rating	86 B	DER	3.96	TER	9.90
Environmental	97 A	% DER < TER			60.00
CO ₂ Emissions (t/year)	0.27	DFEE	17.37	TFEE	22.20
Compliance Check	See BREL	% DFEE < TFEE			21.76
% DPER < TPER	16.59	DPER	43.42	TPER	52.06
Assessor Details	Mr. Kamran Afshar			Assessor ID	AM23-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		
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	0 * 10 = 0.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

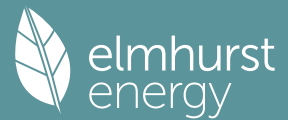
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.0000	(17)
Infiltration rate	0.1500	(18)
Number of sides sheltered	3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1162 (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	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2477	0.2448	0.2419	0.2274	0.2245	0.2099	0.2099	0.2070	0.2157	0.2245	0.2303	0.2361 (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
Door			2.7800	0.9000	2.5020		(26a)
Window (Uw = 0.90)			5.5500	0.8687	4.8214		(27)
1st-W-Wall	33.0600		33.0600	0.1400	4.6284	190.0000	6281.4003 (29a)
1st-S-Wall	26.4000	8.3300	18.0700	0.1400	2.5298	190.0000	3433.2999 (29a)
1st-E-Wall	7.2000		7.2000	0.1400	1.0080	190.0000	1368.0000 (29a)
Total net area of external elements Aum(A, m ²)			66.6600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	15.4896		(33)
Party Floor			74.0000			40.0000	2960.0000 (32d)
Party Ceiling			74.0000			2220.0000	(32b)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16262.7002 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							219.7662 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							2.6664 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	18.1560 (37)

Full SAP Calculation Printout



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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	15.1232	14.9458	14.7684	13.8812	13.7038	12.8167	12.8167	12.6393	13.1715	13.7038	14.0587	14.4135	(38)
Heat transfer coeff	33.2793	33.1018	32.9244	32.0373	31.8598	30.9727	30.9727	30.7953	31.3276	31.8598	32.2147	32.5696	(39)
Average = Sum(39)m / 12 =												31.9929	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.4497	0.4473	0.4449	0.4329	0.4305	0.4186	0.4186	0.4162	0.4233	0.4305	0.4353	0.4401	(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													2.3392 (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	27.4046	26.9976	26.4245	25.3677	24.5764	23.6990	23.2251	23.7942	24.4139	25.3527	26.4313	27.3120	(42b)
Hot water usage for other uses	38.5857	37.1826	35.7795	34.3763	32.9732	31.5701	31.5701	32.9732	34.3763	35.7795	37.1826	38.5857	(42c)
Average daily hot water use (litres/day)												60.4863	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	65.9903	64.1802	62.2039	59.7441	57.5497	55.2691	54.7952	56.7674	58.7902	61.1322	63.6138	65.8977	(44)
Energy content (annual)	104.5125	91.3917	95.6051	81.7866	77.4729	67.9598	66.2700	70.2899	72.4942	82.9558	90.6296	103.1798	(45)
Distribution loss (46)m = 0.15 x (45)m												1004.5481	
Water storage loss:	15.6769	13.7088	14.3408	12.2680	11.6209	10.1940	9.9405	10.5435	10.8741	12.4434	13.5944	15.4770	(46)
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												1.0140	(55)
Total storage loss	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(56)
If cylinder contains dedicated solar storage	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(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	135.9465	119.7837	127.0391	112.2066	108.9069	98.3798	97.7040	101.7239	102.9142	114.3898	121.0496	134.6138	(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	135.9465	119.7837	127.0391	112.2066	108.9069	98.3798	97.7040	101.7239	102.9142	114.3898	121.0496	134.6138	(64)
12Total per year (kWh/year)												1374.6581	(64)
Electric shower(s)	50.8051	45.2677	49.4306	47.1711	48.0562	45.8410	47.3690	48.0562	47.1711	49.4306	48.5012	50.8051	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												577.9048	(64a)
Heat gains from water heating, kWh/month	47.4517	41.7047	44.1464	38.9868	37.7738	34.0569	33.8770	35.3855	35.8971	39.9405	42.2596	47.0086	(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	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	127.1810	140.8075	127.1810	131.4203	127.1810	131.4203	127.1810	127.1810	131.4203	127.1810	131.4203	127.1810	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383	(68)
Pumps, fans	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	(69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	(71)
Total internal gains	63.7791	62.0605	59.3365	54.1484	50.7712	47.3012	45.5336	47.5611	49.8571	53.6834	58.6939	63.1835	(72)
	458.4953	472.5455	450.7965	438.3550	416.2310	400.3654	385.2494	385.1346	397.0684	411.1481	434.9054	448.7907	(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	

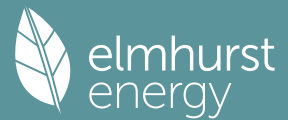
West					5.5500	19.6403	0.4000	0.7000		0.7700		21.1510 (80)	

Solar gains	21.1510	41.3759	68.1402	99.3785	121.7920	124.6758	118.6965	101.9585	79.2499	49.0960	26.3729	17.3936	(83)
Total gains	479.6463	513.9214	518.9367	537.7334	538.0230	525.0412	503.9459	487.0931	476.3183	460.2441	461.2783	466.1843	(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	135.7427	136.4703	137.2057	141.0050	141.7903	145.8515	145.8515	146.6918	144.1994	141.7903	140.2284	138.7006	
alpha	10.0495	10.0980	10.1470	10.4003	10.4527	10.7234	10.7234	10.7795	10.6133	10.4527	10.3486	10.2467	
util living area	0.9612	0.9255	0.8678	0.7140	0.5502	0.3775	0.2704	0.2908	0.4538	0.7133	0.8977	0.9657	(86)

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MIT	20.8234	20.8931	20.9495	20.9931	20.9995	21.0000	21.0000	21.0000	20.9999	20.9943	20.9370	20.8187 (87)
Th 2	20.5671	20.5694	20.5716	20.5827	20.5849	20.5960	20.5960	20.5983	20.5916	20.5849	20.5805	20.5760 (88)
util rest of house	0.9542	0.9140	0.8506	0.6911	0.5258	0.3537	0.2456	0.2654	0.4269	0.6866	0.8819	0.9593 (89)
MIT 2	20.4111	20.4780	20.5307	20.5777	20.5846	20.5960	20.5960	20.5983	20.5916	20.5810	20.5291	20.4151 (90)
Living area fraction									fLA = Living area / (4) =			0.3676 (91)
MIT	20.5626	20.6306	20.6846	20.7304	20.7371	20.7445	20.7445	20.7459	20.7417	20.7329	20.6790	20.5634 (92)
Temperature adjustment												0.0000
adjusted MIT	20.5626	20.6306	20.6846	20.7304	20.7371	20.7445	20.7445	20.7459	20.7417	20.7329	20.6790	20.5634 (93)

8. Space heating requirement

Utilisation	Jan 0.9541	Feb 0.9157	Mar 0.8553	Apr 0.6993	May 0.5348	Jun 0.3625	Jul 0.2547	Aug 0.2748	Sep 0.4368	Oct 0.6962	Nov 0.8858	Dec 0.9591 (94)
Useful gains	457.6386	470.6213	443.8239	376.0146	287.7265	190.3103	128.3672	133.8343	208.0496	320.4239	408.5851	447.1390 (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	541.2083	520.7114	467.0199	379.0131	287.9209	190.3126	128.3673	133.8344	208.0674	322.8322	437.4434	532.9495 (97)
Space heating kWh	62.1759	33.6606	17.2578	2.1589	0.1446	0.0000	0.0000	0.0000	0.0000	1.7918	20.7780	63.8430 (98a)
Space heating requirement - total per year (kWh/year)												201.8107
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	62.1759	33.6606	17.2578	2.1589	0.1446	0.0000	0.0000	0.0000	0.0000	1.7918	20.7780	63.8430 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												201.8107
Space heating per m2										(98c) / (4) =		2.7272 (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 %)												100.0000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	Jan 62.1759	Feb 33.6606	Mar 17.2578	Apr 2.1589	May 0.1446	Jun 0.0000	Jul 0.0000	Aug 0.0000	Sep 0.0000	Oct 1.7918	Nov 20.7780	Dec 63.8430 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	62.1759	33.6606	17.2578	2.1589	0.1446	0.0000	0.0000	0.0000	0.0000	1.7918	20.7780	63.8430 (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	135.9465	119.7837	127.0391	112.2066	108.9069	98.3798	97.7040	101.7239	102.9142	114.3898	121.0496	134.6138 (64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)
Fuel for water heating, kWh/month	135.9465	119.7837	127.0391	112.2066	108.9069	98.3798	97.7040	101.7239	102.9142	114.3898	121.0496	134.6138 (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	19.3158	17.4465	19.3158	18.6927	19.3158	18.6927	19.3158	18.6927	19.3158	18.6927	19.3158	19.3158 (231)
Lighting	25.2570	20.2621	18.2438	13.3662	10.3244	8.4352	9.4183	12.2423	15.9015	20.8636	23.5654	25.9590 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-10.1810	-18.5962	-35.1836	-50.4539	-63.8481	-63.2842	-62.0221	-53.0753	-39.3120	-24.5769	-12.3602	-8.2586 (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												201.8107 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												100.0000
Water heating fuel used												1374.6581 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)												
mechanical ventilation fans (SFP = 0.8260)												186.4282 (230a)
central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												227.4282 (231)
Electricity for lighting (calculated in Appendix L)												203.8389 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-441.1521 (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												2144.4887 (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 (high-rate cost)	181.6296	0.1678	30.4791 (261)
Space heating - main system 1 (low-rate cost)	20.1811	0.1409	2.8428 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	151.0120	0.1477	22.3105 (264)
Water heating - low rate cost	1223.6461	0.1240	151.7249 (264)
Energy for instantaneous electric shower(s)	577.9048	0.1436	83.0026 (264a)
Space and water heating			207.3573 (265)
Pumps, fans and electric keep-hot	227.4282	0.1432	31.7396 (267)
Energy for lighting	203.8389	0.1490	30.3760 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-441.1521	0.1344	-59.2811
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-59.2811 (269)
Total CO2, kg/year			293.1944 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.9600 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1 (high-rate cost)	181.6296	1.4624	295.1219 (275)
Space heating - main system 1 (low-rate cost)	20.1811	1.5111	30.4964 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	151.0120	1.5523	234.4113 (278)
Water heating - low rate cost	1223.6461	1.4437	1766.5324 (278)
Energy for instantaneous electric shower(s)	577.9048	1.5350	887.1044 (278a)
Space and water heating			2326.5621 (279)
Pumps, fans and electric keep-hot	227.4282	1.5335	344.9304 (281)
Energy for lighting	203.8389	1.5547	316.9174 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-441.1521	1.5013	-662.2808
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-662.2808 (283)
Total Primary energy kWh/year			3213.2335 (286)
Dwelling Primary energy Rate (DPER)			43.4200 (287)

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	74.0000 (1b)	x 2.5000 (2b)	= 185.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 185.0000 (5)

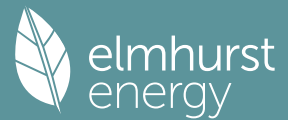
2. Ventilation rate

	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)+(7a)+(7b)+(7c)	30.0000 / (5) = 0.1622 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4122 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3194 (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	0.4073	0.3993	0.3913	0.3514	0.3434	0.3035	0.3035	0.2955	0.3194	0.3434	0.3594	0.3753 (22b)
Effective ac	0.5829	0.5797	0.5766	0.5617	0.5590	0.5460	0.5460	0.5437	0.5510	0.5590	0.5646	0.5704 (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						
TER Semi-glazed door			2.7800	1.0000	2.7800			(26a)					
TER Opening Type (Uw = 1.20)			5.5500	1.1450	6.3550			(27)					
1st-W-Wall	33.0600		33.0600	0.1800	5.9508			(29a)					
1st-S-Wall	26.4000	8.3300	18.0700	0.1800	3.2526			(29a)					
1st-E-Wall	7.2000		7.2000	0.1800	1.2960			(29a)					
Total net area of external elements Aum(A, m2)			66.6600					(31)					
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		19.6344			(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							229.7662	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value	Total							
E5 Ground floor (normal)				20.3000	0.1600	3.2480							
E6 Intermediate floor within a dwelling				20.3000	0.0000	0.0000							
E16 Corner (normal)				6.0000	0.0900	0.5400							
E18 Party wall between dwellings				6.0000	0.0600	0.3600							
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.1480	(36)					
Point Thermal bridges						(36a) =	0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	23.7824	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 35.5881	Feb 35.3915	Mar 35.1988	Apr 34.2936	May 34.1243	Jun 33.3359	Jul 33.3359	Aug 33.1899	Sep 33.6396	Oct 34.1243	Nov 34.4669	Dec 34.8250	(38)
Heat transfer coeff	59.3705	59.1738	58.9811	58.0760	57.9066	57.1182	57.1182	56.9722	57.4219	57.9066	58.2492	58.6074	(39)
Average = Sum(39)m / 12 =												58.0752	
HLP	Jan 0.8023	Feb 0.7996	Mar 0.7970	Apr 0.7848	May 0.7825	Jun 0.7719	Jul 0.7719	Aug 0.7699	Sep 0.7760	Oct 0.7825	Nov 0.7872	Dec 0.7920	(40)
HLP (average)												0.7848	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)													

Assumed occupancy													2.3392 (42)
Hot water usage for mixer showers													
63.4403	62.4869	61.0976	58.4395	56.4779	54.2903	53.0469	54.4256	55.9370	58.2858	61.0010	63.1972	(42a)	
Hot water usage for baths													
27.4046	26.9976	26.4245	25.3677	24.5764	23.6990	23.2251	23.7942	24.4139	25.3527	26.4313	27.3120	(42b)	
Hot water usage for other uses													
38.5857	37.1826	35.7795	34.3763	32.9732	31.5701	31.5701	32.9732	34.3763	35.7795	37.1826	38.5857	(42c)	
Average daily hot water use (litres/day)												118.9761	(43)
Daily hot water use	Jan 129.4306	Feb 126.6671	Mar 123.3016	Apr 118.1836	May 114.0275	Jun 109.5594	Jul 107.8421	Aug 111.1931	Sep 114.7272	Oct 119.4180	Nov 124.6149	Dec 129.0949	(44)
Energy conte	204.9864	180.3722	189.5099	161.7874	153.5030	134.7161	130.4256	137.6802	141.4701	162.0491	177.5367	202.1314	(45)
Energy content (annual)										Total = Sum(45)m =		1976.1681	
Distribution loss (46)m = 0.15 x (45)m													
30.7480	27.0558	28.4265	24.2681	23.0254	20.2074	19.5638	20.6520	21.2205	24.3074	26.6305	30.3197	(46)	
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	251.5813	222.4579	236.1048	206.8792	200.0979	179.8079	177.0205	184.2751	186.5620	208.6440	222.6285	248.7263	(62)
WWHRS	-29.0022	-25.6498	-26.8590	-22.2403	-20.7272	-17.7364	-16.6250	-17.6791	-18.3508	-21.6335	-24.5082	-28.4652	(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	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611	(64)
12Total per year (kWh/year)									Total per year (kWh/year) = Sum(64)m =			2255.3088	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
												0.0000	(64a)
Heat gains from water heating, kWh/month	105.4339	93.6423	100.2880	89.8678	88.3157	80.8666	80.6424	83.0546	83.1123	91.1572	95.1044	104.4846	(65)

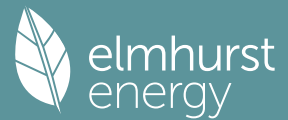
5. Internal gains (see Table 5 and 5a)													

Metabolic gains (Table 5), Watts													
(66)m	Jan 116.9597	Feb 116.9597	Mar 116.9597	Apr 116.9597	May 116.9597	Jun 116.9597	Jul 116.9597	Aug 116.9597	Sep 116.9597	Oct 116.9597	Nov 116.9597	Dec 116.9597	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	127.1810	140.8075	127.1810	131.4203	127.1810	131.4203	127.1810	127.1810	131.4203	127.1810	131.4203	127.1810	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	(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)	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	(71)
Water heating gains (Table 5)	141.7122	139.3487	134.7956	124.8164	118.7038	112.3147	108.3904	111.6325	115.4337	122.5232	132.0895	140.4363	(72)
Total internal gains	536.4284	549.8337	526.2556	509.0230	484.1636	465.3789	448.1062	449.2061	462.6451	479.9879	508.3010	526.0434	(73)

6. Solar gains													

[Jan]	Area	Solar flux	g	FF	Access	Gains							

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				m2	Table 6a W/m2	Specific data or Table 6b		Specific data or Table 6c		factor Table 6d		W
West				5.5500	19.6403	0.6300		0.7000		0.7700		33.3129 (80)
Solar gains	33.3129	65.1671	107.3209	156.5211	191.8224	196.3644	186.9469	160.5846	124.8186	77.3262	41.5372	27.3949 (83)
Total gains	569.7412	615.0007	633.5764	665.5440	675.9861	661.7433	635.0531	609.7907	587.4637	557.3141	549.8382	553.4383 (84)

7. Mean internal temperature (heating season)												

Temperature during heating periods in the living area from Table 9, Th1 (C)												
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	79.5509	79.8152	80.0760	81.3240	81.5619	82.6876	82.6876	82.8995	82.2503	81.5619	81.0822	80.5866
alpha	6.3034	6.3210	6.3384	6.4216	6.4375	6.5125	6.5125	6.5266	6.4834	6.4375	6.4055	6.3724
util living area	0.9868	0.9768	0.9565	0.8876	0.7507	0.5472	0.3952	0.4288	0.6564	0.8966	0.9715	0.9887 (86)
MIT	20.2875	20.4154	20.5858	20.8134	20.9482	20.9942	20.9994	20.9990	20.9823	20.8291	20.5412	20.2723 (87)
Th 2	20.2513	20.2536	20.2559	20.2665	20.2685	20.2778	20.2778	20.2795	20.2742	20.2685	20.2645	20.2603 (88)
util rest of house	0.9834	0.9709	0.9454	0.8617	0.7044	0.4877	0.3306	0.3622	0.5942	0.8675	0.9633	0.9857 (89)
MIT 2	19.4276	19.5899	19.8031	20.0813	20.2257	20.2744	20.2776	20.2791	20.2625	20.1051	19.7577	19.4156 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.7436	19.8933	20.0908	20.3504	20.4912	20.5389	20.5429	20.5437	20.5271	20.3712	20.0457	19.7305 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.7436	19.8933	20.0908	20.3504	20.4912	20.5389	20.5429	20.5437	20.5271	20.3712	20.0457	19.7305 (93)

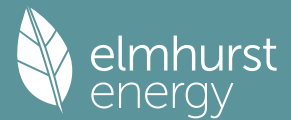
8. Space heating requirement												

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9805	0.9675	0.9426	0.8649	0.7190	0.5094	0.3544	0.3867	0.6164	0.8720	0.9604	0.9831 (94)
Useful gains	558.6497	595.0249	597.2024	575.6293	486.0203	337.0781	225.0404	235.7805	362.1055	485.9832	528.0471	544.0916 (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	916.8953	887.2140	801.6015	664.9941	509.0709	339.2223	225.2104	236.0763	369.0570	565.8194	754.0760	910.2031 (97)
Space heating kWh	266.5347	196.3511	152.0730	64.3427	17.1496	0.0000	0.0000	0.0000	0.0000	59.3982	162.7408	272.3869 (98a)
Space heating requirement - total per year (kWh/year)	1190.9769											
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	266.5347	196.3511	152.0730	64.3427	17.1496	0.0000	0.0000	0.0000	0.0000	59.3982	162.7408	272.3869 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1190.9769											
Space heating per m2	(98c) / (4) = 16.0943 (99)											

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

Fraction of space heat from secondary/supplementary system (Table 11)												
Fraction of space heat from main system(s)												
Efficiency of main space heating system 1 (in %)												
Efficiency of main space heating system 2 (in %)												
Efficiency of secondary/supplementary heating system, %												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	266.5347	196.3511	152.0730	64.3427	17.1496	0.0000	0.0000	0.0000	0.0000	59.3982	162.7408	272.3869 (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)	288.7700	212.7314	164.7594	69.7104	18.5803	0.0000	0.0000	0.0000	0.0000	64.3534	176.3172	295.1104 (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	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611 (64)
Water heating requirement	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611 (64)
Efficiency of water heater	84.4650	84.0546	83.3557	81.9463	80.5121	79.8000	79.8000	79.8000	79.8000	81.7984	83.6221	79.8000 (216)
(217)m	84.4650	84.0546	83.3557	81.9463	80.5121	79.8000	79.8000	79.8000	79.8000	81.7984	83.6221	84.5373 (217)
Fuel for water heating, kWh/month	263.5164	234.1433	251.0275	225.3169	222.7873	203.0972	200.9969	208.7670	210.7910	228.6235	236.9233	260.5491 (219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (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	26.4257	21.1997	19.0880	13.9847	10.8021	8.8254	9.8541	12.8087	16.6372	21.8290	24.6558	27.1601 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-25.1847	-36.6412	-54.3141	-63.0226	-69.6324	-65.6001	-64.8238	-60.4091	-52.8422	-42.8166	-28.1002	-21.6450 (233a)
(233a)m	-25.1847	-36.6412	-54.3141	-63.0226	-69.6324	-65.6001	-64.8238	-60.4091	-52.8422	-42.8166	-28.1002	-21.6450 (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)	-10.9322	-23.3246	-46.9769	-71.4608	-95.3714	-96.1474	-94.9888	-79.9881	-58.0735	-33.6174	-14.6806	-8.6181 (233b)
(233b)m	-10.9322	-23.3246	-46.9769	-71.4608	-95.3714	-96.1474	-94.9888	-79.9881	-58.0735	-33.6174	-14.6806	-8.6181 (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	1290.3325 (211)											
Space heating fuel - main system 2	0.0000 (213)											
Space heating fuel - secondary	0.0000 (215)											
Efficiency of water heater	79.8000											

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Water heating fuel used	2746.5394 (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)	213.2705 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-1219.2118 (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	3116.9306 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1290.3325	0.2100	270.9698 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2746.5394	0.2100	576.7733 (264)
Space and water heating			847.7431 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	213.2705	0.1443	30.7815 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-585.0319	0.1339	-78.3558
PV Unit electricity exported	-634.1799	0.1255	-79.6073
Total			-157.9631 (269)
Total CO2, kg/year			732.4908 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.9000 (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	1290.3325	1.1300	1458.0757 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2746.5394	1.1300	3103.5895 (278)
Space and water heating			4561.6653 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	213.2705	1.5338	327.1213 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-585.0319	1.4950	-874.6003
PV Unit electricity exported	-634.1799	0.4608	-292.2026
Total			-1166.8029 (283)
Total Primary energy kWh/year			3852.0845 (286)
Target Primary Energy Rate (TPER)			52.0600 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
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

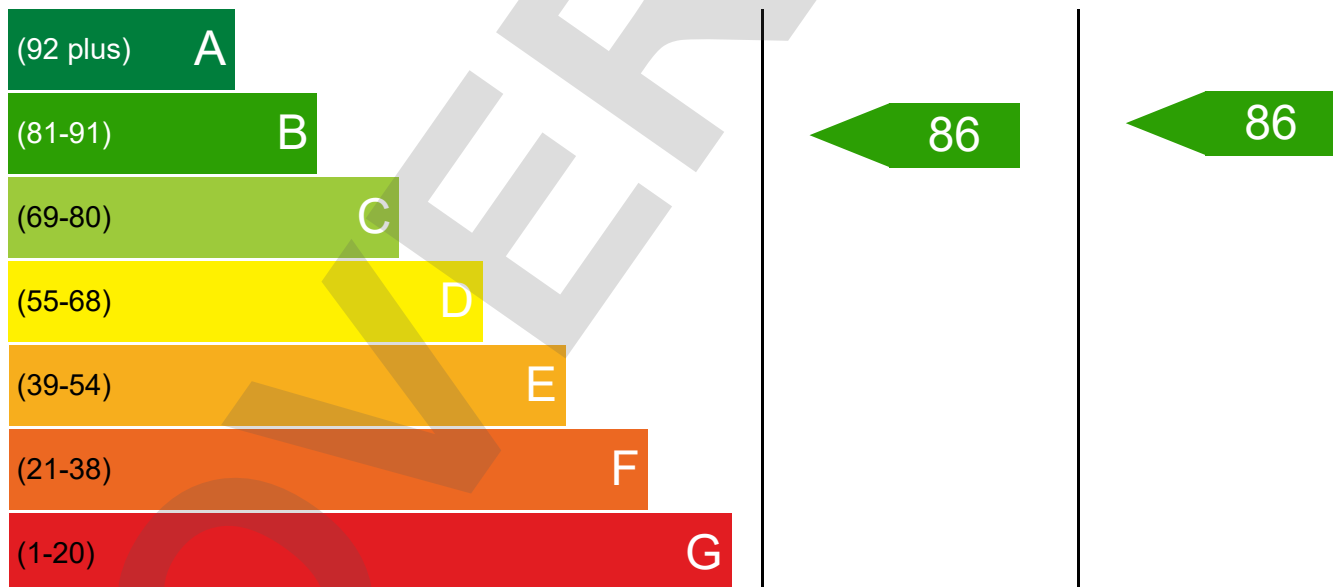
Energy Rating

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



Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor

Poor

Average

Good

Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.14 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 40 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: **0.3** per year

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

Recommendations

Overview Report

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

£338

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details	
Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details	
Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 1-3	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	86 B	DER	5.10	TER	12.74
Environmental	97 A	% DER < TER			59.97
CO ₂ Emissions (t/year)	0.22	DFEE	21.85	TFEE	27.23
Compliance Check	See BREL	% DFEE < TFEE			19.76
% DPER < TPER	17.35	DPER	55.60	TPER	67.27

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2022	
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	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

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:	17.40 m	50.00 m ²	2.50 m
1st Storey:	11.60 m	31.40 m ²	3.00 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	25.50	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
1st-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	26.10	23.32	0.00	None	2.78	Enter Gross Area
1st-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	26.10	14.99	0.00	None	11.11	Enter Gross Area

10.1 Party Ceilings				
Description	Construction	Kappa (kJ/m ² K)	Area (m ²)	
Party Ceiling	Precast concrete planks floor, screed, carpeted	30.00	50.00	

11.1 Party Floors				
Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Floor	Lowest occupied	Precast concrete planks floor, screed, carpeted	30.00	50.00

Summary for Input Data

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
1st-E-Door	Door	1st-E-Wall	East	2.78	0
1st-E-Windows	Window	1st-E-Wall	East	8.33	0
1st-S-Window	Window	1st-S-Wall	South	2.78	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		17.40	0.00	0.00	No
E6 Intermediate floor within a dwelling		17.40	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value W/m²K

Description

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	7

24.0 Main Heating 1

Description

Percentage of Heat %

Database Ref. No.

Fuel Type

Summary for Input Data

SAP Code	191
In Winter	100.00
In Summer	100.00
Controls SAP Code	2106
Delayed Start Stat	No
Burner Control	On/Off
HETAS approved System	No
Oil Pump Inside	No
Flue Type	Balanced
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	No
Electric CPSU Temperature	60.00
Combi boiler type	No Combi
Combi keep hot type	Electric, time clock

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									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	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	No

Summary for Input Data

Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

0 Photovoltaic Unit	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

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

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

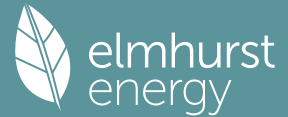
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023	
Assessment Reference	Flat 1-3			Prop Type Ref	22403		
Property	Braemar Avenue, London, Greater London, N22 7BY						
SAP Rating	86 B		DER	5.10		TER	12.74
Environmental	97 A		% DER < TER				59.97
CO ₂ Emissions (t/year)	0.22		DFEE	21.85		TFEE	27.23
Compliance Check	See BREL		% DFEE < TFEE				19.76
% DPER < TPER	17.35		DPER	55.60		TPER	67.27
Assessor Details	Mr. Kamran Afshar					Assessor ID	AM23-0001
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	50.0000 (1b)	2.5000 (2b)	125.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	125.0000 (5)

2. Ventilation rate

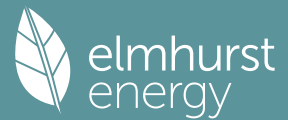
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (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)	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.1500 (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) = 0.1275 (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	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (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
Door			2.7800	0.9000	2.5020		(26a)
Window (Uw = 0.90)			11.1100	0.8687	9.6515		(27)
1st-S-Wall	26.1000	2.7800	23.3200	0.1400	3.2648	190.0000	4430.8001 (29a)
1st-E-Wall	26.1000	11.1100	14.9900	0.1400	2.0986	190.0000	2848.1001 (29a)
Total net area of external elements Aum(A, m ²)			52.2000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	17.5169		(33)
Party Floor			50.0000			40.0000	2000.0000 (32d)
Party Ceiling			50.0000			30.0000	1500.0000 (32b)
Heat capacity Cm = Sum (A x k)						(28)...(30) + (32) + (32a)...(32e) =	10778.9001 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							215.5780 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							2.0880 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	19.6049 (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	10.8101	10.6786	10.5471	9.8897	9.7582	9.1008	9.1008	8.9693	9.3637	9.7582	10.0212	10.2841	(38)
Heat transfer coeff	30.4150	30.2835	30.1521	29.4946	29.3631	28.7057	28.7057	28.5742	28.9687	29.3631	29.6261	29.8891	(39)
Average = Sum(39)m / 12 =												29.4618	
HLP	0.6083	0.6057	0.6030	0.5899	0.5873	0.5741	0.5741	0.5715	0.5794	0.5873	0.5925	0.5978	(40)
HLP (average)												0.5892	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.6901 (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	22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476	(42b)
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383	(42c)
Average daily hot water use (litres/day)												50.1040	(43)
Daily hot water use	54.6627	53.1639	51.5272	49.4895	47.6720	45.7830	45.3900	47.0234	48.6986	50.6385	52.6942	54.5859	(44)
Energy conte	86.5724	75.7046	79.1954	67.7487	64.1757	56.2956	54.8953	58.2247	60.0502	68.7160	75.0726	85.4684	(45)
Energy content (annual)										Total = Sum(45)m =		832.1197	
Distribution loss (46)m = 0.15 x (45)m	12.9859	11.3557	11.8793	10.1623	9.6263	8.4443	8.2343	8.7337	9.0075	10.3074	11.2609	12.8203	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												1.0140	(55)
Total storage loss	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(56)
If cylinder contains dedicated solar storage	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(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	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024	(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	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024	(64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				1202.2297	(64)
Electric shower(s)	42.0893	37.5019	40.9507	39.0787	39.8120	37.9768	39.2427	39.8120	39.0787	40.9507	40.1807	42.0893	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												478.7637	(64a)
Heat gains from water heating, kWh/month	39.3077	34.5473	36.5701	32.2961	31.2914	28.2125	28.0634	29.3127	29.7364	33.0857	35.0068	38.9406	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	74.2680	82.2253	74.2680	76.7436	74.2680	76.7436	74.2680	74.2680	76.7436	74.2680	76.7436	74.2680	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	(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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	(71)
Water heating gains (Table 5)	52.8329	51.4096	49.1534	44.8557	42.0584	39.1840	37.7196	39.3988	41.3005	44.4701	48.6206	52.3395	(72)
Total internal gains	325.6863	333.7482	319.6846	309.6662	294.0468	280.9238	270.4874	270.6389	278.8663	290.7565	307.7291	318.6966	(73)

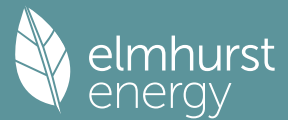
6. Solar gains

[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
East				8.3300	19.6403		0.4000		0.7000		0.7700		31.7456 (76)
South				2.7800	46.7521		0.4000		0.7000		0.7700		25.2195 (78)
Solar gains	56.9651	103.4042	154.8845	208.6211	244.7628	246.7590	236.4166	209.6130	173.9065	118.2375	69.4768		47.8980 (83)
Total gains	382.6514	437.1524	474.5691	518.2873	538.8096	527.6828	506.9041	480.2519	452.7728	408.9940	377.2058		366.5946 (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	98.4428	98.8702	99.3013	101.5147	101.9693	104.3046	104.3046	104.7845	103.3577	101.9693	101.0642	100.1750	
alpha	7.5629	7.5913	7.6201	7.7676	7.7980	7.9536	7.9536	7.9856	7.8905	7.7980	7.7376	7.6783	
util living area	0.9682	0.9258	0.8447	0.6763	0.5056	0.3481	0.2492	0.2737	0.4411	0.7257	0.9204	0.9742	(86)

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MIT	20.6282	20.7757	20.9015	20.9827	20.9982	20.9999	21.0000	21.0000	20.9995	20.9767	20.8246	20.6068 (87)
Th 2	20.4225	20.4249	20.4273	20.4391	20.4415	20.4534	20.4534	20.4557	20.4486	20.4415	20.4367	20.4320 (88)
util rest of house	0.9618	0.9131	0.8233	0.6479	0.4756	0.3184	0.2182	0.2413	0.4060	0.6921	0.9050	0.9688 (89)
MIT 2	20.0916	20.2327	20.3481	20.4267	20.4403	20.4533	20.4534	20.4557	20.4484	20.4254	20.2908	20.0795 (90)
Living area fraction									fLA = Living area / (4) =			0.5100 (91)
MIT	20.3652	20.5097	20.6304	20.7103	20.7248	20.7321	20.7321	20.7333	20.7294	20.7065	20.5630	20.3484 (92)
Temperature adjustment												0.0000
adjusted MIT	20.3652	20.5097	20.6304	20.7103	20.7248	20.7321	20.7321	20.7333	20.7294	20.7065	20.5630	20.3484 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9611	0.9151	0.8311	0.6617	0.4908	0.3335	0.2340	0.2578	0.4239	0.7082	0.9087	0.9680	(94)
Useful gains	367.7511	400.0319	394.4202	342.9585	264.4645	176.0071	118.6152	123.8190	191.9192	289.6621	342.7573	354.8485	(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	488.6245	472.7158	426.0593	348.3391	264.9976	176.0260	118.6161	123.8208	192.0465	296.7594	398.8572	482.6612	(97)
Space heating kWh	89.9298	48.8436	23.5395	3.8741	0.3966	0.0000	0.0000	0.0000	0.0000	5.2804	40.3920	95.0926	(98a)
Space heating requirement - total per year (kWh/year)												307.3485	
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	89.9298	48.8436	23.5395	3.8741	0.3966	0.0000	0.0000	0.0000	0.0000	5.2804	40.3920	95.0926	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												307.3485	
Space heating per m2										(98c) / (4) =		6.1470	(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 %)												100.0000 (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	89.9298	48.8436	23.5395	3.8741	0.3966	0.0000	0.0000	0.0000	0.0000	5.2804	40.3920	95.0926 (98)	
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)	
Space heating fuel (main heating system)	89.9298	48.8436	23.5395	3.8741	0.3966	0.0000	0.0000	0.0000	0.0000	5.2804	40.3920	95.0926 (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	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024 (64)	
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)	
Fuel for water heating, kWh/month	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024 (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	14.1806	12.8083	14.1806	13.7232	14.1806	13.7232	14.1806	14.1806	13.7232	14.1806	13.7232	14.1806 (231)	
Lighting	14.7490	11.8322	10.6536	7.8053	6.0290	4.9258	5.4999	7.1489	9.2858	12.1834	13.7611	15.1589 (232)	
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-10.1311	-18.3812	-34.3548	-48.4431	-60.5230	-59.7325	-58.6126	-50.5523	-37.8802	-24.0563	-12.2591	-8.2266 (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												307.3485 (211)	
Space heating fuel - main system 2												0.0000 (213)	
Space heating fuel - secondary												0.0000 (215)	
Efficiency of water heater												100.0000	
Water heating fuel used												1202.2297 (219)	
Space cooling fuel												0.0000 (221)	
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)													
mechanical ventilation fans (SFP = 0.8260)												125.9650 (230a)	
central heating pump												41.0000 (230c)	
Total electricity for the above, kWh/year												166.9650 (231)	
Electricity for lighting (calculated in Appendix L)												119.0328 (232)	
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-423.1528 (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 energav for all uses												1851.1869 (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 (high-rate cost)	276.6137	0.1673	46.2666 (261)
Space heating - main system 1 (low-rate cost)	30.7349	0.1404	4.3158 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	107.0985	0.1476	15.8103 (264)
Water heating - low rate cost	1095.1312	0.1239	135.6828 (264)
Energy for instantaneous electric shower(s)	478.7637	0.1436	68.7632 (264a)
Space and water heating			202.0754 (265)
Pumps, fans and electric keep-hot	166.9650	0.1432	23.3499 (267)
Energy for lighting	119.0328	0.1490	17.7382 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-423.1528	0.1346	-56.9607
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-56.9607 (269)
Total CO2, kg/year			254.9661 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.1000 (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 (high-rate cost)	276.6137	1.4606	448.9264 (275)
Space heating - main system 1 (low-rate cost)	30.7349	1.5094	46.3902 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	107.0985	1.5518	166.2006 (278)
Water heating - low rate cost	1095.1312	1.4433	1580.5703 (278)
Energy for instantaneous electric shower(s)	478.7637	1.5350	734.9193 (278a)
Space and water heating			2242.0874 (279)
Pumps, fans and electric keep-hot	166.9650	1.5335	253.4523 (281)
Energy for lighting	119.0328	1.5547	185.0655 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-423.1528	1.5021	-635.6184
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-635.6184 (283)
Total Primary energy kWh/year			2779.9062 (286)
Dwelling Primary energy Rate (DPER)			55.6000 (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	50.0000 (1b)	x 2.5000 (2b)	= 125.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 125.0000 (5)

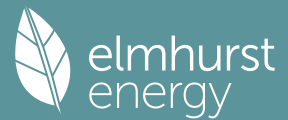
2. Ventilation rate

	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	2 * 10 = 20.0000 (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)	20.0000 / (5) = 0.1600 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4100 (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) = 0.3485 (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	0.4443	0.4356	0.4269	0.3834	0.3746	0.3311	0.3311	0.3224	0.3485	0.3746	0.3921	0.4095 (22b)
Effective ac	0.5987	0.5949	0.5911	0.5735	0.5702	0.5548	0.5548	0.5520	0.5607	0.5702	0.5769	0.5838 (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						
TER Semi-glazed door			2.7800	1.0000	2.7800			(26a)					
TER Opening Type (Uw = 1.20)			9.7200	1.1450	11.1298			(27)					
1st-S-Wall	26.1000	2.4300	23.6700	0.1800	4.2606			(29a)					
1st-E-Wall	26.1000	10.0700	16.0300	0.1800	2.8854			(29a)					
Total net area of external elements Aum(A, m2)			52.2000					(31)					
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.0558			(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							225.5780	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value		Total						
E5 Ground floor (normal)				17.4000	0.1600		2.7840						
E6 Intermediate floor within a dwelling				17.4000	0.0000		0.0000						
E16 Corner (normal)				6.0000	0.0900		0.5400						
E18 Party wall between dwellings				6.0000	0.0600		0.3600						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							3.6840	(36)					
Point Thermal bridges						(36a) =	0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	24.7398	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 24.6971	Feb 24.5390	Mar 24.3840	Apr 23.6560	May 23.5198	Jun 22.8857	Jul 22.8857	Aug 22.7683	Sep 23.1300	Oct 23.5198	Nov 23.7953	Dec 24.0834	(38)
Heat transfer coeff	49.4369	49.2788	49.1238	48.3958	48.2596	47.6255	47.6255	47.5081	47.8697	48.2596	48.5351	48.8232	(39)
Average = Sum(39)m / 12 =												48.3951	
HLP	Jan 0.9887	Feb 0.9856	Mar 0.9825	Apr 0.9679	May 0.9652	Jun 0.9525	Jul 0.9525	Aug 0.9502	Sep 0.9574	Oct 0.9652	Nov 0.9707	Dec 0.9765	(40)
HLP (average)												0.9679	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

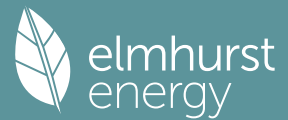
4. Water heating energy requirements (kWh/year)												
Assumed occupancy												1.6901 (42)
Hot water usage for mixer showers	52.5569	51.7671	50.6162	48.4141	46.7890	44.9767	43.9465	45.0888	46.3409	48.2867	50.5361	52.3556 (42a)
Hot water usage for baths	22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476 (42b)
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383 (42c)
Average daily hot water use (litres/day)												98.5597 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	107.2197	104.9310	102.1434	97.9036	94.4609	90.7597	89.3366	92.1121	95.0395	98.9252	103.2304	106.9415 (44)
Energy content (annual)	169.8097	149.4203	156.9906	134.0251	127.1626	111.5996	108.0448	114.0541	117.1932	134.2406	147.0706	167.4445 (45)
Distribution loss (46)m = 0.15 x (45)m	25.4715	22.4130	23.5486	20.1038	19.0744	16.7399	16.2067	17.1081	17.5790	20.1361	22.0606	25.1167 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.7527 (55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
WWHRS	216.4047	191.5060	203.5855	179.1170	173.7575	156.6915	154.6398	160.6490	162.2850	180.8355	192.1624	214.0394 (62)
PV diverter	-24.0268	-21.2495	-22.2513	-18.4249	-17.1714	-14.6937	-13.7730	-14.6462	-15.2026	-17.9222	-20.3037	-23.5819 (63a)
Solar input	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
Total per year (kWh/year)												1962.4258 (64)
Electric shower(s)												1962 (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												
	93.7377	83.3508	89.4753	80.6368	79.5575	73.1803	73.2008	75.1989	75.0402	81.9109	84.9744	92.9512 (65)

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
(66)m	Jan 84.5050	Feb 84.5050	Mar 84.5050	Apr 84.5050	May 84.5050	Jun 84.5050	Jul 84.5050	Aug 84.5050	Sep 84.5050	Oct 84.5050	Nov 84.5050	Dec 84.5050 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	75.0263	83.0649	75.0263	77.5272	75.0263	77.5272	75.0263	75.0263	77.5272	75.0263	77.5272	75.0263 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505 (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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040 (71)
Water heating gains (Table 5)	125.9915	124.0340	120.2625	111.9956	106.9321	101.6394	98.3882	101.0738	104.2225	110.0953	118.0201	124.9344 (72)
Total internal gains	399.6033	407.2121	391.5520	377.5897	359.6789	344.1628	331.9144	333.0722	342.5719	357.1402	377.9122	392.0499 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
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					W/m2		or Table 6b		or Table 6c		Table 6d		
East			7.2900		19.6403		0.6300		0.7000		0.7700		43.7569 (76)
South			2.4300		46.7521		0.6300		0.7000		0.7700		34.7199 (78)
Solar gains	78.4768	142.4601	213.3999	287.4570	337.2692	340.0245	325.7712	288.8289	239.6152	162.9003	95.7147		65.9848 (83)
Total gains	478.0801	549.6722	604.9519	665.0466	696.9480	684.1873	657.6857	621.9011	582.1870	520.0405	473.6269		458.0347 (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	63.3743	63.5777	63.7783	64.7376	64.9204	65.7847	65.7847	65.9473	65.4490	64.9204	64.5518	64.1709
alpha	5.2250	5.2385	5.2519	5.3158	5.3280	5.3856	5.3856	5.3965	5.3633	5.3280	5.3035	5.2781
util living area	0.9749	0.9500	0.9001	0.7837	0.6205	0.4423	0.3182	0.3506	0.5553	0.8267	0.9489	0.9791 (86)
MIT	20.1373	20.3488	20.5969	20.8448	20.9606	20.9947	20.9993	20.9988	20.9830	20.8264	20.4575	20.1056 (87)
Th 2	20.0927	20.0954	20.0980	20.1102	20.1124	20.1231	20.1231	20.1251	20.1190	20.1124	20.1078	20.1030 (88)
util rest of house	0.9686	0.9384	0.8786	0.7454	0.5684	0.3831	0.2550	0.2843	0.4891	0.7852	0.9350	0.9737 (89)
MIT 2	19.1146	19.3774	19.6772	19.9655	20.0820	20.1202	20.1228	20.1246	20.1085	19.9554	19.5252	19.0830 (90)
Living area fraction										FLA = Living area / (4) =		0.5100 (91)
MIT	19.6361	19.8728	20.1462	20.4139	20.5301	20.5662	20.5698	20.5704	20.5545	20.3996	20.0007	19.6045 (92)
Temperature adjustment												0.0000
adjusted MIT	19.6361	19.8728	20.1462	20.4139	20.5301	20.5662	20.5698	20.5704	20.5545	20.3996	20.0007	19.6045 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9648	0.9351	0.8799	0.7590	0.5934	0.4132	0.2872	0.3181	0.5222	0.7994	0.9331	0.9701 (94)
Useful gains	461.2540	514.0041	532.2747	504.7892	413.5349	282.6749	188.9012	197.8482	304.0381	415.7382	441.9207	444.3559 (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	758.1711	737.8419	670.3545	557.2244	426.1365	284.1428	189.0648	198.1299	308.9755	472.9247	626.1357	752.0961 (97)
Space heating kWh	220.9064	150.4190	102.7314	37.7533	9.3756	0.0000	0.0000	0.0000	0.0000	42.5467	132.6348	228.9587 (98a)
Space heating requirement - total per year (kWh/year)												925.3260
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	220.9064	150.4190	102.7314	37.7533	9.3756	0.0000	0.0000	0.0000	0.0000	42.5467	132.6348	228.9587 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												925.3260
Space heating per m2										(98c) / (4) =		18.5065 (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	220.9064	150.4190	102.7314	37.7533	9.3756	0.0000	0.0000	0.0000	0.0000	42.5467	132.6348	228.9587 (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)	239.3352	162.9675	111.3016	40.9028	10.1578	0.0000	0.0000	0.0000	0.0000	46.0961	143.6997	248.0593 (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	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
Efficiency of water heater (217)m	84.3707	83.7831	82.8362	81.3689	80.2595	79.8000	79.8000	79.8000	79.8000	81.5107	83.4857	79.8000 (216)
Fuel for water heating, kWh/month	228.0150	203.2110	218.9069	197.4857	195.0997	177.9421	176.5248	182.9609	184.3137	199.8673	205.8540	225.4636 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	15.5890	12.5061	11.2603	8.2498	6.3724	5.2063	5.8131	7.5561	9.8146	12.8773	14.5449	16.0223 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-17.2190	-25.1717	-37.5148	-43.8066	-48.6813	-46.0001	-45.4689	-42.2255	-36.7229	-29.5315	-19.2571	-14.7863 (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	-7.1843	-15.3457	-30.9250	-47.0606	-62.8078	-63.2887	-62.5126	-52.6375	-38.2202	-22.1131	-9.6488	-5.6617 (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												1002.5200 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000

Full SAP Calculation Printout



Water heating fuel used	2395.6447 (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)	125.8121 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-823.7918 (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	2786.1850 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1002.5200	0.2100	210.5292 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2395.6447	0.2100	503.0854 (264)
Space and water heating			713.6146 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	125.8121	0.1443	18.1586 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-406.3859	0.1338	-54.3750
PV Unit electricity exported	-417.4059	0.1255	-52.3950
Total			-106.7700 (269)
Total CO2, kg/year			636.9324 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.7400 (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	1002.5200	1.1300	1132.8476 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2395.6447	1.1300	2707.0785 (278)
Space and water heating			3839.9261 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	125.8121	1.5338	192.9748 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-406.3859	1.4945	-607.3286
PV Unit electricity exported	-417.4059	0.4607	-192.3189
Total			-799.6475 (283)
Total Primary energy kWh/year			3363.3542 (286)
Target Primary Energy Rate (TPER)			67.2700 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	50

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

86

86

Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor

Poor

Average

Good

Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.14 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 49 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: **0.2** per year

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

Recommendations

Overview Report

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

£274

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details	
Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details	
Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 1-4	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	85 B	DER	5.60	TER	13.98
Environmental	96 A	% DER < TER			59.94
CO ₂ Emissions (t/year)	0.22	DFEE	24.87	TFEE	30.61
Compliance Check	See BREL	% DFEE < TFEE			18.75
% DPER < TPER	17.95	DPER	60.76	TPER	74.05

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2022	
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	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

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:	16.90 m	46.10 m ²	2.50 m
1st Storey:	11.60 m	31.40 m ²	3.00 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	22.70	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
1st-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	6.66	6.66	0.00	None	0.00	Enter Gross Area
1st-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	17.01	8.68	0.00	None	8.33	Enter Gross Area
1st-N-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	27.12	21.57	0.00	None	5.55	Enter Gross Area

10.1 Party Ceilings				
Description	Construction	Kappa (kJ/m ² K)	Area (m ²)	
Party Ceiling	Precast concrete planks floor, screed, carpeted	30.00	46.10	

11.1 Party Floors				
Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)

Summary for Input Data

Party Floor Lowest occupied Precast concrete planks floor, screed, carpeted 30.00 46.10

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
1st-E-Door	Door	1st-E-Wall	East	2.78	0
1st-E-Windows	Window	1st-E-Wall	East	5.55	0
1st-N-Window	Window	1st-N-Wall	North	5.55	0

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

User Input

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		16.90	0.00	0.00	No
E6 Intermediate floor within a dwelling		16.90	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value 0.04 W/m²K

Description Bridge

18.0 Pressure Testing

Yes

Designed AP₅₀ 3.00 m³/(h.m²) @ 50 Pa

Property Tested? Yes

Test Method Blower Door

As Built AP₅₀ 0.10 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present Yes

Approved Installation No

Mechanical Ventilation data Type Database

Type Balanced mechanical ventilation with heat recovery

MV Reference Number 500500

Configuration 2

Manufacturer SFP 0.59

Duct Type Rigid

MVHR Efficiency 89.00

Wet Rooms 2

SFP from Installer Commissioning Certificate No

MVHR System Location Inside heated envelope (installed exclusively)

Duct Installation Specification Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

No

22.0 Lighting

No Fixed Lighting No

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	7

24.0 Main Heating 1

SAP table

Description Electric Boiler

Percentage of Heat 100.00 %

Summary for Input Data

Database Ref. No.	0
Fuel Type	Electricity
SAP Code	191
In Winter	100.00
In Summer	100.00
Controls SAP Code	2106
Delayed Start Stat	No
Burner Control	On/Off
HETAS approved System	No
Oil Pump Inside	No
Flue Type	Balanced
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	No
Electric CPSU Temperature	60.00
Combi boiler type	No Combi
Combi keep hot type	Electric, time clock

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder

Summary for Input Data

Cylinder Stat	Yes	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

0 Photovoltaic Unit	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

None	
Electricity Generated	0.00
Apportioned	0.00
Connected to dwelling's electricity meter	Yes
Electricity Generation	Annual

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

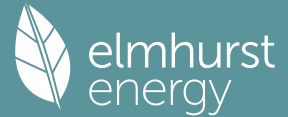
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023
Assessment Reference	Flat 1-4	Prop Type Ref	22403			
Property	Braemar Avenue, London, Greater London, N22 7BY					
SAP Rating	85 B	DER	5.60	TER	13.98	
Environmental	96 A	% DER < TER				59.94
CO ₂ Emissions (t/year)	0.22	DFEE	24.87	TFEE	30.61	
Compliance Check	See BREL	% DFEE < TFEE				18.75
% DPER < TPER	17.95	DPER	60.76	TPER	74.05	
Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	46.1000 (1b)	2.5000 (2b)	115.2500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	46.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	115.2500 (5)

2. Ventilation rate

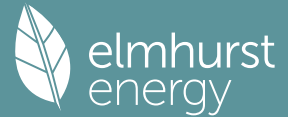
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (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) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.1500 (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) = 0.1275 (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	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (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
Door			2.7800	0.9000	2.5020		(26a)
Window (Uw = 0.90)			11.1000	0.8687	9.6429		(27)
1st-S-Wall	6.6600		6.6600	0.1400	0.9324	190.0000	1265.4000 (29a)
1st-E-Wall	17.0100		8.6800	0.1400	1.2152	190.0000	1649.2000 (29a)
1st-N-Wall	27.1200	8.3300	21.5700	0.1400	3.0198	190.0000	4098.3002 (29a)
Total net area of external elements Aum(A, m ²)			50.7900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	17.3123		(33)
Party Floor			46.1000			40.0000	1844.0000 (32d)
Party Ceiling			46.1000			30.0000	1383.0000 (32b)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	10239.9002 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							222.1237 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							2.0316 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	19.3439 (37)

Full SAP Calculation Printout



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	(38)
Heat transfer coeff	9.9669	9.8457	9.7244	9.1183	8.9971	8.3909	8.3909	8.2697	8.6334	8.9971	9.2395	9.4820	(39)
Average = Sum(39)m / 12 =	29.3107	29.1895	29.0683	28.4621	28.3409	27.7348	27.7348	27.6135	27.9772	28.3409	28.5834	28.8258	(40)
HLP	0.6358	0.6332	0.6305	0.6174	0.6148	0.6016	0.6016	0.5990	0.6069	0.6148	0.6200	0.6253	(41)
HLP (average)												0.6167	(42)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	(43)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.5762 (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	21.9034	21.5781	21.1200	20.2754	19.6429	18.9416	18.5628	19.0177	19.5130	20.2634	21.1254	21.8293	(42b)
Hot water usage for other uses	30.7722	29.6532	28.5342	27.4152	26.2962	25.1772	25.1772	26.2962	27.4152	28.5342	29.6532	30.7722	(42c)
Average daily hot water use (litres/day)													48.2826 (43)
Daily hot water use	52.6755	51.2312	49.6542	47.6905	45.9391	44.1188	43.7400	45.3139	46.9282	48.7976	50.7786	52.6015	(44)
Energy content	83.4251	72.9526	76.3166	65.2860	61.8429	54.2493	52.8998	56.1081	57.8671	66.2178	72.3434	82.3612	(45)
Energy content (annual)													801.8699
Distribution loss (46)m = 0.15 x (45)m	12.5138	10.9429	11.4475	9.7929	9.2764	8.1374	7.9350	8.4162	8.6801	9.9327	10.8515	12.3542	(46)
Water storage loss:													150.0000 (47)
Store volume													1.6900 (48)
a) If manufacturer declared loss factor is known (kWh/day):													0.6000 (49)
Temperature factor from Table 2b													1.0140 (55)
Enter (49) or (54) in (55)													
Total storage loss	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(56)
If cylinder contains dedicated solar storage	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(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	114.8591	101.3446	107.7506	95.7060	93.2769	84.6693	84.3338	87.5421	88.2871	97.6518	102.7634	113.7952	(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	114.8591	101.3446	107.7506	95.7060	93.2769	84.6693	84.3338	87.5421	88.2871	97.6518	102.7634	113.7952	(64)
12Total per year (kWh/year)													1171.9799 (64)
Electric shower(s)	40.5603	36.1396	39.4630	37.6591	38.3657	36.5972	37.8171	38.3657	37.6591	39.4630	38.7210	40.5603	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													461.3710 (64a)
Heat gains from water heating, kWh/month	37.8789	33.2916	35.2410	31.1224	30.1542	27.1872	27.0435	28.2474	28.6556	31.8832	33.7344	37.5252	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	69.1614	76.5716	69.1614	71.4668	69.1614	71.4668	69.1614	69.1614	71.4668	69.1614	71.4668	69.1614	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	137.1203	138.5432	134.9575	127.3242	117.6885	108.6323	102.5822	101.1593	104.7449	112.3782	122.0139	131.0702	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	(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)	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	(71)
Water heating gains (Table 5)	50.9125	49.5411	47.3670	43.2255	40.5298	37.7600	36.3487	37.9669	39.7994	42.8537	46.8534	50.4371	(72)
Total internal gains	306.8377	314.2993	301.1294	291.6599	277.0232	264.5025	254.7357	254.9310	262.6546	274.0368	289.9775	300.3121	(73)

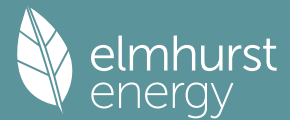
6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d		Gains W	
North					5.5500	10.6334		0.4000	0.7000	0.7700		11.4513 (74)	
East					5.5500	19.6403		0.4000	0.7000	0.7700		21.1510 (76)	
Solar gains	32.6024	63.2600	105.3266	159.1094	202.2550	210.8138	199.1173	165.7622	123.9600	75.1461	40.4995	26.9400 (83)	
Total gains	339.4400	377.5593	406.4560	450.7693	479.2782	475.3163	453.8531	420.6932	386.6146	349.1830	330.4771	327.2521 (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)													
tau	97.0435	97.4465	97.8529	99.9368	100.3643	102.5578	102.5578	103.0080	101.6690	100.3643	99.5130	98.6760	(86)
alpha	7.4696	7.4964	7.5235	7.6625	7.6910	7.8372	7.8372	7.8672	7.7779	7.6910	7.6342	7.5784	(87)
util living area													

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	0.9792	0.9549	0.8981	0.7386	0.5474	0.3733	0.2689	0.3019	0.4982	0.7977	0.9482	0.9828 (86)
MIT	20.5535	20.6888	20.8393	20.9673	20.9966	20.9999	21.0000	21.0000	20.9988	20.9538	20.7606	20.5366 (87)
Th 2	20.3979	20.4002	20.4026	20.4144	20.4167	20.4285	20.4285	20.4309	20.4238	20.4167	20.4120	20.4073 (88)
util rest of house												
	0.9745	0.9457	0.8801	0.7086	0.5139	0.3400	0.2340	0.2646	0.4571	0.7640	0.9363	0.9788 (89)
MIT 2	19.9970	20.1290	20.2706	20.3907	20.4146	20.4285	20.4285	20.4309	20.4232	20.3841	20.2093	19.9889 (90)
Living area fraction									fLA = Living area / (4) =			
MIT	20.2710	20.4046	20.5506	20.6746	20.7012	20.7098	20.7099	20.7111	20.7066	20.6646	20.4808	20.2586 (92)
Temperature adjustment												0.0000
adjusted MIT	20.2710	20.4046	20.5506	20.6746	20.7012	20.7098	20.7099	20.7111	20.7066	20.6646	20.4808	20.2586 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9733	0.9458	0.8848	0.7222	0.5303	0.3564	0.2512	0.2830	0.4773	0.7787	0.9378	0.9777	(94)
Useful gains	330.3884	357.0826	359.6333	325.5249	254.1638	169.4211	113.9862	119.0412	184.5237	271.9186	309.9336	319.9540	(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	468.1213	452.5732	408.4280	335.1313	255.1018	169.4547	113.9879	119.0453	184.8343	285.2397	382.4674	462.9031	(97)
Space heating kWh	102.4733	64.1697	36.3033	6.9166	0.6978	0.0000	0.0000	0.0000	0.0000	9.9109	52.2243	106.3542	(98a)
Space heating requirement - total per year (kWh/year)												379.0501	
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	102.4733	64.1697	36.3033	6.9166	0.6978	0.0000	0.0000	0.0000	0.0000	9.9109	52.2243	106.3542	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												379.0501	
Space heating per m2										(98c) / (4) =		8.2223	(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 %)													100.0000 (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	102.4733	64.1697	36.3033	6.9166	0.6978	0.0000	0.0000	0.0000	0.0000	9.9109	52.2243	106.3542	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	102.4733	64.1697	36.3033	6.9166	0.6978	0.0000	0.0000	0.0000	0.0000	9.9109	52.2243	106.3542	(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	114.8591	101.3446	107.7506	95.7060	93.2769	84.6693	84.3338	87.5421	88.2871	97.6518	102.7634	113.7952	(64)
Efficiency of water heater	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	114.8591	101.3446	107.7506	95.7060	93.2769	84.6693	84.3338	87.5421	88.2871	97.6518	102.7634	113.7952	(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	(221)
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	13.3461	12.0546	13.3461	12.9156	13.3461	12.9156	13.3461	13.3461	12.9156	13.3461	12.9156	13.3461	(231)
Lighting	13.7349	11.0186	9.9210	7.2686	5.6145	4.5871	5.1217	6.6574	8.6473	11.3457	12.8149	14.1166	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	-10.1275	-18.3803	-34.3110	-48.0811	-59.7940	-58.9408	-57.8550	-49.9922	-37.5617	-23.9759	-12.2533	-8.2237	(233a)
(233a)m	-10.1275	-18.3803	-34.3110	-48.0811	-59.7940	-58.9408	-57.8550	-49.9922	-37.5617	-23.9759	-12.2533	-8.2237	(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													379.0501 (211)
Space heating fuel - main system 2													0.0000 (213)
Space heating fuel - secondary													0.0000 (215)
Efficiency of water heater													100.0000
Water heating fuel used													1171.9799 (219)
Space cooling fuel													0.0000 (221)
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)													
mechanical ventilation fans (SFP = 0.8260)													116.1397 (230a)
central heating pump													41.0000 (230c)
Total electricity for the above, kWh/year													157.1397 (231)
Electricity for lighting (calculated in Appendix L)													110.8483 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation													-419.4965 (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													1860.8924 (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 (high-rate cost)	341.1451	0.1666	56.8236 (261)
Space heating - main system 1 (low-rate cost)	37.9050	0.1398	5.3005 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	100.1331	0.1476	14.7796 (264)
Water heating - low rate cost	1071.8467	0.1239	132.7764 (264)
Energy for instantaneous electric shower(s)	461.3710	0.1436	66.2652 (264a)
Space and water heating			209.6801 (265)
Pumps, fans and electric keep-hot	157.1397	0.1432	21.9865 (267)
Energy for lighting	110.8483	0.1490	16.5186 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-419.4965	0.1347	-56.4982
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-56.4982 (269)
Total CO2, kg/year			257.9523 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.6000 (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 (high-rate cost)	341.1451	1.4584	552.8123 (275)
Space heating - main system 1 (low-rate cost)	37.9050	1.5071	57.1256 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	100.1331	1.5518	155.3827 (278)
Water heating - low rate cost	1071.8467	1.4432	1546.8780 (278)
Energy for instantaneous electric shower(s)	461.3710	1.5350	708.2209 (278a)
Space and water heating			2312.1986 (279)
Pumps, fans and electric keep-hot	157.1397	1.5335	238.5871 (281)
Energy for lighting	110.8483	1.5547	172.3407 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-419.4965	1.5024	-630.2347
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-630.2347 (283)
Total Primary energy kWh/year			2801.1127 (286)
Dwelling Primary energy Rate (DPER)			60.7600 (287)

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

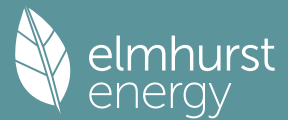
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	46.1000 (1b)	x 2.5000 (2b)	= 115.2500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	46.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 115.2500 (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	2 * 10 = 20.0000 (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) =	20.0000 / (5) = 0.1735 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4235 (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) = 0.3600 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	0.4590 0.4500 0.4410 0.3960 0.3870 0.3420 0.3420 0.3330 0.3600 0.3870 0.4050 0.4230 (22b)
Effective ac	0.6053 0.6013 0.5972 0.5784 0.5749 0.5585 0.5585 0.5554 0.5648 0.5749 0.5820 0.5895 (25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K						
TER Semi-glazed door			2.7800	1.0000	2.7800			(26a)					
TER Opening Type (Uw = 1.20)			8.7400	1.1450	10.0076			(27)					
1st-S-Wall	6.6600		6.6600	0.1800	1.1988			(29a)					
1st-E-Wall	17.0100	7.1500	9.8600	0.1800	1.7748			(29a)					
1st-N-Wall	27.1200	4.3700	22.7500	0.1800	4.0950			(29a)					
Total net area of external elements Aum(A, m2)			50.7900					(31)					
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =			19.8562		(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							232.1237	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value		Total						
E5 Ground floor (normal)				16.9000	0.1600		2.7040						
E6 Intermediate floor within a dwelling				16.9000	0.0000		0.0000						
E16 Corner (normal)				6.0000	0.0900		0.5400						
E18 Party wall between dwellings				6.0000	0.0600		0.3600						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							3.6040	(36)					
Point Thermal bridges						(36a) =	0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	23.4602	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 23.0227	Feb 22.8672	Mar 22.7147	Apr 21.9984	May 21.8644	Jun 21.2405	Jul 21.2405	Aug 21.1250	Sep 21.4808	Oct 21.8644	Nov 22.1355	Dec 22.4189	(38)
Heat transfer coeff	46.4830	46.3274	46.1749	45.4586	45.3246	44.7008	44.7008	44.5852	44.9411	45.3246	45.5957	45.8791	(39)
Average = Sum(39)m / 12 =												45.4580	
HLP	Jan 1.0083	Feb 1.0049	Mar 1.0016	Apr 0.9861	May 0.9832	Jun 0.9696	Jul 0.9696	Aug 0.9671	Sep 0.9749	Oct 0.9832	Nov 0.9891	Dec 0.9952	(40)
HLP (average)												0.9861	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

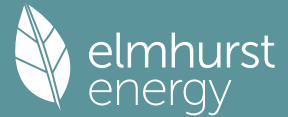
Assumed occupancy													1.5762	(42)
Hot water usage for mixer showers	50.6476	49.8865	48.7774	46.6552	45.0892	43.3427	42.3500	43.4508	44.6574	46.5325	48.7002	50.4536	(42a)	
Hot water usage for baths	21.9034	21.5781	21.1200	20.2754	19.6429	18.9416	18.5628	19.0177	19.5130	20.2634	21.1254	21.8293	(42b)	
Hot water usage for other uses	30.7722	29.6532	28.5342	27.4152	26.2962	25.1772	25.1772	26.2962	27.4152	28.5342	29.6532	30.7722	(42c)	
Average daily hot water use (litres/day)												94.9780	(43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Energy content (annual)	103.3231	101.1177	98.4315	94.3458	91.0283	87.4616	86.0901	88.7647	91.5856	95.3301	99.4788	103.0550	(44)	
Distribution loss (46)m = 0.15 x (45)m	163.6386	143.9903	151.2856	129.1547	122.5416	107.5442	104.1185	109.9092	112.9341	129.3621	141.7258	161.3593	(45)	
Water storage loss:										Total = Sum(45)m =		1577.5639		
Store volume	24.5458	21.5985	22.6928	19.3732	18.3812	16.1316	15.6178	16.4864	16.9401	19.4043	21.2589	24.2039	(46)	
a) If manufacturer declared loss factor is known (kWh/day):													150.0000	(47)
Temperature factor from Table 2b													1.3938	(48)
Enter (49) or (54) in (55)													0.5400	(49)
Total storage loss													0.7527	(55)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)	
Primary loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)	
Combi loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)	
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
WWHRS	210.2335	186.0760	197.8805	174.2465	169.1365	152.6360	150.7134	156.5041	158.0260	175.9570	186.8176	207.9542	(62)	
PV diverter	-23.1540	-20.4776	-21.4429	-17.7556	-16.5476	-14.1599	-13.2726	-14.1141	-14.6504	-17.2711	-19.5661	-22.7252	(63a)	
Solar input	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)	
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)	
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)	
12Total per year (kWh/year)	187.0795	165.5984	176.4375	156.4909	152.5889	138.4762	137.4408	142.3900	143.3756	158.6858	167.2515	185.2290	(64)	
Electric shower(s)								Total per year (kWh/year) = Sum(64)m =				1911.0442	(64)	
Heat gains from water heating, kWh/month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)	
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				0.0000	(64a)	
	91.6857	81.5453	87.5784	79.0174	78.0210	71.8319	71.8953	73.8207	73.6241	80.2888	83.1973	90.9279	(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	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	70.0982	77.6088	70.0982	72.4348	70.0982	72.4348	70.0982	70.0982	72.4348	70.0982	72.4348	70.0982	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	137.1203	138.5432	134.9575	127.3242	117.6885	108.6323	102.5822	101.1593	104.7449	112.3782	122.0139	131.0702	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	(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)													
	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	(71)
Water heating gains (Table 5)													
	123.2335	121.3472	117.7129	109.7464	104.8669	99.7666	96.6335	99.2214	102.2557	107.9151	115.5518	122.2149	(72)
Total internal gains													
	380.0955	387.1426	372.4121	359.1489	342.2971	327.4771	315.9573	317.1223	326.0788	340.0349	359.6440	373.0267	(73)

6. Solar gains

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[Jan]	Area m2				Solar flux Table 6a W/m2	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d	Gains W
North	4.3700				10.6334	0.6300		0.7000		0.7700	14.2012 (74)
East	4.3700				19.6403	0.6300		0.7000		0.7700	26.2301 (76)
Solar gains	40.4313	78.4509	130.6193	197.3171	250.8236	261.4377	246.9324	205.5675	153.7272	93.1914	33.4092 (83)
Total gains	420.5268	465.5935	503.0313	556.4660	593.1206	588.9147	562.8897	522.6899	479.8060	433.2263	406.4359 (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
tau	63.9476	64.1623	64.3742	65.3885	65.5819	66.4971	66.4971	66.6694	66.1416	65.5819	65.1919
alpha	5.2632	5.2775	5.2916	5.3592	5.3721	5.4331	5.4331	5.4446	5.4094	5.3721	5.3461
util living area	0.9814	0.9670	0.9344	0.8378	0.6737	0.4808	0.3487	0.3909	0.6233	0.8764	0.9633
MIT	20.0788	20.2504	20.4938	20.7866	20.9441	20.9925	20.9989	20.9980	20.9719	20.7664	20.3922
Th 2	20.0764	20.0792	20.0820	20.0949	20.0974	20.1087	20.1087	20.1108	20.1043	20.0974	20.0925
util rest of house	0.9764	0.9585	0.9179	0.8028	0.6192	0.4160	0.2784	0.3161	0.5512	0.8404	0.9524
MIT 2	19.0271	19.2433	19.5434	19.8919	20.0537	20.1046	20.1083	20.1101	20.0867	19.8804	19.4330
Living area fraction	19.5449	19.7392	20.0114	20.3325	20.4921	20.5418	20.5469	20.5473	20.5226	20.3167	19.9053
MIT	19.5449	19.7392	20.0114	20.3325	20.4921	20.5418	20.5469	20.5473	20.5226	20.3167	19.9053
Temperature adjustment	19.5449	19.7392	20.0114	20.3325	20.4921	20.5418	20.5469	20.5473	20.5226	20.3167	19.9053
adjusted MIT	19.5449	19.7392	20.0114	20.3325	20.4921	20.5418	20.5469	20.5473	20.5226	20.3167	19.9053
8. Space heating requirement											
Utilisation	0.9729	0.9548	0.9164	0.8126	0.6436	0.4477	0.3130	0.3530	0.5856	0.8499	0.9497
Useful gains	409.1240	444.5542	461.0024	452.1761	381.7296	263.6640	176.2064	184.4920	280.9851	368.2035	389.2654
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000
Heat loss rate W	708.6298	687.4609	623.8856	519.7046	398.4991	265.6027	176.4282	184.9096	288.6379	440.4050	583.8677
Space heating kWh	222.8323	163.2333	121.1851	48.6205	12.4765	0.0000	0.0000	0.0000	0.0000	53.7179	140.1137
Space heating requirement - total per year (kWh/year)											
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
Solar heating contribution - total per year (kWh/year)											
Space heating kWh	222.8323	163.2333	121.1851	48.6205	12.4765	0.0000	0.0000	0.0000	0.0000	53.7179	140.1137
Space heating requirement after solar contribution - total per year (kWh/year)											
Space heating per m2										(98c) / (4) =	21.4762 (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
Space heating requirement	222.8323	163.2333	121.1851	48.6205	12.4765	0.0000	0.0000	0.0000	0.0000	53.7179	140.1137
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
Space heating fuel (main heating system)	241.4217	176.8508	131.2948	52.6766	13.5174	0.0000	0.0000	0.0000	0.0000	58.1992	151.8025
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
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
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
Water heating											
Water heating requirement	187.0795	165.5984	176.4375	156.4909	152.5889	138.4762	137.4408	142.3900	143.3756	158.6858	167.2515
Efficiency of water heater (217)m	84.4530	84.0275	83.2349	81.7644	80.4160	79.8000	79.8000	79.8000	79.8000	81.8993	83.6655
Fuel for water heating, kWh/month	221.5191	197.0764	211.9754	191.3926	189.7494	173.5290	172.2316	178.4336	179.6687	193.7573	199.9051
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
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
Lighting	14.5650	11.6846	10.5207	7.7079	5.9538	4.8643	5.4313	7.0598	9.1699	12.0315	13.5895
Electricity generated by PVs (Appendix M) (negative quantity)	-15.9245	-23.3053	-34.7735	-40.6581	-45.2342	-42.7689	-42.2824	-39.2453	-34.0942	-27.3720	-17.8211
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
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
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
Electricity generated by PVs (Appendix M) (negative quantity)	-6.5753	-14.0518	-28.3280	-43.1214	-57.5587	-57.9955	-57.2765	-48.2184	-35.0033	-20.2443	-8.8302
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
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
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
Annual totals kWh/year											
Space heating fuel - main system 1											1072.6452 (211)
Space heating fuel - main system 2											0.0000 (213)

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Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	79.8000
Water heating fuel used	2328.3777 (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)	117.5481 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-759.5360 (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	2845.0351 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1072.6452	0.2100	225.2555 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2328.3777	0.2100	488.9593 (264)
Space and water heating			714.2148 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	117.5481	0.1443	16.9658 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-377.1517	0.1338	-50.4526
PV Unit electricity exported	-382.3842	0.1255	-47.9969
Total			-98.4496 (269)
Total CO2, kg/year			644.6603 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.9800 (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	1072.6452	1.1300	1212.0891 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2328.3777	1.1300	2631.0668 (278)
Space and water heating			3843.1559 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	117.5481	1.5338	180.2992 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-377.1517	1.4944	-563.5987
PV Unit electricity exported	-382.3842	0.4607	-176.1754
Total			-739.7742 (283)
Total Primary energy kWh/year			3413.7818 (286)
Target Primary Energy Rate (TPER)			74.0500 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	46

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

85

85

Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:



Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.14 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 53 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: **0.2** per year

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

Recommendations

Overview Report

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

£273

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details	
Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details	
Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 2-1	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	81 B	DER	6.64	TER	15.01
Environmental	96 A	% DER < TER			55.76
CO ₂ Emissions (t/year)	0.27	DFEE	33.81	TFEE	37.90
Compliance Check	See BREL	% DFEE < TFEE			10.80
% DPER < TPER	11.05	DPER	70.71	TPER	79.50

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, Semi-Detached
Position of Flat	Mid-floor flat
Which Floor	2
2.0 Number of Storeys	1
3.0 Date Built	2022
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	7 Hour Off Peak
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements			
	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	11.81 m	50.00 m ²	2.50 m
1st Storey:	11.60 m	31.40 m ²	3.00 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	29.00	m ²
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9.0 External Walls										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
1st-N-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	23.85	18.30	0.00	None	5.55	Enter Gross Area
1st-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	16.20	7.87	0.00	None	8.33	Enter Gross Area

10.0 External Roofs										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	25.91	25.91	None	0.00	Enter Gross Area	0.00

10.1 Party Ceilings										
Description	Construction								Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling	Precast concrete planks floor, screed, carpeted								30.00	55.00

Summary for Input Data



11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
LGF-Floor	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.09	None	0.00	110.00	55.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
1st-W-Door	Door	1st-W-Wall	West	2.78	0
1st-W-Window	Window	1st-W-Wall	West	5.55	0
1st-N-Window	Window	1st-N-Wall	North	5.55	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		11.81	0.00	0.00	No
E6 Intermediate floor within a dwelling		11.81	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value W/m²K

Description

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	7

24.0 Main Heating 1

Percentage of Heat %

Summary for Input Data

Database Ref. No.	0
Fuel Type	Electricity
SAP Code	191
In Winter	100.00
In Summer	100.00
Controls SAP Code	2106
Delayed Start Stat	No
Burner Control	On/Off
HETAS approved System	No
Oil Pump Inside	No
Flue Type	Balanced
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	No
Electric CPSU Temperature	60.00
Combi boiler type	No Combi
Combi keep hot type	Electric, time clock

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder

Summary for Input Data

Cylinder Stat	Yes	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

0 Photovoltaic Unit	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	5.80

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

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

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

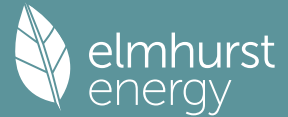
Lower cost measures

None

Further measures to achieve even higher standards

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

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023
Assessment Reference	Flat 2-1	Prop Type Ref	22403			
Property	Braemar Avenue, London, Greater London, N22 7BY					
SAP Rating	81 B	DER	6.64	TER	15.01	
Environmental	96 A	% DER < TER				55.76
CO ₂ Emissions (t/year)	0.27	DFEE	33.81	TFEE	37.90	
Compliance Check	See BREL	% DFEE < TFEE				10.80
% DPER < TPER	11.05	DPER	70.71	TPER	79.50	
Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	50.0000 (1b)	2.5000 (2b)	125.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	125.0000 (5)

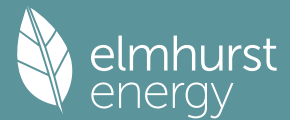
2. Ventilation rate

											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											0 * 10 =	0.0000 (7a)
Number of passive vents											0 * 10 =	0.0000 (7b)
Number of flueless gas fires											0 * 40 =	0.0000 (7c)
											Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											0.0000 / (5) =	0.0000 (8)
Pressure test											Yes	
Pressure Test Method											Blower Door	
Measured/design AP50											3.0000 (17)	
Infiltration rate											0.1500 (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) =	0.1275 (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												
	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation											0.5000 (23a)	
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)											0.5000 (23b)	
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =											80.1000 (23c)	
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (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
Door			2.7800	0.9000	2.5020		(26a)
Window (Uw = 0.90)			11.1000	0.8687	9.6429		(27)
LGF-Floor			55.0000	0.0900	4.9500	110.0000	6050.0000 (28a)
1st-N-Wall	23.8500		18.3000	0.1400	2.5620	190.0000	3477.0001 (29a)
1st-W-Wall	16.2000	8.3300	7.8700	0.1400	1.1018	190.0000	1495.3001 (29a)
External Roof 1	25.9100		25.9100	0.1000	2.5910	9.0000	233.1900 (30)
Total net area of external elements Aum(A, m ²)			120.9600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.3497		(33)
Party Ceiling			55.0000			30.0000	1650.0000 (32b)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		12905.4902 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							258.1098 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							4.8384 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss					(33) + (36) + (36a) =		28.1881 (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	10.8101	10.6786	10.5471	9.8897	9.7582	9.1008	9.1008	8.9693	9.3637	9.7582	10.0212	10.2841	(38)
Heat transfer coeff	38.9981	38.8667	38.7352	38.0777	37.9463	37.2888	37.2888	37.1574	37.5518	37.9463	38.2092	38.4722	(39)
Average = Sum(39)m / 12 =												38.0449	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.7800	0.7773	0.7747	0.7616	0.7589	0.7458	0.7458	0.7431	0.7510	0.7589	0.7642	0.7694	(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													1.6901 (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	0.0000	(42a)
Hot water usage for baths													
22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476		(42b)
Hot water usage for other uses													
31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383		(42c)
Average daily hot water use (litres/day)												50.1040	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
54.6627	53.1639	51.5272	49.4895	47.6720	45.7830	45.3900	47.0234	48.6986	50.6385	52.6942	54.5859		(44)
Energy conte	86.5724	75.7046	79.1954	67.7487	64.1757	56.2956	54.8953	58.2247	60.0502	68.7160	75.0726	85.4684	(45)
Energy content (annual)												832.1197	
Distribution loss (46)m = 0.15 x (45)m													
12.9859	11.3557	11.8793	10.1623	9.6263	8.4443	8.2343	8.7337	9.0075	10.3074	11.2609	12.8203		(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												1.0140	(55)
Total storage loss													
31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340		(56)
If cylinder contains dedicated solar storage													
31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340		(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													
118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024		(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													
118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024		(64)
12Total per year (kWh/year)												1202.2297	(64)
Electric shower(s)												1202	(64)
42.0893	37.5019	40.9507	39.0787	39.8120	37.9768	39.2427	39.8120	39.0787	40.9507	40.1807	42.0893		(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												478.7637	(64a)
Heat gains from water heating, kWh/month													
39.3077	34.5473	36.5701	32.2961	31.2914	28.2125	28.0634	29.3127	29.7364	33.0857	35.0068	38.9406		(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	
84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
74.2695	82.2270	74.2695	76.7452	74.2695	76.7452	74.2695	74.2695	76.7452	74.2695	76.7452	74.2695	74.2695	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376		(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	(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)													
-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	(71)
Water heating gains (Table 5)													
52.8329	51.4096	49.1534	44.8557	42.0584	39.1840	37.7196	39.3988	41.3005	44.4701	48.6206	52.3395		(72)
Total internal gains													
325.6879	333.7499	319.6862	309.6678	294.0483	280.9254	270.4890	270.6404	278.8679	290.7581	307.7307	318.6981		(73)

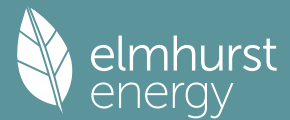
6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
North					5.5500	10.6334	0.4000	0.7000			0.7700			11.4513 (74)
West					5.5500	19.6403	0.4000	0.7000			0.7700			21.1510 (80)
Solar gains	32.6024	63.2600	105.3266	159.1094	202.2550	210.8138	199.1173	165.7622	123.9600	75.1461	40.4995	26.9400 (83)		
Total gains	358.2902	397.0099	425.0128	468.7771	496.3033	491.7393	469.6063	436.4026	402.8279	365.9042	348.2302	345.6381 (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	
91.9238	92.2348	92.5479	94.1458	94.4720	96.1376	96.1376	96.4778	95.4643	94.4720	93.8218	93.1805		
alpha	7.1283	7.1490	7.1699	7.2764	7.2981	7.4092	7.4092	7.4319	7.3643	7.2981	7.2548	7.2120	
util living area													

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	0.9936	0.9855	0.9633	0.8714	0.6929	0.4841	0.3493	0.3914	0.6341	0.9100	0.9834	0.9949 (86)
MIT	20.3394	20.4751	20.6590	20.8827	20.9798	20.9987	20.9999	20.9998	20.9917	20.8615	20.5766	20.3219 (87)
Th 2	20.2707	20.2730	20.2753	20.2868	20.2891	20.3006	20.3006	20.3029	20.2960	20.2891	20.2845	20.2799 (88)
util rest of house												
	0.9917	0.9813	0.9528	0.8422	0.6459	0.4318	0.2938	0.3322	0.5733	0.8816	0.9778	0.9933 (89)
MIT 2	19.6722	19.8076	19.9872	20.1997	20.2770	20.3000	20.3005	20.3028	20.2920	20.1878	19.9181	19.6627 (90)
Living area fraction												
MIT	20.0591	20.1947	20.3769	20.5959	20.6846	20.7053	20.7062	20.7071	20.6979	20.5785	20.3000	20.0451 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0591	20.1947	20.3769	20.5959	20.6846	20.7053	20.7062	20.7071	20.6979	20.5785	20.3000	20.0451 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9910	0.9807	0.9545	0.8555	0.6724	0.4621	0.3260	0.3666	0.6083	0.8940	0.9779	0.9927	(94)
Useful gains	355.0589	389.3666	405.6550	401.0259	333.7250	227.2505	153.0888	159.9801	245.0548	327.1165	340.5319	343.1142	(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													
	614.5774	594.4553	537.5226	445.3523	340.9331	227.6578	153.1144	160.0387	247.7616	378.6479	504.3626	609.5939	(97)
Space heating kWh													
	193.0817	137.8196	98.1095	31.9150	5.3628	0.0000	0.0000	0.0000	0.0000	38.3393	117.9581	198.2609	(98a)
Space heating requirement - total per year (kWh/year)												820.8469	
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													
	193.0817	137.8196	98.1095	31.9150	5.3628	0.0000	0.0000	0.0000	0.0000	38.3393	117.9581	198.2609	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												820.8469	
Space heating per m2											(98c) / (4) =	16.4169	(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 %)		100.0000	(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													
	193.0817	137.8196	98.1095	31.9150	5.3628	0.0000	0.0000	0.0000	0.0000	38.3393	117.9581	198.2609	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	193.0817	137.8196	98.1095	31.9150	5.3628	0.0000	0.0000	0.0000	0.0000	38.3393	117.9581	198.2609	(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													
	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024	(64)
Efficiency of water heater													
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month													
	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024	(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	14.1806	12.8083	14.1806	13.7232	14.1806	13.7232	14.1806	14.1806	13.7232	14.1806	13.7232	14.1806	(231)
Lighting	14.7493	11.8324	10.6538	7.8054	6.0291	4.9259	5.5000	7.1491	9.2859	12.1837	13.7614	15.1592	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-10.3944	-19.2789	-37.1188	-53.8163	-68.1984	-67.6191	-66.2440	-56.3940	-41.3743	-25.6295	-12.7023	-8.4095	(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												820.8469	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1202.2297	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)													
mechanical ventilation fans (SFP = 0.8260)												125.9650	(230a)
central heating pump												41.0000	(230c)
Total electricity for the above, kWh/year												166.9650	(231)
Electricity for lighting (calculated in Appendix L)												119.0353	(232)

Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-467.1795	(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												2320.6610	(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 (high-rate cost)	738.7622	0.1651	121.9645 (261)
Space heating - main system 1 (low-rate cost)	82.0847	0.1386	11.3770 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	107.0985	0.1476	15.8103 (264)
Water heating - low rate cost	1095.1312	0.1239	135.6828 (264)
Energy for instantaneous electric shower(s)	478.7637	0.1436	68.7632 (264a)
Space and water heating			284.8346 (265)
Pumps, fans and electric keep-hot	166.9650	0.1432	23.3499 (267)
Energy for lighting	119.0353	0.1490	17.7386 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-467.1795	0.1342	-62.7142
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-62.7142 (269)
Total CO2, kg/year			331.9721 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.6400 (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 (high-rate cost)	738.7622	1.4537	1193.2430 (275)
Space heating - main system 1 (low-rate cost)	82.0847	1.5022	123.3066 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	107.0985	1.5518	166.2006 (278)
Water heating - low rate cost	1095.1312	1.4433	1580.5703 (278)
Energy for instantaneous electric shower(s)	478.7637	1.5350	734.9193 (278a)
Space and water heating			3063.3206 (279)
Pumps, fans and electric keep-hot	166.9650	1.5335	253.4523 (281)
Energy for lighting	119.0353	1.5547	185.0694 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-467.1795	1.5008	-701.1203
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-701.1203 (283)
Total Primary energy kWh/year			3535.6413 (286)
Dwelling Primary energy Rate (DPER)			70.7100 (287)

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

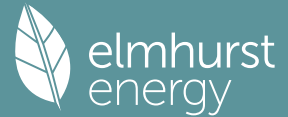
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	50.0000 (1b)	x 2.5000 (2b)	= 125.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 125.0000 (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	2 * 10 = 20.0000 (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) =	20.0000 / (5) = 0.1600 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4100 (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) = 0.3485 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	0.4443 0.4356 0.4269 0.3834 0.3746 0.3311 0.3311 0.3224 0.3485 0.3746 0.3921 0.4095 (22b)
Effective ac	0.5987 0.5949 0.5911 0.5735 0.5702 0.5548 0.5548 0.5520 0.5607 0.5702 0.5769 0.5838 (25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K						
TER Semi-glazed door			2.7800	1.0000	2.7800			(26a)					
TER Opening Type (Uw = 1.20)			9.7200	1.1450	11.1298			(27)					
LGF-Floor			55.0000	0.1300	7.1500			(28a)					
1st-N-Wall	23.8500	4.8600	18.9900	0.1800	3.4182			(29a)					
1st-W-Wall	16.2000	7.6400	8.5600	0.1800	1.5408			(29a)					
External Roof 1	25.9100		25.9100	0.1100	2.8501			(30)					
Total net area of external elements Aum(A, m2)			120.9600					(31)					
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.8689			(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							269.1098	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value		Total						
E5 Ground floor (normal)				11.8100	0.1600		1.8896						
E6 Intermediate floor within a dwelling				11.8100	0.0000		0.0000						
E16 Corner (normal)				6.0000	0.0900		0.5400						
E18 Party wall between dwellings				6.0000	0.0600		0.3600						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							2.7896	(36)					
Point Thermal bridges						(36a) =	0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	31.6585	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 24.6971	Feb 24.5390	Mar 24.3840	Apr 23.6560	May 23.5198	Jun 22.8857	Jul 22.8857	Aug 22.7683	Sep 23.1300	Oct 23.5198	Nov 23.7953	Dec 24.0834	(38)
Heat transfer coeff	56.3556	56.1975	56.0425	55.3145	55.1783	54.5442	54.5442	54.4268	54.7884	55.1783	55.4538	55.7419	(39)
Average = Sum(39)m / 12 =												55.3138	
HLP	Jan 1.1271	Feb 1.1239	Mar 1.1208	Apr 1.1063	May 1.1036	Jun 1.0909	Jul 1.0909	Aug 1.0885	Sep 1.0958	Oct 1.1036	Nov 1.1091	Dec 1.1148	(40)
HLP (average)												1.1063	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

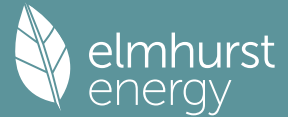
Assumed occupancy													1.6901	(42)
Hot water usage for mixer showers	52.5569	51.7671	50.6162	48.4141	46.7890	44.9767	43.9465	45.0888	46.3409	48.2867	50.5361	52.3556	(42a)	
Hot water usage for baths	22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476	(42b)	
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383	(42c)	
Average daily hot water use (litres/day)													98.5597	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	107.2197	104.9310	102.1434	97.9036	94.4609	90.7597	89.3366	92.1121	95.0395	98.9252	103.2304	106.9415	(44)	
Energy content (annual)	169.8097	149.4203	156.9906	134.0251	127.1626	111.5996	108.0448	114.0541	117.1932	134.2406	147.0706	167.4445	(45)	
Distribution loss (46)m = 0.15 x (45)m	25.4715	22.4130	23.5486	20.1038	19.0744	16.7399	16.2067	17.1081	17.5790	20.1361	22.0606	25.1167	(46)	
Water storage loss:														
Store volume													150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)	
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month	216.4047	191.5060	203.5855	179.1170	173.7575	156.6915	154.6398	160.6490	162.2850	180.8355	192.1624	214.0394	(62)	
WWHRS	-24.0268	-21.2495	-22.2513	-18.4249	-17.1714	-14.6937	-13.7730	-14.6462	-15.2026	-17.9222	-20.3037	-23.5819	(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	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575	(64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		1962.4258	(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	93.7377	83.3508	89.4753	80.6368	79.5575	73.1803	73.2008	75.1989	75.0402	81.9109	84.9744	92.9512	(65)	

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

Metabolic gains (Table 5), Watts													
(66)m	Jan 84.5050	Feb 84.5050	Mar 84.5050	Apr 84.5050	May 84.5050	Jun 84.5050	Jul 84.5050	Aug 84.5050	Sep 84.5050	Oct 84.5050	Nov 84.5050	Dec 84.5050	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
75.0263	83.0649	75.0263	77.5272	75.0263	77.5272	75.0263	75.0263	77.5272	75.0263	77.5272	75.0263	75.0263	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376	140.7376	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	(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)													
-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	(71)
Water heating gains (Table 5)													
125.9915	124.0340	120.2625	111.9956	106.9321	101.6394	98.3882	101.0738	104.2225	110.0953	118.0201	124.9344	124.9344	(72)
Total internal gains	399.6033	407.2121	391.5520	377.5897	359.6789	344.1628	331.9144	333.0722	342.5719	357.1402	377.9122	392.0499	(73)

6. Solar gains

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[Jan]	Area m2				Solar flux Table 6a W/m2	Specific data or Table 6b	Specific data or Table 6c	FF	Access factor Table 6d	Gains W		
North	4.8600				10.6334	0.6300	0.7000	0.7000	0.7700	15.7936 (74)		
West	4.8600				19.6403	0.6300	0.7000	0.7000	0.7700	29.1713 (80)		
Solar gains	44.9648	87.2475	145.2654	219.4419	278.9479	290.7522	274.6204	228.6174	170.9643	103.6407	55.8565	37.1553 (83)
Total gains	444.5681	494.4596	536.8174	597.0316	638.6268	634.9150	606.5349	561.6896	513.5362	460.7809	433.7687	429.2052 (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	66.3224	66.5090	66.6929	67.5707	67.7375	68.5249	68.5249	68.6728	68.2195	67.7375	67.4009	67.0526
alpha	5.4215	5.4339	5.4462	5.5047	5.5158	5.5683	5.5683	5.5782	5.5480	5.5158	5.4934	5.4702
util living area	0.9909	0.9826	0.9619	0.8902	0.7413	0.5408	0.3943	0.4430	0.6951	0.9228	0.9810	0.9924 (86)
MIT	19.9839	20.1493	20.3980	20.7193	20.9191	20.9883	20.9983	20.9969	20.9570	20.6970	20.2969	19.9615 (87)
Th 2	19.9788	19.9813	19.9838	19.9957	19.9979	20.0083	20.0083	20.0102	20.0043	19.9979	19.9934	19.9887 (88)
util rest of house	0.9879	0.9770	0.9494	0.8577	0.6804	0.4611	0.3062	0.3492	0.6111	0.8918	0.9737	0.9898 (89)
MIT 2	18.8213	19.0316	19.3425	19.7299	19.9369	20.0025	20.0078	20.0092	19.9789	19.7165	19.2289	18.8005 (90)
Living area fraction	19.4956	19.6798	19.9547	20.3038	20.5065	20.5742	20.5823	20.5821	20.5462	20.2852	19.8484	0.5800 (91)
MIT	19.4956	19.6798	19.9547	20.3038	20.5065	20.5742	20.5823	20.5821	20.5462	20.2852	19.8484	19.4739 (92)
Temperature adjustment												0.0000
adjusted MIT	19.4956	19.6798	19.9547	20.3038	20.5065	20.5742	20.5823	20.5821	20.5462	20.2852	19.8484	19.4739 (93)
8. Space heating requirement												
Utilisation	0.9860	0.9749	0.9490	0.8685	0.7124	0.5071	0.3574	0.4037	0.6583	0.9018	0.9724	0.9882 (94)
Useful gains	438.3613	482.0733	509.4523	518.5517	454.9736	321.9447	216.7525	226.7363	338.0533	415.5322	421.8118	424.1231 (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	856.3549	830.5894	754.0333	630.7924	485.9291	325.8600	217.2112	227.6162	353.1778	534.4128	706.9455	851.3954 (97)
Space heating kWh	310.9873	234.2029	181.9683	80.8133	23.0308	0.0000	0.0000	0.0000	0.0000	88.4472	205.2962	317.8906 (98a)
Space heating requirement - total per year (kWh/year)												1442.6366
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	310.9873	234.2029	181.9683	80.8133	23.0308	0.0000	0.0000	0.0000	0.0000	88.4472	205.2962	317.8906 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1442.6366
Space heating per m2										(98c) / (4) =		28.8527 (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	310.9873	234.2029	181.9683	80.8133	23.0308	0.0000	0.0000	0.0000	0.0000	88.4472	205.2962	317.8906 (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)	336.9310	253.7409	197.1487	87.5551	24.9522	0.0000	0.0000	0.0000	0.0000	95.8257	222.4228	344.4102 (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	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
Efficiency of water heater (217)m	85.1306	84.7753	84.0676	82.6014	80.8507	79.8000	79.8000	79.8000	79.8000	82.7511	84.4595	79.8000 (216)
Fuel for water heating, kWh/month	225.9797	200.8327	215.7004	194.5391	193.6732	177.9421	176.5248	182.9609	184.3137	196.8713	203.4806	85.1999 (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	15.5890	12.5061	11.2603	8.2498	6.3724	5.2063	5.8131	7.5561	9.8146	12.8773	14.5449	16.0223 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-17.2190	-25.1717	-37.5148	-43.8066	-48.6813	-46.0001	-45.4689	-42.2255	-36.7229	-29.5315	-19.2571	-14.7863 (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)	-7.1843	-15.3457	-30.9250	-47.0606	-62.8078	-63.2887	-62.5126	-52.6375	-38.2202	-22.1131	-9.6488	-5.6617 (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												1562.9866 (211)

Full SAP Calculation Printout



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	2376.3605	(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)	125.8121	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-823.7918	(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	3327.3674	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1562.9866	0.2100	328.2272 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2376.3605	0.2100	499.0357 (264)
Space and water heating			827.2629 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	125.8121	0.1443	18.1586 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-406.3859	0.1338	-54.3750
PV Unit electricity exported	-417.4059	0.1255	-52.3950
Total			-106.7700 (269)
Total CO2, kg/year			750.5807 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.0100 (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	1562.9866	1.1300	1766.1748 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2376.3605	1.1300	2685.2874 (278)
Space and water heating			4451.4622 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	125.8121	1.5338	192.9748 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-406.3859	1.4945	-607.3286
PV Unit electricity exported	-417.4059	0.4607	-192.3189
Total			-799.6475 (283)
Total Primary energy kWh/year			3974.8903 (286)
Target Primary Energy Rate (TPER)			79.5000 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	50

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

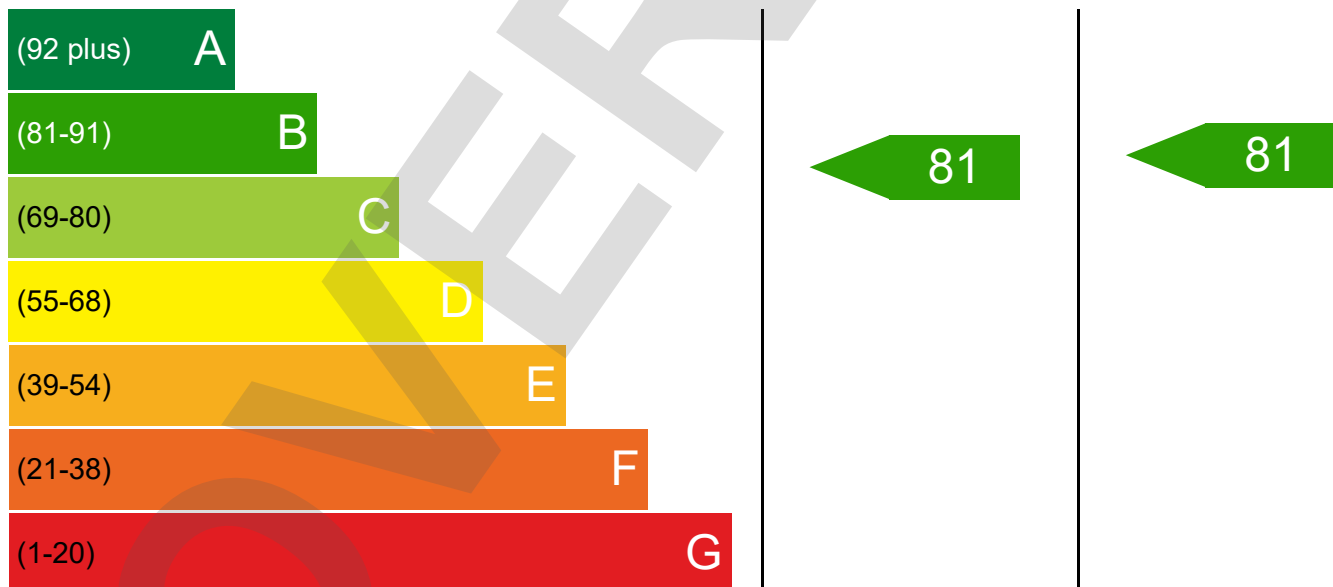
Energy Rating

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



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 0.14 W/m ² K	Very Good
Roof	Average thermal transmittance 0.1 W/m ² K	Very Good
Floor	Average thermal transmittance 0.09 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 59 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: **0.3** per year

Overview Report

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

£346

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 2-2	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	85 B	DER	4.44	TER	10.61
Environmental	96 A	% DER < TER			58.15
CO ₂ Emissions (t/year)	0.29	DFEE	21.24	TFEE	25.58
Compliance Check	See BREL	% DFEE < TFEE			16.94
% DPER < TPER	13.84	DPER	48.15	TPER	55.88

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, Semi-Detached
Position of Flat	Mid-floor flat
Which Floor	2
2.0 Number of Storeys	1
3.0 Date Built	2022
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	7 Hour Off Peak
Smart electricity meter fitted	No
Smart gas meter fitted	No

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:	20.30 m	74.00 m ²	2.50 m
1st Storey:	11.60 m	31.40 m ²	3.00 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	27.20	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
1st-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	33.06	33.06	0.00	None	0.00	Enter Gross Area
1st-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	26.40	18.07	0.00	None	8.33	Enter Gross Area
1st-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	7.20	7.20	0.00	None	0.00	Enter Gross Area

10.0 External Roofs										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Flat roof	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	31.67	31.67	None	0.00	Enter Gross Area	0.00

10.1 Party Ceilings

Summary for Input Data

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling	Precast concrete planks floor, screed, carpeted	30.00	74.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	Lowest occupied	Precast concrete planks floor, screed, carpeted	30.00	74.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
1st-W-Door	Door	1st-S-Wall	West	2.78	0
1st-W-Window	Window	1st-S-Wall	West	5.55	0

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

User Input

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		20.30	0.00	0.00	No
E6 Intermediate floor within a dwelling		20.30	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value: 0.04 W/m²K

Description: Bridge

18.0 Pressure Testing

Yes

Designed AP₅₀: 3.00 m³/(h.m²) @ 50 Pa

Property Tested?: Yes

Test Method: Blower Door

As Built AP₅₀: 0.10 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present: Yes

Approved Installation: No

Mechanical Ventilation data Type: Database

Type: Balanced mechanical ventilation with heat recovery

MV Reference Number: 500500

Configuration: 2

Manufacturer SFP: 0.59

Duct Type: Rigid

MVHR Efficiency: 89.00

Wet Rooms: 2

SFP from Installer Commissioning Certificate: No

MVHR System Location: Inside heated envelope (installed exclusively)

Duct Installation Specification: Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

No

22.0 Lighting

No Fixed Lighting: No

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	12

Summary for Input Data

24.0 Main Heating 1

.0 Main Heating 1		SAP table	
Percentage of Heat		100.00	%
Database Ref. No.		0	
Fuel Type		Electricity	
SAP Code		191	
In Winter		100.00	
In Summer		100.00	
Controls SAP Code		2106	
Delayed Start Stat		No	
Burner Control		On/Off	
HETAS approved System		No	
Oil Pump Inside		No	
Flue Type		Open	
Fan Assisted Flue		No	
Is MHS Pumped		Pump in heated space	
Heating Pump Age		2013 or later	
Heat Emitter		Radiators	
Flow Temperature		Unknown	
Boiler Interlock		No	
Electric CPSU Temperature		60.00	
Combi boiler type		No Combi	
Combi keep hot type		Electric, time clock	

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

28.3 Waste Water Heat Recovery System

Summary for Input Data

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

One Dwelling
Export Capable Meter?
No
Connected To Dwelling
Yes
Diverter
No
Battery Capacity [kWh]
3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

None
Electricity Generated
0.00
Apportioned
0.00
Connected to dwelling's electricity meter
Yes
Electricity Generation
Annual

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

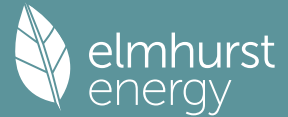
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023
Assessment Reference	Flat 2-2	Prop Type Ref	22403			
Property	Braemar Avenue, London, Greater London, N22 7BY					
SAP Rating	85 B	DER	4.44	TER	10.61	
Environmental	96 A	% DER < TER				58.15
CO ₂ Emissions (t/year)	0.29	DFEE	21.24	TFEE	25.58	
Compliance Check	See BREL	% DFEE < TFEE				16.94
% DPER < TPER	13.84	DPER	48.15	TPER	55.88	
Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	74.0000 (1b)	2.5000 (2b)	185.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		185.0000 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	185.0000 (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	0 * 10 = 0.0000 (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) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.0000	(17)
Infiltration rate	0.1500	(18)
Number of sides sheltered	2	(19)

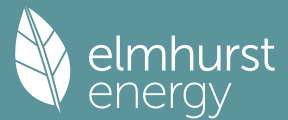
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275 (21)

	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	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (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
Door			2.7800	0.9000	2.5020		(26a)
Window (Uw = 0.90)			5.5500	0.8687	4.8214		(27)
1st-W-Wall	33.0600	8.3300	33.0600	0.1400	4.6284	190.0000	6281.4003 (29a)
1st-S-Wall	26.4000		18.0700	0.1400	2.5298	190.0000	3433.2999 (29a)
1st-E-Wall	7.2000		7.2000	0.1400	1.0080	190.0000	1368.0000 (29a)
Flat roof	31.6700		31.6700	0.1000	3.1670	9.0000	285.0300 (30)
Total net area of external elements Aum(A, m ²)			98.3300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	18.6566		(33)
Party Floor			74.0000			40.0000	2960.0000 (32d)
Party Ceiling			74.0000			30.0000	2220.0000 (32b)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16547.7302 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							223.6180 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							3.9332 (36)
Point Thermal bridges						(36a) =	0.0000

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Total fabric heat loss (33) + (36) + (36a) = 22.5898 (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	15.9989	15.8043	15.6097	14.6367	14.4421	13.4692	13.4692	13.2746	13.8583	14.4421	14.8313	15.2205 (38)
Heat transfer coeff	38.5887	38.3941	38.1996	37.2266	37.0320	36.0590	36.0590	35.8644	36.4482	37.0320	37.4212	37.8104 (39)
Average = Sum(39)m / 12 =												37.1779

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.5215	0.5188	0.5162	0.5031	0.5004	0.4873	0.4873	0.4847	0.4925	0.5004	0.5057	0.5110 (40)
HLP (average)												0.5024
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.3392 (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 27.4046 26.9976 26.4245 25.3677 24.5764 23.6990 23.2251 23.7942 24.4139 25.3527 26.4313 27.3120 (42b)

Hot water usage for other uses 38.5857 37.1826 35.7795 34.3763 32.9732 31.5701 31.5701 32.9732 34.3763 35.7795 37.1826 38.5857 (42c)

Average daily hot water use (litres/day) 60.4863 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	65.9903	64.1802	62.2039	59.7441	57.5497	55.2691	54.7952	56.7674	58.7902	61.1322	63.6138	65.8977 (44)
Energy conte	104.5125	91.3917	95.6051	81.7866	77.4729	67.9598	66.2700	70.2899	72.4942	82.9558	90.6296	103.1798 (45)
Energy content (annual)												Total = Sum(45)m = 1004.5481
Distribution loss (46)m = 0.15 x (45)m	15.6769	13.7088	14.3408	12.2680	11.6209	10.1940	9.9405	10.5435	10.8741	12.4434	13.5944	15.4770 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												1.0140 (55)
Total storage loss	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340 (56)
If cylinder contains dedicated solar storage	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340 (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	135.9465	119.7837	127.0391	112.2066	108.9069	98.3798	97.7040	101.7239	102.9142	114.3898	121.0496	134.6138 (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	135.9465	119.7837	127.0391	112.2066	108.9069	98.3798	97.7040	101.7239	102.9142	114.3898	121.0496	134.6138 (64)
Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 1374.6581 (64)
Electric shower(s)	50.8051	45.2677	49.4306	47.1711	48.0562	45.8410	47.3690	48.0562	47.1711	49.4306	48.5012	50.8051 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												577.9048 (64a)
Heat gains from water heating, kWh/month	47.4517	41.7047	44.1464	38.9868	37.7738	34.0569	33.8770	35.3855	35.8971	39.9405	42.2596	47.0086 (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	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	127.1810	140.8075	127.1810	131.4203	127.1810	131.4203	127.1810	127.1810	131.4203	127.1810	131.4203	127.1810 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960 (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)	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678 (71)
Water heating gains (Table 5)	63.7791	62.0605	59.3365	54.1484	50.7712	47.3012	45.5336	47.5611	49.8571	53.6834	58.6939	63.1835 (72)
Total internal gains	458.4953	472.5455	450.7965	438.3550	416.2310	400.3654	385.2494	385.1346	397.0684	411.1481	434.9054	448.7907 (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
West	5.5500	19.6403	0.4000	0.7000	0.7700	21.1510 (80)
Solar gains	21.1510	41.3759	68.1402	99.3785	121.7920	124.6758
Total gains	479.6463	513.9214	518.9367	537.7334	538.0230	525.0412
						503.9459
						487.0931
						476.3183
						460.2441
						461.2783
						466.1843 (84)

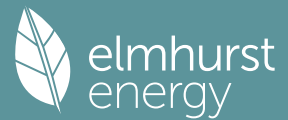
7. Mean internal temperature (heating season)

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	119.1174	119.7212	120.3310	123.4761	124.1250	127.4742	127.4742	128.1659	126.1131	124.1250	122.8340	121.5696
alpha	8.9412	8.9814	9.0221	9.2317	9.2750	9.4983	9.4983	9.5444	9.4075	9.2750	9.1889	9.1046
util living area												

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	0.9807	0.9619	0.9269	0.8060	0.6364	0.4394	0.3148	0.3387	0.5274	0.8056	0.9468	0.9834 (86)
MIT	20.6857	20.7762	20.8682	20.9691	20.9964	20.9999	21.0000	21.0000	20.9995	20.9740	20.8488	20.6800 (87)
Th 2	20.5012	20.5036	20.5060	20.5180	20.5204	20.5325	20.5325	20.5349	20.5277	20.5204	20.5156	20.5108 (88)
util rest of house												
	0.9765	0.9542	0.9134	0.7807	0.6048	0.4074	0.2814	0.3044	0.4915	0.7761	0.9355	0.9797 (89)
MIT 2	20.2180	20.3072	20.3956	20.4950	20.5181	20.5325	20.5325	20.5349	20.5274	20.5020	20.3878	20.2212 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	20.3899	20.4796	20.5694	20.6693	20.6939	20.7043	20.7043	20.7059	20.7009	20.6755	20.5573	0.3676 (91)
Temperature adjustment												0.0000
adjusted MIT	20.3899	20.4796	20.5694	20.6693	20.6939	20.7043	20.7043	20.7059	20.7009	20.6755	20.5573	20.3898 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9755	0.9538	0.9152	0.7888	0.6163	0.4192	0.2937	0.3170	0.5047	0.7859	0.9365	0.9787	(94)
Useful gains	467.8877	490.1912	474.9520	424.1658	331.5673	220.0808	147.9973	154.4254	240.3983	361.7106	432.0030	456.2411	(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	620.8902	598.1650	537.4429	438.1292	333.0629	220.1140	147.9983	154.4272	240.5914	373.1146	503.5867	612.1418	(97)
Space heating kWh	113.8339	72.5584	46.4932	10.0536	1.1127	0.0000	0.0000	0.0000	0.0000	8.4846	51.5402	115.9901	(98a)
Space heating requirement - total per year (kWh/year)												420.0667	
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	113.8339	72.5584	46.4932	10.0536	1.1127	0.0000	0.0000	0.0000	0.0000	8.4846	51.5402	115.9901	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												420.0667	
Space heating per m2												5.6766	(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 %)		100.0000	(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	113.8339	72.5584	46.4932	10.0536	1.1127	0.0000	0.0000	0.0000	0.0000	8.4846	51.5402	115.9901	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	113.8339	72.5584	46.4932	10.0536	1.1127	0.0000	0.0000	0.0000	0.0000	8.4846	51.5402	115.9901	(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	135.9465	119.7837	127.0391	112.2066	108.9069	98.3798	97.7040	101.7239	102.9142	114.3898	121.0496	134.6138	(64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	135.9465	119.7837	127.0391	112.2066	108.9069	98.3798	97.7040	101.7239	102.9142	114.3898	121.0496	134.6138	(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	19.3158	17.4465	19.3158	18.6927	19.3158	18.6927	19.3158	19.3158	18.6927	19.3158	18.6927	19.3158	(231)
Lighting	25.2570	20.2621	18.2438	13.3662	10.3244	8.4352	9.4183	12.2423	15.9015	20.8636	23.5654	25.9590	(232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-10.2060	-18.6741	-35.3724	-50.5886	-63.8768	-63.2842	-62.0221	-53.0753	-39.3120	-24.6075	-12.3919	-8.2764	(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												420.0667	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1374.6581	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)													
mechanical ventilation fans (SFP = 0.8260)												186.4282	(230a)
central heating pump												41.0000	(230c)
Total electricity for the above, kWh/year												227.4282	(231)
Electricity for lighting (calculated in Appendix L)												203.8389	(232)

Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-441.6873	(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												2362.2094	(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 (high-rate cost)	378.0600	0.1666	62.9940 (261)
Space heating - main system 1 (low-rate cost)	42.0067	0.1399	5.8757 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	151.0120	0.1477	22.3105 (264)
Water heating - low rate cost	1223.6461	0.1240	151.7249 (264)
Energy for instantaneous electric shower(s)	577.9048	0.1436	83.0026 (264a)
Space and water heating			242.9051 (265)
Pumps, fans and electric keep-hot	227.4282	0.1432	31.7396 (267)
Energy for lighting	203.8389	0.1490	30.3760 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-441.6873	0.1344	-59.3641
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-59.3641 (269)
Total CO2, kg/year			328.6592 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.4400 (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 (high-rate cost)	378.0600	1.4586	612.7024 (275)
Space heating - main system 1 (low-rate cost)	42.0067	1.5072	63.3142 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	151.0120	1.5523	234.4113 (278)
Water heating - low rate cost	1223.6461	1.4437	1766.5324 (278)
Energy for instantaneous electric shower(s)	577.9048	1.5350	887.1044 (278a)
Space and water heating			2676.9603 (279)
Pumps, fans and electric keep-hot	227.4282	1.5335	344.9304 (281)
Energy for lighting	203.8389	1.5547	316.9174 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-441.6873	1.5013	-663.1251
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-663.1251 (283)
Total Primary energy kWh/year			3562.7875 (286)
Dwelling Primary energy Rate (DPER)			48.1500 (287)

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

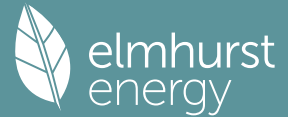
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	74.0000 (1b)	x 2.5000 (2b)	= 185.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 185.0000 (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) = 0.1622 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4122 (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) = 0.3503 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	0.4467 0.4379 0.4292 0.3854 0.3766 0.3328 0.3328 0.3241 0.3503 0.3766 0.3941 0.4116 (22b)
Effective ac	0.5998 0.5959 0.5921 0.5743 0.5709 0.5554 0.5554 0.5525 0.5614 0.5709 0.5777 0.5847 (25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K						
TER Semi-glazed door			2.7800	1.0000	2.7800			(26a)					
TER Opening Type (Uw = 1.20)			5.5500	1.1450	6.3550			(27)					
1st-W-Wall	33.0600		33.0600	0.1800	5.9508			(29a)					
1st-S-Wall	26.4000	8.3300	18.0700	0.1800	3.2526			(29a)					
1st-E-Wall	7.2000		7.2000	0.1800	1.2960			(29a)					
Flat roof	31.6700		31.6700	0.1100	3.4837			(30)					
Total net area of external elements Aum(A, m2)			98.3300					(31)					
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.1181			(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							233.6180	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value		Total						
E5 Ground floor (normal)				20.3000	0.1600		3.2480						
E6 Intermediate floor within a dwelling				20.3000	0.0000		0.0000						
E16 Corner (normal)				6.0000	0.0900		0.5400						
E18 Party wall between dwellings				6.0000	0.0600		0.3600						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.1480	(36)					
Point Thermal bridges						(36a) =	0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	27.2661	(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	36.6155	36.3790	36.1471	35.0583	34.8546	33.9062	33.9062	33.7306	34.2715	34.8546	35.2667	35.6976	(38)
Heat transfer coeff	63.8815	63.6450	63.4132	62.3244	62.1207	61.1723	61.1723	60.9967	61.5376	62.1207	62.5328	62.9636	(39)
Average = Sum(39)m / 12 =												62.3234	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.8633	0.8601	0.8569	0.8422	0.8395	0.8267	0.8267	0.8243	0.8316	0.8395	0.8450	0.8509	(40)
HLP (average)												0.8422	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

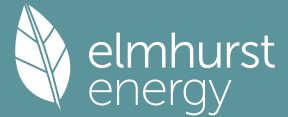
Assumed occupancy													2.3392	(42)
Hot water usage for mixer showers	63.4403	62.4869	61.0976	58.4395	56.4779	54.2903	53.0469	54.4256	55.9370	58.2858	61.0010	63.1972	(42a)	
Hot water usage for baths	27.4046	26.9976	26.4245	25.3677	24.5764	23.6990	23.2251	23.7942	24.4139	25.3527	26.4313	27.3120	(42b)	
Hot water usage for other uses	38.5857	37.1826	35.7795	34.3763	32.9732	31.5701	31.5701	32.9732	34.3763	35.7795	37.1826	38.5857	(42c)	
Average daily hot water use (litres/day)												118.9761	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	129.4306	126.6671	123.3016	118.1836	114.0275	109.5594	107.8421	111.1931	114.7272	119.4180	124.6149	129.0949	(44)	
Energy content (annual)	204.9864	180.3722	189.5099	161.7874	153.5030	134.7161	130.4256	137.6802	141.4701	162.0491	177.5367	202.1314	(45)	
Distribution loss (46)m = 0.15 x (45)m	30.7480	27.0558	28.4265	24.2681	23.0254	20.2074	19.5638	20.6520	21.2205	24.3074	26.6305	30.3197	(46)	
Water storage loss:														
Store volume													150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)	
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month	251.5813	222.4579	236.1048	206.8792	200.0979	179.8079	177.0205	184.2751	186.5620	208.6440	222.6285	248.7263	(62)	
WWHRS	-29.0022	-25.6498	-26.8599	-22.2403	-20.7272	-17.7364	-16.6250	-17.6791	-18.3508	-21.6335	-24.5082	-28.4652	(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	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611	(64)	
12Total per year (kWh/year)													2255.3088	(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	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													0.0000	(64a)
Heat gains from water heating, kWh/month	105.4339	93.6423	100.2880	89.8678	88.3157	80.8666	80.6424	83.0546	83.1123	91.1572	95.1044	104.4846	(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	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	127.1810	140.8075	127.1810	131.4203	127.1810	131.4203	127.1810	127.1810	131.4203	127.1810	131.4203	127.1810	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	(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)	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	(71)
Water heating gains (Table 5)	141.7122	139.3487	134.7956	124.8164	118.7038	112.3147	108.3904	111.6325	115.4337	122.5232	132.0895	140.4363	(72)
Total internal gains	536.4284	549.8337	526.2556	509.0230	484.1636	465.3789	448.1062	449.2061	462.6451	479.9879	508.3010	526.0434	(73)

6. Solar gains

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[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
West	5.5500				19.6403		0.6300		0.7000		0.7700	33.3129 (80)
Solar gains	33.3129	65.1671	107.3209	156.5211	191.8224	196.3644	186.9469	160.5846	124.8186	77.3262	41.5372	27.3949 (83)
Total gains	569.7412	615.0007	633.5764	665.5440	675.9861	661.7433	635.0531	609.7907	587.4637	557.3141	549.8382	553.4383 (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	75.1727	75.4520	75.7279	77.0509	77.3036	78.5020	78.5020	78.7280	78.0360	77.3036	76.7941	76.2686
alpha	6.0115	6.0301	6.0485	6.1367	6.1536	6.2335	6.2335	6.2485	6.2024	6.1536	6.1196	6.0846
util living area	0.9891	0.9811	0.9648	0.9075	0.7846	0.5822	0.4227	0.4582	0.6932	0.9152	0.9768	0.9906 (86)
MIT	20.1863	20.3184	20.5010	20.7562	20.9231	20.9899	20.9988	20.9981	20.9717	20.7790	20.4610	20.1741 (87)
Th 2	20.1988	20.2016	20.2043	20.2169	20.2193	20.2303	20.2303	20.2323	20.2260	20.2193	20.2145	20.2095 (88)
util rest of house	0.9862	0.9760	0.9551	0.8836	0.7373	0.5162	0.3494	0.3828	0.6264	0.8883	0.9697	0.9881 (89)
MIT 2	19.2574	19.4259	19.6560	19.9725	20.1550	20.2243	20.2299	20.2316	20.2073	20.0056	19.6170	19.2503 (90)
Living area fraction	19.5988	19.7540	19.9666	20.2606	20.4373	20.5057	20.5125	20.5133	20.4882	20.2899	19.9273	19.5899 (92)
MIT	19.5988	19.7540	19.9666	20.2606	20.4373	20.5057	20.5125	20.5133	20.4882	20.2899	19.9273	19.5899 (93)
Temperature adjustment												0.0000
adjusted MIT	19.5988	19.7540	19.9666	20.2606	20.4373	20.5057	20.5125	20.5133	20.4882	20.2899	19.9273	19.5899 (93)
8. Space heating requirement												
Utilisation	0.9834	0.9725	0.9517	0.8850	0.7512	0.5402	0.3763	0.4105	0.6498	0.8911	0.9665	0.9855 (94)
Useful gains	560.2570	598.0987	602.9635	589.0309	507.7779	357.4491	238.9960	250.3233	381.7200	496.6031	531.4389	545.4295 (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	977.3129	945.3802	853.9612	708.0427	542.7678	361.2676	239.3365	250.8987	393.1173	601.9435	802.1243	969.0009 (97)
Space heating kWh	310.2896	233.3732	186.7423	85.6884	26.0325	0.0000	0.0000	0.0000	0.0000	78.3733	194.8934	315.1372 (98a)
Space heating requirement - total per year (kWh/year)												1430.5299
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	310.2896	233.3732	186.7423	85.6884	26.0325	0.0000	0.0000	0.0000	0.0000	78.3733	194.8934	315.1372 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1430.5299
Space heating per m2										(98c) / (4) =		19.3315 (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	310.2896	233.3732	186.7423	85.6884	26.0325	0.0000	0.0000	0.0000	0.0000	78.3733	194.8934	315.1372 (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)	336.1751	252.8420	202.3210	92.8369	28.2042	0.0000	0.0000	0.0000	0.0000	84.9114	211.1522	341.4270 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611 (64)
Efficiency of water heater (217)m	84.8049	84.4429	83.8056	82.4488	80.8384	79.8000	79.8000	79.8000	79.8000	82.2622	84.0230	79.8000 (216)
Fuel for water heating, kWh/month	262.4600	233.0664	249.6801	223.9438	221.8880	203.0972	200.9969	208.7670	210.7910	227.3346	235.7932	259.5504 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	26.4257	21.1997	19.0880	13.9847	10.8021	8.8254	9.8541	12.8087	16.6372	21.8290	24.6558	27.1601 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-25.1847	-36.6412	-54.3141	-63.0226	-69.6324	-65.6001	-64.8238	-60.4091	-52.8422	-42.8166	-28.1002	-21.6450 (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)	-10.9322	-23.3246	-46.9769	-71.4608	-95.3714	-96.1474	-94.9888	-79.9881	-58.0735	-33.6174	-14.6806	-8.6181 (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												1549.8699 (211)
Space heating fuel - main system 2												0.0000 (213)

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Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	79.8000
Water heating fuel used	2737.3687 (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)	213.2705 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-1219.2118 (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	3367.2972 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1549.8699	0.2100	325.4727 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2737.3687	0.2100	574.8474 (264)
Space and water heating			900.3201 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	213.2705	0.1443	30.7815 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-585.0319	0.1339	-78.3558
PV Unit electricity exported	-634.1799	0.1255	-79.6073
Total			-157.9631 (269)
Total CO2, kg/year			785.0677 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.6100 (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	1549.8699	1.1300	1751.3529 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2737.3687	1.1300	3093.2266 (278)
Space and water heating			4844.5795 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	213.2705	1.5338	327.1213 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-585.0319	1.4950	-874.6003
PV Unit electricity exported	-634.1799	0.4608	-292.2026
Total			-1166.8029 (283)
Total Primary energy kWh/year			4134.9988 (286)
Target Primary Energy Rate (TPER)			55.8800 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
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

85

85

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 0.14 W/m ² K	Very Good
Roof	Average thermal transmittance 0.1 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 43 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: **0.3** 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

£367

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 2-3	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	85 B	DER	5.16	TER	12.78
Environmental	97 A	% DER < TER			59.62
CO ₂ Emissions (t/year)	0.22	DFEE	22.54	TFEE	27.41
Compliance Check	See BREL	% DFEE < TFEE			17.77
% DPER < TPER	16.73	DPER	56.19	TPER	67.48

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, Semi-Detached
Position of Flat	Mid-floor flat
Which Floor	2
2.0 Number of Storeys	1
3.0 Date Built	2022
3.0 Property Age Band	L
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	N/A
7.0 Electricity Tariff	7 Hour Off Peak
Smart electricity meter fitted	No
Smart gas meter fitted	No

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:	17.40 m	50.00 m ²	2.50 m
1st Storey:	11.60 m	31.40 m ²	3.00 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	25.50	m ²
-----------------	-------	----------------

9.0 External Walls										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
1st-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	26.10	23.32	0.00	None	2.78	Enter Gross Area
1st-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	26.10	14.99	0.00	None	11.11	Enter Gross Area

10.0 External Roofs										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	7.26	7.26	None	0.00	Enter Gross Area	0.00

10.1 Party Ceilings										
Description	Construction								Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling	Precast concrete planks floor, screed, carpeted								30.00	50.00

Summary for Input Data

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	Lowest occupied	Precast concrete planks floor, screed, carpeted	30.00	50.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
1st-E-Door	Door	1st-E-Wall	East	2.78	0
1st-E-Window	Window	1st-E-Wall	East	8.33	0
1st-S-Window	Window	1st-S-Wall	South	2.78	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		17.40	0.00	0.00	No
E6 Intermediate floor within a dwelling		17.40	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value W/m²K

Description

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	7

24.0 Main Heating 1

Summary for Input Data

Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	191	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2106	
Delayed Start Stat	No	
Burner Control	On/Off	
HETAS approved System	No	
Oil Pump Inside	No	
Flue Type	Balanced	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	No	
Electric CPSU Temperature	60.00	
Combi boiler type	No Combi	
Combi keep hot type	Electric, time clock	

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

28.3 Waste Water Heat Recovery System

Summary for Input Data

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

One Dwelling	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

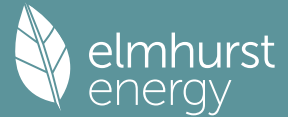
None	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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

Lower cost measures	None
Further measures to achieve even higher standards	None

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023
Assessment Reference	Flat 2-3		Prop Type Ref	22403		
Property	Braemar Avenue, London, Greater London, N22 7BY					
SAP Rating	85 B	DER	5.16	TER	12.78	
Environmental	97 A	% DER < TER				59.62
CO ₂ Emissions (t/year)	0.22	DFEE	22.54	TFEE	27.41	
Compliance Check	See BREL	% DFEE < TFEE				17.77
% DPER < TPER	16.73	DPER	56.19	TPER	67.48	
Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	50.0000 (1b)	2.5000 (2b)	125.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	125.0000 (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											0 * 10 =	0.0000 (7a)
Number of passive vents											0 * 10 =	0.0000 (7b)
Number of flueless gas fires											0 * 40 =	0.0000 (7c)
											Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											0.0000 / (5) =	0.0000 (8)
Pressure test											Yes	
Pressure Test Method											Blower Door	
Measured/design AP50											3.0000 (17)	
Infiltration rate											0.1500 (18)	
Number of sides sheltered											3 (19)	
Shelter factor											(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor											(21) = (18) x (20) =	0.1162 (21)
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
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												
	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation											0.5000 (23a)	
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)											0.5000 (23b)	
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =											80.1000 (23c)	
Effective ac	0.2477	0.2448	0.2419	0.2274	0.2245	0.2099	0.2099	0.2070	0.2157	0.2245	0.2303	0.2361 (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
Door			2.7800	0.9000	2.5020		(26a)
Window (Uw = 0.90)			11.1100	0.8687	9.6515		(27)
1st-S-Wall	26.1000	2.7800	23.3200	0.1400	3.2648	190.0000	4430.8001 (29a)
1st-E-Wall	26.1000	11.1100	14.9900	0.1400	2.0986	190.0000	2848.1001 (29a)
External Roof 1	7.2600		7.2600	0.1000	0.7260	9.0000	65.3400 (30)
Total net area of external elements Aum(A, m ²)			59.4600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		18.2429		(33)
Party Floor			50.0000			40.0000	2000.0000 (32d)
Party Ceiling			50.0000			30.0000	1500.0000 (32b)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		10844.2401 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							216.8848 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							2.3784 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss					(33) + (36) + (36a) =		20.6213 (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	10.2184	10.0985	9.9786	9.3792	9.2593	8.6599	8.6599	8.5400	8.8997	9.2593	9.4991	9.7389	(38)
Heat transfer coeff	30.8397	30.7199	30.6000	30.0006	29.8807	29.2813	29.2813	29.1614	29.5210	29.8807	30.1204	30.3602	(39)
Average = Sum(39)m / 12 =												29.9706	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.6168	0.6144	0.6120	0.6000	0.5976	0.5856	0.5856	0.5832	0.5904	0.5976	0.6024	0.6072	(40)
HLP (average)												0.5994	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.6901 (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	22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476	(42b)
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383	(42c)
Average daily hot water use (litres/day)												50.1040	(43)
Daily hot water use	54.6627	53.1639	51.5272	49.4895	47.6720	45.7830	45.3900	47.0234	48.6986	50.6385	52.6942	54.5859	(44)
Energy conte	86.5724	75.7046	79.1954	67.7487	64.1757	56.2956	54.8953	58.2247	60.0502	68.7160	75.0726	85.4684	(45)
Energy content (annual)												832.1197	
Distribution loss (46)m = 0.15 x (45)m	12.9859	11.3557	11.8793	10.1623	9.6263	8.4443	8.2343	8.7337	9.0075	10.3074	11.2609	12.8203	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												1.0140	(55)
Total storage loss	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(56)
If cylinder contains dedicated solar storage	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(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	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024	(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	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024	(64)
12Total per year (kWh/year)												1202.2297	(64)
Electric shower(s)	42.0893	37.5019	40.9507	39.0787	39.8120	37.9768	39.2427	39.8120	39.0787	40.9507	40.1807	42.0893	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												478.7637	(64a)
Heat gains from water heating, kWh/month	39.3077	34.5473	36.5701	32.2961	31.2914	28.2125	28.0634	29.3127	29.7364	33.0857	35.0068	38.9406	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	74.2680	82.2253	74.2680	76.7436	74.2680	76.7436	74.2680	74.2680	76.7436	74.2680	76.7436	74.2680	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	(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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	(71)
Water heating gains (Table 5)	52.8329	51.4096	49.1534	44.8557	42.0584	39.1840	37.7196	39.3988	41.3005	44.4701	48.6206	52.3395	(72)
Total internal gains	325.6863	333.7482	319.6846	309.6662	294.0468	280.9238	270.4874	270.6389	278.8663	290.7565	307.7291	318.6966	(73)

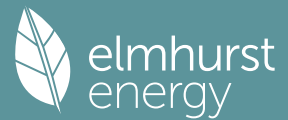
6. Solar gains

[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
East					8.3300	19.6403	0.4000	0.7000	0.7700					31.7456 (76)
South					2.7800	46.7521	0.4000	0.7000	0.7700					25.2195 (78)
Solar gains	56.9651	103.4042	154.8845	208.6211	244.7628	246.7590	236.4166	209.6130	173.9065	118.2375	69.4768			47.8980 (83)
Total gains	382.6514	437.1524	474.5691	518.2873	538.8096	527.6828	506.9041	480.2519	452.7728	408.9940	377.2058	366.5946	(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	97.6756	98.0567	98.4409	100.4077	100.8106	102.8743	102.8743	103.2972	102.0387	100.8106	100.0081	99.2183	
alpha	7.5117	7.5371	7.5627	7.6938	7.7207	7.8583	7.8583	7.8865	7.8026	7.7207	7.6672	7.6146	
util living area													

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	0.9700	0.9297	0.8514	0.6862	0.5142	0.3551	0.2542	0.2793	0.4494	0.7357	0.9252	0.9758 (86)
MIT	20.6136	20.7630	20.8934	20.9802	20.9978	20.9999	21.0000	21.0000	20.9994	20.9734	20.8122	20.5900 (87)
Th 2	20.4149	20.4171	20.4192	20.4300	20.4321	20.4430	20.4430	20.4451	20.4386	20.4321	20.4278	20.4235 (88)
util rest of house												
	0.9638	0.9173	0.8303	0.6572	0.4833	0.3242	0.2220	0.2456	0.4130	0.7017	0.9102	0.9707 (89)
MIT 2	20.0706	20.2137	20.3334	20.4157	20.4308	20.4429	20.4430	20.4451	20.4383	20.4138	20.2712	20.0556 (90)
Living area fraction									fLA = Living area / (4) =			
MIT	20.3475	20.4939	20.6190	20.7036	20.7200	20.7270	20.7270	20.7281	20.7245	20.6992	20.5471	0.5100 (91)
Temperature adjustment												0.0000 (92)
adjusted MIT	20.3475	20.4939	20.6190	20.7036	20.7200	20.7270	20.7270	20.7281	20.7245	20.6992	20.5471	20.3281 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9630	0.9191	0.8378	0.6713	0.4990	0.3399	0.2384	0.2628	0.4316	0.7179	0.9135	0.9698	(94)
Useful gains	368.4978	401.7752	397.5858	347.9026	268.8807	179.3810	120.8439	126.2109	195.4025	293.6315	344.5907	355.5106	(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	494.9022	479.0412	432.0413	354.1146	269.5230	179.4056	120.8451	126.2134	195.5614	301.7707	405.0335	489.6529	(97)
Space heating kWh	94.0449	51.9228	25.6349	4.4727	0.4778	0.0000	0.0000	0.0000	0.0000	6.0556	43.5188	99.8019	(98a)
Space heating requirement - total per year (kWh/year)												325.9293	
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	94.0449	51.9228	25.6349	4.4727	0.4778	0.0000	0.0000	0.0000	0.0000	6.0556	43.5188	99.8019	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												325.9293	
Space heating per m2										(98c) / (4) =		6.5186	(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 %)													100.0000 (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	94.0449	51.9228	25.6349	4.4727	0.4778	0.0000	0.0000	0.0000	0.0000	6.0556	43.5188	99.8019	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	94.0449	51.9228	25.6349	4.4727	0.4778	0.0000	0.0000	0.0000	0.0000	6.0556	43.5188	99.8019	(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	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024	(64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	118.0064	104.0966	110.6294	98.1687	95.6097	86.7156	86.3293	89.6587	90.4702	100.1500	105.4926	116.9024	(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	14.1806	12.8083	14.1806	13.7232	14.1806	13.7232	14.1806	14.1806	13.7232	14.1806	13.7232	14.1806	(231)
Lighting	14.7490	11.8322	10.6536	7.8053	6.0290	4.9258	5.4999	7.1489	9.2858	12.1834	13.7611	15.1589	(232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-10.1341	-18.3912	-34.3777	-48.4602	-60.5269	-59.7325	-58.6126	-50.5523	-37.8802	-24.0623	-12.2642	-8.2290	(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												325.9293	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1202.2297	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)													
mechanical ventilation fans (SFP = 0.8260)													125.9650 (230a)
central heating pump													41.0000 (230c)
Total electricity for the above, kWh/year													166.9650 (231)
Electricity for lighting (calculated in Appendix L)													119.0328 (232)

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

PV generation													-423.2233 (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													1869.6972 (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 (high-rate cost)	293.3364	0.1671	49.0291 (261)
Space heating - main system 1 (low-rate cost)	32.5929	0.1403	4.5735 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	107.0985	0.1476	15.8103 (264)
Water heating - low rate cost	1095.1312	0.1239	135.6828 (264)
Energy for instantaneous electric shower(s)	478.7637	0.1436	68.7632 (264a)
Space and water heating			205.0957 (265)
Pumps, fans and electric keep-hot	166.9650	0.1432	23.3499 (267)
Energy for lighting	119.0328	0.1490	17.7382 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-423.2233	0.1346	-56.9716
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-56.9716 (269)
Total CO2, kg/year			257.9755 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.1600 (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 (high-rate cost)	293.3364	1.4603	475.9440 (275)
Space heating - main system 1 (low-rate cost)	32.5929	1.5090	49.1821 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	107.0985	1.5518	166.2006 (278)
Water heating - low rate cost	1095.1312	1.4433	1580.5703 (278)
Energy for instantaneous electric shower(s)	478.7637	1.5350	734.9193 (278a)
Space and water heating			2271.8970 (279)
Pumps, fans and electric keep-hot	166.9650	1.5335	253.4523 (281)
Energy for lighting	119.0328	1.5547	185.0655 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-423.2233	1.5021	-635.7294
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-635.7294 (283)
Total Primary energy kWh/year			2809.6047 (286)
Dwelling Primary energy Rate (DPER)			56.1900 (287)

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

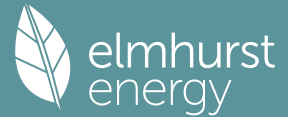
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	50.0000 (1b)	x 2.5000 (2b)	= 125.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 125.0000 (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	2 * 10 = 20.0000 (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) =	20.0000 / (5) = 0.1600 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4100 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3178 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	0.4051 0.3972 0.3892 0.3495 0.3416 0.3019 0.3019 0.2939 0.3178 0.3416 0.3575 0.3734 (22b)
Effective ac	0.5821 0.5789 0.5758 0.5611 0.5583 0.5456 0.5456 0.5432 0.5505 0.5583 0.5639 0.5697 (25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K						
TER Semi-glazed door			2.7800	1.0000	2.7800			(26a)					
TER Opening Type (Uw = 1.20)			9.7200	1.1450	11.1298			(27)					
1st-S-Wall	26.1000	2.4300	23.6700	0.1800	4.2606			(29a)					
1st-E-Wall	26.1000	10.0700	16.0300	0.1800	2.8854			(29a)					
External Roof 1	7.2600		7.2600	0.1100	0.7986			(30)					
Total net area of external elements Aum(A, m2)			59.4600					(31)					
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =			21.8544		(33)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							226.8848	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value		Total						
E5 Ground floor (normal)				17.4000	0.1600		2.7840						
E6 Intermediate floor within a dwelling				17.4000	0.0000		0.0000						
E16 Corner (normal)				6.0000	0.0900		0.5400						
E18 Party wall between dwellings				6.0000	0.0600		0.3600						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							3.6840	(36)					
Point Thermal bridges							0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	25.5384	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 24.0102	Feb 23.8788	Mar 23.7499	Apr 23.1447	May 23.0315	Jun 22.5044	Jul 22.5044	Aug 22.4068	Sep 22.7074	Oct 23.0315	Nov 23.2605	Dec 23.5000	(38)
Heat transfer coeff	49.5486	49.4171	49.2883	48.6831	48.5698	48.0427	48.0427	47.9451	48.2458	48.5698	48.7989	49.0384	(39)
Average = Sum(39)m / 12 =												48.6825	
HLP	Jan 0.9910	Feb 0.9883	Mar 0.9858	Apr 0.9737	May 0.9714	Jun 0.9609	Jul 0.9609	Aug 0.9589	Sep 0.9649	Oct 0.9714	Nov 0.9760	Dec 0.9808	(40)
HLP (average)												0.9737	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

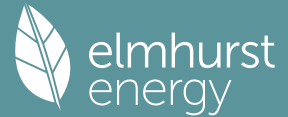
Assumed occupancy													1.6901	(42)
Hot water usage for mixer showers	52.5569	51.7671	50.6162	48.4141	46.7890	44.9767	43.9465	45.0888	46.3409	48.2867	50.5361	52.3556	(42a)	
Hot water usage for baths	22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476	(42b)	
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383	(42c)	
Average daily hot water use (litres/day)													98.5597	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	107.2197	104.9310	102.1434	97.9036	94.4609	90.7597	89.3366	92.1121	95.0395	98.9252	103.2304	106.9415	(44)	
Energy content (annual)	169.8097	149.4203	156.9906	134.0251	127.1626	111.5996	108.0448	114.0541	117.1932	134.2406	147.0706	167.4445	(45)	
Distribution loss (46)m = 0.15 x (45)m	25.4715	22.4130	23.5486	20.1038	19.0744	16.7399	16.2067	17.1081	17.5790	20.1361	22.0606	25.1167	(46)	
Water storage loss:														
Store volume													150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)	
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month	216.4047	191.5060	203.5855	179.1170	173.7575	156.6915	154.6398	160.6490	162.2850	180.8355	192.1624	214.0394	(62)	
WWHRS	-24.0268	-21.2495	-22.2513	-18.4249	-17.1714	-14.6937	-13.7730	-14.6462	-15.2026	-17.9222	-20.3037	-23.5819	(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	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575	(64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		1962.4258	(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	93.7377	83.3508	89.4753	80.6368	79.5575	73.1803	73.2008	75.1989	75.0402	81.9109	84.9744	92.9512	(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	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	75.0263	83.0649	75.0263	77.5272	75.0263	77.5272	75.0263	75.0263	77.5272	75.0263	77.5272	75.0263 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505 (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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040 (71)
Water heating gains (Table 5)	125.9915	124.0340	120.2625	111.9956	106.9321	101.6394	98.3882	101.0738	104.2225	110.0953	118.0201	124.9344 (72)
Total internal gains	399.6033	407.2121	391.5520	377.5897	359.6789	344.1628	331.9144	333.0722	342.5719	357.1402	377.9122	392.0499 (73)

6. Solar gains

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[Jan]			Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d	Gains W
East			7.2900	19.6403		0.6300		0.7000	0.7700	43.7569 (76)
South			2.4300	46.7521		0.6300		0.7000	0.7700	34.7199 (78)

Solar gains	78.4768	142.4601	213.3999	287.4570	337.2692	340.0245	325.7712	288.8289	239.6152	162.9003	95.7147	65.9848 (83)
Total gains	478.0801	549.6722	604.9519	665.0466	696.9480	684.1873	657.6857	621.9011	582.1870	520.0405	473.6269	458.0347 (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	63.5977	63.7669	63.9336	64.7284	64.8793	65.5911	65.5911	65.7247	65.3151	64.8793	64.5748	64.2594
alpha	5.2398	5.2511	5.2622	5.3152	5.3253	5.3727	5.3727	5.3816	5.3543	5.3253	5.3050	5.2840
util living area	0.9754	0.9508	0.9014	0.7865	0.6239	0.4460	0.3209	0.3538	0.5592	0.8294	0.9499	0.9795 (86)
MIT	20.1377	20.3478	20.5952	20.8419	20.9596	20.9944	20.9992	20.9987	20.9823	20.8231	20.4530	20.1023 (87)
Th 2	20.0909	20.0931	20.0952	20.1053	20.1072	20.1161	20.1161	20.1177	20.1127	20.1072	20.1034	20.0994 (88)
util rest of house	0.9691	0.9392	0.8800	0.7482	0.5713	0.3859	0.2567	0.2864	0.4922	0.7880	0.9362	0.9743 (89)
MIT 2	19.1132	19.3742	19.6728	19.9580	20.0760	20.1130	20.1158	20.1173	20.1018	19.9473	19.5160	19.0757 (90)
Living area fraction	19.6357	19.8707	20.1432	20.4088	20.5266	20.5625	20.5664	20.5668	20.5509	20.3939	19.9938	19.5993 (91)
MIT	19.6357	19.8707	20.1432	20.4088	20.5266	20.5625	20.5664	20.5668	20.5509	20.3939	19.9938	19.5993 (92)
Temperature adjustment												0.0000
adjusted MIT	19.6357	19.8707	20.1432	20.4088	20.5266	20.5625	20.5664	20.5668	20.5509	20.3939	19.9938	19.5993 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9654	0.9360	0.8812	0.7618	0.5965	0.4164	0.2895	0.3208	0.5257	0.8021	0.9342	0.9707 (94)
Useful gains	461.5208	514.4922	533.1048	506.6171	415.6995	284.9019	190.3805	199.4765	306.0651	417.1344	442.4774	444.6186 (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	759.8627	739.8110	672.4507	560.2838	428.7073	286.4566	190.5547	199.7774	311.2271	475.6905	629.2057	755.1566 (97)
Space heating kWh	221.9664	151.4142	103.6734	38.6401	9.6778	0.0000	0.0000	0.0000	0.0000	43.5658	134.4444	231.0402 (98a)
Space heating requirement - total per year (kWh/year)												934.4222
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	221.9664	151.4142	103.6734	38.6401	9.6778	0.0000	0.0000	0.0000	0.0000	43.5658	134.4444	231.0402 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												934.4222
Space heating per m2										(98c) / (4) =		18.6884 (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	221.9664	151.4142	103.6734	38.6401	9.6778	0.0000	0.0000	0.0000	0.0000	43.5658	134.4444	231.0402 (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)	240.4836	164.0457	112.3222	41.8636	10.4852	0.0000	0.0000	0.0000	0.0000	47.2002	145.6602	250.3144 (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	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
Efficiency of water heater (217)m	84.3814	83.7978	82.8546	81.3992	80.2736	79.8000	79.8000	79.8000	79.8000	81.5438	83.5152	79.8000 (216)
Fuel for water heating, kWh/month	227.9859	203.1754	218.8583	197.4122	195.0656	177.9421	176.5248	182.9609	184.3137	199.7863	205.7813	225.4094 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041 (231)
Lighting	15.5890	12.5061	11.2603	8.2498	6.3724	5.2063	5.8131	7.5561	9.8146	12.8773	14.5449	16.0223 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-17.2190	-25.1717	-37.5148	-43.8066	-48.6813	-46.0001	-45.4689	-42.2255	-36.7229	-29.5315	-19.2571	-14.7863 (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	-7.1843	-15.3457	-30.9250	-47.0606	-62.8078	-63.2887	-62.5126	-52.6375	-38.2202	-22.1131	-9.6488	-5.6617 (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												1012.3751 (211)
Space heating fuel - main system 2												0.0000 (213)

Full SAP Calculation Printout



Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	79.8000
Water heating fuel used	2395.2159 (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)	125.8121 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-823.7918 (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	2795.6113 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1012.3751	0.2100	212.5988 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2395.2159	0.2100	502.9953 (264)
Space and water heating			715.5941 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	125.8121	0.1443	18.1586 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-406.3859	0.1338	-54.3750
PV Unit electricity exported	-417.4059	0.1255	-52.3950
Total			-106.7700 (269)
Total CO2, kg/year			638.9119 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.7800 (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	1012.3751	1.1300	1143.9839 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2395.2159	1.1300	2706.5939 (278)
Space and water heating			3850.5778 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	125.8121	1.5338	192.9748 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-406.3859	1.4945	-607.3286
PV Unit electricity exported	-417.4059	0.4607	-192.3189
Total			-799.6475 (283)
Total Primary energy kWh/year			3374.0058 (286)
Target Primary Energy Rate (TPER)			67.4800 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	50

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

85

85

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 0.14 W/m ² K	Very Good
Roof	Average thermal transmittance 0.1 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 50 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: **0.2** 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

£277

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 2-4	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	84 B	DER	6.01	TER	14.42
Environmental	96 A	% DER < TER			58.32
CO ₂ Emissions (t/year)	0.24	DFEE	28.01	TFEE	32.67
Compliance Check	See BREL	% DFEE < TFEE			14.26
% DPER < TPER	15.05	DPER	64.91	TPER	76.41

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Mid-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2022	
3.0 Property Age Band	L	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	7 Hour Off Peak	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

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:	16.90 m	46.10 m ²	2.50 m
1st Storey:	11.60 m	31.40 m ²	3.00 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	22.70	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
1st-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	6.66	6.66	0.00	None	0.00	Enter Gross Area
1st-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	17.01	8.68	0.00	None	8.33	Enter Gross Area
1st-N-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	27.12	21.57	0.00	None	5.55	Enter Gross Area

10.0 External Roofs										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	21.41	21.41	None	0.00	Enter Gross Area	0.00

10.1 Party Ceilings

Summary for Input Data

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling	Precast concrete planks floor, screed, carpeted	30.00	46.10

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	Lowest occupied	Precast concrete planks floor, screed, carpeted	30.00	46.10

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
1st-E-Door	Door	1st-E-Wall	East	2.78	0
1st-E-Windows	Window	1st-E-Wall	East	5.55	0
1st-N-Window	Window	1st-N-Wall	North	5.55	0

14.0 Conservatory

None

15.0 Draught Proofing

100

 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

User Input

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		16.90	0.00	0.00	No
E6 Intermediate floor within a dwelling		16.90	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value

0.04

 W/m²K

Description

Bridge

18.0 Pressure Testing

Yes

Designed AP₅₀

3.00

 m³/(h.m²) @ 50 Pa

Property Tested?

Yes

Test Method

Blower Door

As Built AP₅₀

0.10

 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Yes

Approved Installation

No

Mechanical Ventilation data Type

Database

Type

Balanced mechanical ventilation with heat recovery

MV Reference Number

500500

Configuration

2

Manufacturer SFP

0.59

Duct Type

Rigid

MVHR Efficiency

89.00

Wet Rooms

2

SFP from Installer Commissioning Certificate

No

MVHR System Location

Inside heated envelope (installed exclusively)

Duct Installation Specification

Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

No

22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	7

Summary for Input Data

24.0 Main Heating 1

	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	191	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2105	
Delayed Start Stat	No	
Burner Control	On/Off	
HETAS approved System	No	
Oil Pump Inside	No	
Flue Type	Balanced	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	No	
Electric CPSU Temperature	60.00	
Combi boiler type	No Combi	
Combi keep hot type	Electric, time clock	

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

Summary for Input Data

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	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

One Dwelling	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

None	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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

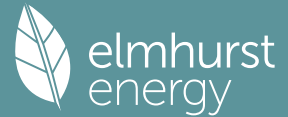
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023
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Property	Braemar Avenue, London, Greater London, N22 7BY					
SAP Rating	84 B	DER	6.01	TER	14.42	
Environmental	96 A	% DER < TER				58.32
CO ₂ Emissions (t/year)	0.24	DFEE	28.01	TFEE	32.67	
Compliance Check	See BREL	% DFEE < TFEE				14.26
% DPER < TPER	15.05	DPER	64.91	TPER	76.41	
Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	46.1000 (1b)	2.5000 (2b)	115.2500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	46.1000		115.2500 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 115.2500 (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	0 * 10 = 0.0000 (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) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.1500 (18)
Number of sides sheltered	3 (19)

Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1162 (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	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2477	0.2448	0.2419	0.2274	0.2245	0.2099	0.2099	0.2070	0.2157	0.2245	0.2303	0.2361 (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
Door			2.7800	0.9000	2.5020		(26a)
Window (Uw = 0.90)			11.1000	0.8687	9.6429		(27)
1st-S-Wall	6.6600		6.6600	0.1400	0.9324	190.0000	1265.4000 (29a)
1st-E-Wall	17.0100		8.6800	0.1400	1.2152	190.0000	1649.2000 (29a)
1st-N-Wall	27.1200	8.3300	21.5700	0.1400	3.0198	190.0000	4098.3002 (29a)
External Roof 1	21.4100		21.4100	0.1000	2.1410	9.0000	192.6900 (30)
Total net area of external elements Aum(A, m ²)			72.2000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 19.4533		(33)
Party Floor			46.1000			40.0000	1844.0000 (32d)
Party Ceiling			46.1000			30.0000	1383.0000 (32b)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 10432.5902 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							226.3035 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							2.8880 (36)
Point Thermal bridges							(36a) = 0.0000

elmhurst
energy

$$(33) + (36) + (36a) = 22.3413 \quad (37)$$
[illegible]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.6890	0.6866	0.6842	0.6722	0.6698	0.6578	0.6578	0.6554	0.6626	0.6698	0.6746	0.6794 (40)
HLP (average)												0.6716
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy	1.5762 (42)
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Assumed occupancy												1.5762 (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												
21.9034	21.5781	21.1200	20.2754	19.6429	18.9416	18.5628	19.0177	19.5130	20.2634	21.1254	21.8293	(42b)
Hot water usage for other uses												
30.7722	29.6532	28.5342	27.4152	26.2962	25.1772	25.1772	26.2962	27.4152	28.5342	29.6532	30.7722	(42c)
Average daily hot water use (litres/day)												48.2826 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	52.6755	51.2312	49.6542	47.6905	45.9391	44.1188	43.7400	45.3139	46.9282	48.7976	50.7786	52.6015 (44)
Energy conte	83.4251	72.9526	76.3166	65.2860	61.8429	54.2493	52.8998	56.1081	57.8671	66.2178	72.3434	82.3612 (45)
Energy content (annual)										Total =	Sum (45)m =	801.8699
Distribution loss (46)m =	0.15 x (45)m											
	12.5138	10.9429	11.4475	9.7929	9.2764	8.1374	7.9350	8.4162	8.6801	9.9327	10.8515	12.3542 (46)

[illegible][illegible][illegible]

Output from w/h	114.8591	101.3446	107.7506	95.7060	93.2769	84.6693	84.3338	87.5421	88.2871	97.6518	102.7634	113.7952 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											1171.9799 (64)
												1172 (64)

12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m = 1171.3753 (64)										
Electric shower(s)	1172 (64)										
40.5603	36.1396	39.4630	37.6591	38.3657	36.5972	37.8171	38.3657	37.6591	39.4630	38.7210	40.5603 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 461.3710 (64a)											

Heat gains from water heating, kWh/month	37.8789	33.2916	35.2410	31.1224	30.1542	27.1872	27.0435	28.2474	28.6556	31.8832	33.7344	37.5252 (65)
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Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	69.1614	76.5716	69.1614	71.4668	69.1614	71.4668	69.1614	69.1614	71.4668	69.1614	71.4668	69.1614 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	137.1203	138.5432	134.9575	127.3242	117.6885	108.6323	102.5822	101.1593	104.7449	112.3782	122.0139	131.0702 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811 (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)	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491 (71)
Water heating gains (Table 5)	50.9125	49.5411	47.3670	43.2255	40.5298	37.7600	36.3487	37.9669	39.7994	42.8537	46.8534	50.4371 (72)
Total internal gains	306.8377	314.2993	301.1294	291.6599	277.0232	264.5025	254.7357	254.9310	262.6546	274.0368	289.9775	300.3121 (73)

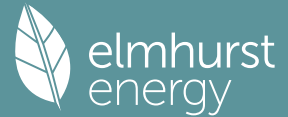
[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	5.5500	10.6334	0.4000	0.7000	0.7700	11.4513 (74)
East	5.5500	19.6403	0.4000	0.7000	0.7700	21.1510 (76)

Solar gains	32.6024	63.2600	105.3266	159.1094	202.2550	210.8138	199.1173	165.7622	123.9600	75.1461	40.4995	26.9400 (83)
Total gains	339.4400	377.5593	406.4560	450.7693	479.2782	475.3163	453.8531	420.6932	386.6146	349.1830	330.4771	327.2521 (84)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000 (85)
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Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	91.2375	91.5561	91.8769	93.5155	93.8502	95.5606	95.5606	95.9101	94.8690	93.8502	93.1831	92.5254
alpha	7.0825	7.1037	7.1251	7.2344	7.2567	7.3707	7.3707	7.3940	7.3246	7.2567	7.2122	7.1684

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util living area	0.9843	0.9663	0.9221	0.7845	0.5932	0.4080	0.2940	0.3303	0.5422	0.8391	0.9618	0.9872 (86)
MIT	20.4573	20.5995	20.7715	20.9408	20.9921	20.9996	21.0000	20.9999	20.9968	20.9219	20.6827	20.4373 (87)
Th 2	20.3506	20.3527	20.3548	20.3654	20.3676	20.3782	20.3782	20.3804	20.3740	20.3676	20.3633	20.3591 (88)
util rest of house												
MIT 2	0.9805	0.9587	0.9063	0.7535	0.5548	0.3685	0.2524	0.2859	0.4942	0.8058	0.9520	0.9840 (89)
Living area fraction	19.8613	20.0010	20.1648	20.3220	20.3628	20.3780	20.3782	20.3803	20.3724	20.3114	20.0919	19.8491 (90)
MIT	20.1548	20.2957	20.4636	20.6267	20.6727	20.6841	20.6844	20.6854	20.6799	20.6120	20.3828	20.1387 (92)
Temperature adjustment												0.0000
adjusted MIT	20.1548	20.2957	20.4636	20.6267	20.6727	20.6841	20.6844	20.6854	20.6799	20.6120	20.3828	20.1387 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9792	0.9579	0.9091	0.7666	0.5735	0.3879	0.2729	0.3078	0.5178	0.8192	0.9524	0.9828	(94)
Useful gains	332.3786	361.6708	369.5232	345.5499	274.8460	184.3986	123.8554	129.4704	200.1895	286.0525	314.7372	321.6109	(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	503.5884	487.3061	440.4333	363.3980	277.0610	184.5041	123.8616	129.4851	200.9940	309.1541	413.0885	499.2080	(97)
Space heating kWh	127.3801	84.4269	52.7571	12.8506	1.6479	0.0000	0.0000	0.0000	0.0000	17.1876	70.8130	132.1322	(98a)
Space heating requirement - total per year (kWh/year)												499.1955	
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	127.3801	84.4269	52.7571	12.8506	1.6479	0.0000	0.0000	0.0000	0.0000	17.1876	70.8130	132.1322	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												499.1955	
Space heating per m2											(98c) / (4) =	10.8285	(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 %)													100.0000 (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	127.3801	84.4269	52.7571	12.8506	1.6479	0.0000	0.0000	0.0000	0.0000	17.1876	70.8130	132.1322 (98)	
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)	
Space heating fuel (main heating system)	127.3801	84.4269	52.7571	12.8506	1.6479	0.0000	0.0000	0.0000	0.0000	17.1876	70.8130	132.1322 (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	114.8591	101.3446	107.7506	95.7060	93.2769	84.6693	84.3338	87.5421	88.2871	97.6518	102.7634	113.7952 (64)	
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)	
Fuel for water heating, kWh/month	114.8591	101.3446	107.7506	95.7060	93.2769	84.6693	84.3338	87.5421	88.2871	97.6518	102.7634	113.7952 (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	13.3461	12.0546	13.3461	12.9156	13.3461	12.9156	13.3461	13.3461	12.9156	13.3461	12.9156	13.3461 (231)	
Lighting	13.7349	11.0186	9.9210	7.2686	5.6145	4.5871	5.1217	6.6574	8.6473	11.3457	12.8149	14.1166 (232)	
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-10.1455	-18.4432	-34.4879	-48.2613	-59.8445	-58.9408	-57.8550	-49.9922	-37.5617	-24.0347	-12.2829	-8.2366 (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												499.1955 (211)	
Space heating fuel - main system 2												0.0000 (213)	
Space heating fuel - secondary												0.0000 (215)	
Efficiency of water heater												100.0000	
Water heating fuel used												1171.9799 (219)	
Space cooling fuel												0.0000 (221)	
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)													
mechanical ventilation fans (SFP = 0.8260)												116.1397 (230a)	
central heating pump												41.0000 (230c)	
Total electricity for the above, kWh/year												157.1397 (231)	
Electricity for lighting (calculated in Appendix L)												110.8483 (232)	
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-420.0862 (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												1980.4481 (238)	

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

	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1 (high-rate cost)	449.2759	0.1660	74.5700 (261)
Space heating - main system 1 (low-rate cost)	49.9195	0.1393	6.9560 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating - high rate cost	100.1331	0.1476	14.7796 (264)
Water heating - low rate cost	1071.8467	0.1239	132.7764 (264)
Energy for instantaneous electric shower(s)	461.3710	0.1436	66.2652 (264a)
Space and water heating			229.0819 (265)
Pumps, fans and electric keep-hot	157.1397	0.1432	21.9865 (267)
Energy for lighting	110.8483	0.1490	16.5186 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-420.0862	0.1347	-56.5881
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-56.5881 (269)
Total CO ₂ , kg/year			277.2642 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.0100 (273)

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

	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year
Space heating - main system 1 (high-rate cost)	449.2759	1.4565	727.0894 (275)
Space heating - main system 1 (low-rate cost)	49.9195	1.5051	75.1351 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating - high rate cost	100.1331	1.5518	155.3827 (278)
Water heating - low rate cost	1071.8467	1.4432	1546.8780 (278)
Energy for instantaneous electric shower(s)	461.3710	1.5350	708.2209 (278a)
Space and water heating			2504.4851 (279)
Pumps, fans and electric keep-hot	157.1397	1.5335	238.5871 (281)
Energy for lighting	110.8483	1.5547	172.3407 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-420.0862	1.5025	-631.1594
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-631.1594 (283)
Total Primary energy kWh/year			2992.4745 (286)
Dwelling Primary energy Rate (DPER)			64.9100 (287)

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

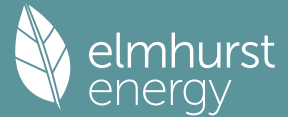
1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	46.1000 (1b)	x 2.5000 (2b)	= 115.2500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	46.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 115.2500 (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	2 * 10 = 20.0000 (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) = 20.0000 / (5) = 0.1735 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4235 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3282 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	0.4185 0.4103 0.4021 0.3611 0.3529 0.3118 0.3118 0.3036 0.3282 0.3529 0.3693 0.3857 (22b)
Effective ac	0.5876 0.5842 0.5808 0.5652 0.5623 0.5486 0.5486 0.5461 0.5539 0.5623 0.5682 0.5744 (25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Semi-glazed door			2.7800	1.0000	2.7800			(26a)
TER Opening Type (Uw = 1.20)			8.7400	1.1450	10.0076			(27)
1st-S-Wall	6.6600		6.6600	0.1800	1.1988			(29a)
1st-E-Wall	17.0100	7.1500	9.8600	0.1800	1.7748			(29a)
1st-N-Wall	27.1200	4.3700	22.7500	0.1800	4.0950			(29a)
External Roof 1	21.4100		21.4100	0.1100	2.3551			(30)
Total net area of external elements Aum(A, m2)			72.2000					(31)
Fabric heat loss, W/K = Sum (A x U)								(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K

236.3035 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element				
E5 Ground floor (normal)	16.9000	0.1600	2.7040	
E6 Intermediate floor within a dwelling	16.9000	0.0000	0.0000	
E16 Corner (normal)	6.0000	0.0900	0.5400	
E18 Party wall between dwellings	6.0000	0.0600	0.3600	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				3.6040 (36)
Point Thermal bridges				(36a) = 0.0000
Total fabric heat loss				(33) + (36) + (36a) = 25.8153 (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	
(38)m	22.3469	22.2176	22.0908	21.4953	21.3839	20.8653	20.8653	20.7693	21.0651	21.3839	21.6093	21.8449	(38)
Heat transfer coeff	48.1622	48.0329	47.9061	47.3107	47.1993	46.6807	46.6807	46.5846	46.8804	47.1993	47.4246	47.6603	(39)
Average = Sum(39)m / 12 =												47.3101	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0447	1.0419	1.0392	1.0263	1.0238	1.0126	1.0126	1.0105	1.0169	1.0238	1.0287	1.0338	(40)
HLP (average)												1.0263	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

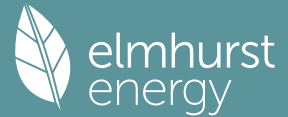
Assumed occupancy													1.5762 (42)
Hot water usage for mixer showers													
50.6476	49.8865	48.7774	46.6552	45.0892	43.3427	42.3500	43.4508	44.6574	46.5325	48.7002	50.4536		(42a)
Hot water usage for baths													
21.9034	21.5781	21.1200	20.2754	19.6429	18.9416	18.5628	19.0177	19.5130	20.2634	21.1254	21.8293		(42b)
Hot water usage for other uses													
30.7722	29.6532	28.5342	27.4152	26.2962	25.1772	25.1772	26.2962	27.4152	28.5342	29.6532	30.7722		(42c)
Average daily hot water use (litres/day)												94.9780	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	103.3231	101.1177	98.4315	94.3458	91.0283	87.4616	86.0901	88.7647	91.5856	95.3301	99.4788	103.0550	(44)
Energy conte	163.6386	143.9903	151.2856	129.1547	122.5416	107.5442	104.1185	109.9092	112.9341	129.3621	141.7258	161.3593	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m													
24.5458	21.5985	22.6928	19.3732	18.3812	16.1316	15.6178	16.4864	16.9401	19.4043	21.2589	24.2039		(46)
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss													
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage													
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
210.2335	186.0760	197.8805	174.2465	169.1365	152.6360	150.7134	156.5041	158.0260	175.9570	186.8176	207.9542		(62)
WWHRS	-23.1540	-20.4776	-21.4429	-17.7556	-16.5476	-14.1599	-13.2726	-14.1141	-14.6504	-17.2711	-19.5661	-22.7252	(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	187.0795	165.5984	176.4375	156.4909	152.5889	138.4762	137.4408	142.3900	143.3756	158.6858	167.2515	185.2290	(64)
12Total per year (kWh/year)													
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	91.6857	81.5453	87.5784	79.0174	78.0210	71.8319	71.8953	73.8207	73.6241	80.2888	83.1973	90.9279	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	78.8114	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
70.0982	77.6088	70.0982	72.4348	70.0982	72.4348	70.0982	70.0982	72.4348	70.0982	72.4348	70.0982	72.4348	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
137.1203	138.5432	134.9575	127.3242	117.6885	108.6323	102.5822	101.1593	104.7449	112.3782	122.0139	131.0702		(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	30.8811	(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)													
-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	-63.0491	(71)
Water heating gains (Table 5)													
123.2335	121.3472	117.7129	109.7464	104.8669	99.7666	96.6335	99.2214	102.2557	107.9151	115.5518	122.2149		(72)
Total internal gains	380.0955	387.1426	372.4121	359.1489	342.2971	327.4771	315.9573	317.1223	326.0788	340.0349	359.6440	373.0267	(73)

6. Solar gains

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[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b		FF Specific data or Table 6c	Access factor Table 6d		Gains W	
North				4.3700	10.6334	0.6300		0.7000	0.7700		14.2012 (74)	
East				4.3700	19.6403	0.6300		0.7000	0.7700		26.2301 (76)	
Solar gains	40.4313	78.4509	130.6193	197.3171	250.8236	261.4377	246.9324	205.5675	153.7272	93.1914	50.2249	33.4092 (83)
Total gains	420.5268	465.5935	503.0313	556.4660	593.1206	588.9147	562.8897	522.6899	479.8060	433.2263	409.8689	406.4359 (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	62.8293	62.9984	63.1651	63.9601	64.1111	64.8234	64.8234	64.9570	64.5471	64.1111	63.8064	63.4910
alpha	5.1886	5.1999	5.2110	5.2640	5.2741	5.3216	5.3216	5.3305	5.3031	5.2741	5.2538	5.2327
util living area	0.9832	0.9703	0.9407	0.8520	0.6937	0.5005	0.3638	0.4079	0.6446	0.8882	0.9672	0.9856 (86)
MIT	20.0306	20.2020	20.4502	20.7552	20.9316	20.9899	20.9985	20.9973	20.9646	20.7358	20.3462	20.0055 (87)
Th 2	20.0462	20.0485	20.0508	20.0615	20.0635	20.0729	20.0729	20.0746	20.0692	20.0635	20.0595	20.0552 (88)
util rest of house	0.9785	0.9623	0.9250	0.8175	0.6374	0.4309	0.2877	0.3269	0.5688	0.8532	0.9569	0.9816 (89)
MIT 2	18.9422	19.1582	19.4650	19.8280	20.0101	20.0674	20.0724	20.0736	20.0471	19.8173	19.3495	18.9175 (90)
Living area fraction	fLA = Living area / (4) =											0.4924 (91)
MIT	19.4782	19.6722	19.9501	20.2845	20.4638	20.5217	20.5284	20.5284	20.4989	20.2695	19.8403	19.4533 (92)
Temperature adjustment												0.0000
adjusted MIT	19.4782	19.6722	19.9501	20.2845	20.4638	20.5217	20.5284	20.5284	20.4989	20.2695	19.8403	19.4533 (93)
8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9751	0.9585	0.9231	0.8263	0.6622	0.4649	0.3252	0.3668	0.6047	0.8617	0.9541	0.9784 (94)
Useful gains	410.0464	446.2748	464.3576	459.8320	392.7613	273.7842	183.0630	191.7312	290.1580	373.3004	391.0451	397.6520 (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	731.0138	709.5500	644.3434	538.6104	413.6460	276.4268	183.3796	192.3214	299.9821	456.3957	604.2023	726.9752 (97)
Space heating kWh	238.7997	176.9209	133.9094	56.7205	15.5382	0.0000	0.0000	0.0000	0.0000	61.8230	153.4732	245.0164 (98a)
Space heating requirement - total per year (kWh/year)												1082.2013
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	238.7997	176.9209	133.9094	56.7205	15.5382	0.0000	0.0000	0.0000	0.0000	61.8230	153.4732	245.0164 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1082.2013
Space heating per m2	(98c) / (4) =											23.4751 (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	238.7997	176.9209	133.9094	56.7205	15.5382	0.0000	0.0000	0.0000	0.0000	61.8230	153.4732	245.0164 (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)	258.7212	191.6803	145.0806	61.4523	16.8345	0.0000	0.0000	0.0000	0.0000	66.9805	166.2765	265.4566 (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	187.0795	165.5984	176.4375	156.4909	152.5889	138.4762	137.4408	142.3900	143.3756	158.6858	167.2515	185.2290 (64)
Efficiency of water heater (217)m	84.6083	84.2084	83.4494	82.0112	80.5545	79.8000	79.8000	79.8000	79.8000	82.1339	83.8675	79.8000 (216)
Fuel for water heating, kWh/month	221.1125	196.6531	211.4307	190.8165	189.4231	173.5290	172.2316	178.4336	179.6687	193.2039	199.4236	218.7193 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	14.5650	11.6846	10.5207	7.7079	5.9538	4.8643	5.4313	7.0598	9.1699	12.0315	13.5895	14.9698 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-15.9245	-23.3053	-34.7735	-40.6581	-45.2342	-42.7689	-42.2824	-39.2453	-34.0942	-27.3720	-17.8211	-13.6724 (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	-6.5753	-14.0518	-28.3280	-43.1214	-57.5587	-57.9955	-57.2765	-48.2184	-35.0033	-20.2443	-8.8302	-5.1807 (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												

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Space heating fuel - main system 1	1172.4825	(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	2324.6456	(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)	117.5481	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-759.5360	(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	2941.1402	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1172.4825	0.2100	246.2213 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2324.6456	0.2100	488.1756 (264)
Space and water heating			734.3969 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	117.5481	0.1443	16.9658 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-377.1517	0.1338	-50.4526
PV Unit electricity exported	-382.3842	0.1255	-47.9969
Total			-98.4496 (269)
Total CO2, kg/year			664.8424 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.4200 (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	1172.4825	1.1300	1324.9052 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2324.6456	1.1300	2626.8496 (278)
Space and water heating			3951.7547 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	117.5481	1.5338	180.2992 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-377.1517	1.4944	-563.5987
PV Unit electricity exported	-382.3842	0.4607	-176.1754
Total			-739.7742 (283)
Total Primary energy kWh/year			3522.3806 (286)
Target Primary Energy Rate (TPER)			76.4100 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	46

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

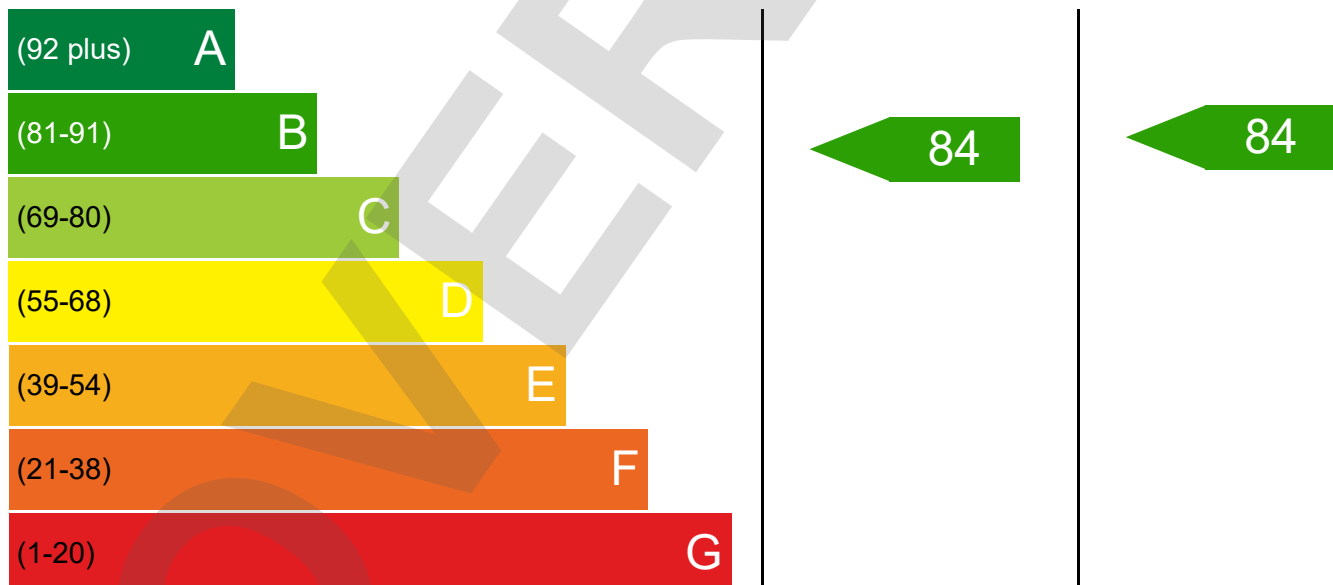
Energy Rating

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



Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
-----------	------	---------	------	-----------

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.14 W/m ² K	Very Good
Roof	Average thermal transmittance 0.1 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer and at least two room thermostats	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 56 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

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

The estimated CO emissions for this dwellings is: **0.2** 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

£293

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 3-1	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	72 C	DER	8.28	TER	15.54
Environmental	94 A	% DER < TER			46.72
CO ₂ Emissions (t/year)	0.43	DFEE	44.38	TFEE	42.05
Compliance Check	See BREL	% DFEE < TFEE			-5.54
% DPER < TPER	-4.18	DPER	86.75	TPER	83.27

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, Semi-Detached
Position of Flat	Top-floor flat
Which Floor	4
2.0 Number of Storeys	1
3.0 Date Built	2022
3.0 Property Age Band	L
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	N/A
7.0 Electricity Tariff	7 Hour Off Peak
Smart electricity meter fitted	No
Smart gas meter fitted	No

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:	29.82 m	63.00 m ²	2.50 m
1st Storey:	11.60 m	31.40 m ²	3.00 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	27.00	m ²
-----------------	-------	----------------

9.0 External Walls										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
3rd-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	11.40	11.40	0.00	None	0.00	Enter Gross Area
3rd-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	23.10	12.00	0.00	None	11.10	Enter Gross Area
3rd-N-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	42.60	28.72	0.00	None	13.88	Enter Gross Area
3rd-NW-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	12.06	6.50	0.00	None	5.56	Enter Gross Area

10.0 External Roofs										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	63.00	63.00	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data



Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	Lowest occupied	Precast concrete planks floor, screed, carpeted	30.00	63.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Triple glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
3rd-NW-Door	Door	3rd-NW-Wall	North West	2.78	0
3rd-NW-Window	Window	3rd-NW-Wall	North West	2.78	0
3rd-N-Doors	Door	3rd-N-Wall	North	5.55	0
3rd-N-Windows	Window	3rd-N-Wall	North	8.33	0
3rd-E-Windows	Window	3rd-E-Wall	East	5.55	0
3rd-E-Door	Door	3rd-E-Wall	East	5.55	0

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

User Input

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		16.90	0.00	0.00	No
E6 Intermediate floor within a dwelling		16.90	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value

0.04 W/m²K

Description

Bridge

18.0 Pressure Testing

Yes

Designed AP₅₀

3.00 m³/(h.m²) @ 50 Pa

Property Tested?

Yes

Test Method

Blower Door

As Built AP₅₀

0.10 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Yes

Approved Installation

No

Mechanical Ventilation data Type

Database

Type

Balanced mechanical ventilation with heat recovery

MV Reference Number

500500

Configuration

2

Manufacturer SFP

0.59

Duct Type

Rigid

MVHR Efficiency

89.00

Wet Rooms

2

SFP from Installer Commissioning Certificate

No

MVHR System Location

Inside heated envelope (installed exclusively)

Duct Installation Specification

Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

No

22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	12

Summary for Input Data

24.0 Main Heating 1

.0 Main Heating 1		SAP table	
Percentage of Heat		100.00	%
Database Ref. No.		0	
Fuel Type		Electricity	
SAP Code		191	
In Winter		100.00	
In Summer		100.00	
Controls SAP Code		2106	
Delayed Start Stat		No	
Burner Control		On/Off	
HETAS approved System		No	
Oil Pump Inside		No	
Flue Type		Balanced	
Fan Assisted Flue		No	
Is MHS Pumped		Pump in heated space	
Heating Pump Age		2013 or later	
Heat Emitter		Radiators	
Flow Temperature		Unknown	
Boiler Interlock		No	
Electric CPSU Temperature		60.00	
Combi boiler type		No Combi	
Combi keep hot type		Electric, time clock	

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

28.3 Waste Water Heat Recovery System

Summary for Input Data

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

One Dwelling	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

None	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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

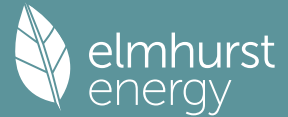
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023
Assessment Reference	Flat 3-1	Prop Type Ref	22403			
Property	Braemar Avenue, London, Greater London, N22 7BY					
SAP Rating	72 C	DER	8.28	TER	15.54	
Environmental	94 A	% DER < TER				46.72
CO ₂ Emissions (t/year)	0.43	DFEE	44.38	TFEE	42.05	
Compliance Check	See BREL	% DFEE < TFEE				-5.54
% DPER < TPER	-4.18	DPER	86.75	TPER	83.27	
Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	63.0000 (1b)	2.5000 (2b)	157.5000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.0000		157.5000 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	157.5000 (5)

2. Ventilation rate

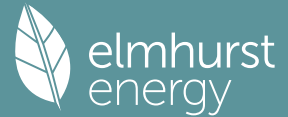
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (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) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.1500 (18)
Number of sides sheltered	1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1388 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1769	0.1734	0.1700	0.1526	0.1492	0.1318	0.1318	0.1283	0.1388	0.1492	0.1561	0.1630 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2764	0.2729	0.2695	0.2521	0.2487	0.2313	0.2313	0.2278	0.2382	0.2487	0.2556	0.2625 (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
Door			13.9800	0.9000	12.4920		(26a)
Window (Uw = 0.90)			16.6600	0.8687	14.4730		(27)
3rd-S-Wall	11.4000		11.4000	0.1400	1.5960	190.0000	2165.9999 (29a)
3rd-E-Wall	23.1000	11.1000	12.0000	0.1400	1.6800	190.0000	2280.0001 (29a)
3rd-N-Wall	42.6000	13.8800	28.7200	0.1400	4.0208	190.0000	5456.7997 (29a)
3rd-NW-Wall	12.0600	5.5600	6.5000	0.1400	0.9100	190.0000	1235.0001 (29a)
External Roof	63.0000		63.0000	0.1000	6.3000	9.0000	567.0000 (30)
Total net area of external elements Aum(A, m ²)			152.1600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		41.4718		(33)
Party Floor			63.0000			40.0000	2520.0000 (32d)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =				14224.7998 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							225.7905 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							6.0864 (36)
Point Thermal bridges						(36a) =	0.0000

Full SAP Calculation Printout



Total fabric heat loss												(33) + (36) + (36a) =	47.5582 (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	(38)
Heat transfer coeff	14.3662	14.1859	14.0056	13.1042	12.9239	12.0225	12.0225	11.8422	12.3830	12.9239	13.2845	13.6451	(38)
Average = Sum(39)m / 12 =	61.9244	61.7441	61.5638	60.6624	60.4821	59.5806	59.5806	59.4004	59.9412	60.4821	60.8427	61.2032	(39)
												60.6173	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(40)
HLP (average)	0.9829	0.9801	0.9772	0.9629	0.9600	0.9457	0.9457	0.9429	0.9514	0.9600	0.9658	0.9715	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	
												0.9622	
												31	

4. Water heating energy requirements (kWh/year)													

Assumed occupancy												2.0651	(42)
Hot water usage for mixer showers												0.0000	(42a)
Hot water usage for baths												25.4280	(42b)
Hot water usage for other uses												35.7783	(42c)
Average daily hot water use (litres/day)												56.1015	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	61.2063	59.5277	57.6948	55.4133	53.3780	51.2628	50.8231	52.6522	54.5282	56.7004	59.0022	61.1204	(44)
Energy conte	96.9359	84.7666	88.6748	75.8580	71.8571	63.0336	61.4661	65.1944	67.2387	76.9419	84.0594	95.6997	(45)
Energy content (annual)												931.7262	
Distribution loss (46)m = 0.15 x (45)m	14.5404	12.7150	13.3012	11.3787	10.7786	9.4550	9.2199	9.7792	10.0858	11.5413	12.6089	14.3550	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												1.0140	(55)
Total storage loss													
	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(56)
If cylinder contains dedicated solar storage													
	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340	(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													
	128.3699	113.1586	120.1088	106.2780	103.2911	93.4536	92.9001	96.6284	97.6587	108.3759	114.4794	127.1337	(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	128.3699	113.1586	120.1088	106.2780	103.2911	93.4536	92.9001	96.6284	97.6587	108.3759	114.4794	127.1337	(64)
Total per year (kWh/year)												1301.8362	(64)
Electric shower(s)												1302	(64)
	47.1241	41.9880	45.8493	43.7534	44.5744	42.5197	43.9370	44.5744	43.7534	45.8493	44.9871	47.1241	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												536.0344	(64a)
Heat gains from water heating, kWh/month													
	44.0122	38.6819	40.9467	36.1611	35.0361	31.5886	31.4217	32.8208	33.2952	37.0455	39.1965	43.6012	(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	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	(66)
	91.0136	100.7651	91.0136	94.0474	91.0136	94.0474	91.0136	91.0136	94.0474	91.0136	94.0474	91.0136	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	180.4447	182.3171	177.5986	167.5534	154.8732	142.9556	134.9939	133.1215	137.8400	147.8851	160.5654	172.4830	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	(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)													
	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	(71)
Water heating gains (Table 5)													
	59.1562	57.5623	55.0359	50.2238	47.0915	43.8731	42.2335	44.1139	46.2434	49.7923	54.4396	58.6038	(72)
Total internal gains	387.5904	397.6204	380.6240	368.8006	349.9543	334.8520	322.2170	322.2249	332.1067	345.6670	366.0283	379.0763	(73)

6. Solar gains													

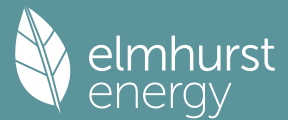
[Jan]			Area	Solar flux	g	FF	Access	Gains					
			m2	Table 6a	Specific data	Specific data	factor	W					
				W/m2	or Table 6b	or Table 6c	Table 6d						
North			8.3300	10.6334	0.4000	0.7000	0.7700	17.1873	(74)				
East			5.5500	19.6403	0.4000	0.7000	0.7700	21.1510	(76)				
Northwest			2.7800	11.2829	0.4000	0.7000	0.7700	6.0864	(81)				

Solar gains	44.4247	86.6107	146.2743	225.6861	291.8339	306.4927	288.5430	236.8988	173.5538	103.3350	55.2338	36.6922	(83)
Total gains	432.0151	484.2312	526.8984	594.4867	641.7882	641.3447	610.7600	559.1237	505.6605	449.0020	421.2622	415.7685	(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	
	63.8090	63.9953	64.1827	65.1365	65.3306	66.3191	66.3191	66.5204	65.9201	65.3306	64.9435	64.5609	

Full SAP Calculation Printout



alpha	5.2539	5.2664	5.2788	5.3424	5.3554	5.4213	5.4213	5.4347	5.3947	5.3554	5.3296	5.3041
util living area	0.9940	0.9883	0.9737	0.9164	0.7823	0.5796	0.4267	0.4835	0.7483	0.9467	0.9876	0.9951 (86)
MIT	19.8478	20.0171	20.2758	20.6380	20.8843	20.9816	20.9971	20.9945	20.9325	20.6096	20.1784	19.8264 (87)
Th 2	20.0976	20.1000	20.1024	20.1144	20.1168	20.1288	20.1288	20.1312	20.1240	20.1168	20.1120	20.1072 (88)
util rest of house	0.9923	0.9849	0.9660	0.8932	0.7316	0.5068	0.3435	0.3948	0.6765	0.9267	0.9835	0.9937 (89)
MIT 2	19.0505	19.2200	19.4759	19.8288	20.0412	20.1204	20.1280	20.1295	20.0876	19.8115	19.3904	19.0368 (90)
Living area fraction	19.3922	19.5616	19.8187	20.1756	20.4025	20.4895	20.5004	20.5002	20.4497	20.1535	19.7281	19.3752 (91)
MIT	19.3922	19.5616	19.8187	20.1756	20.4025	20.4895	20.5004	20.5002	20.4497	20.1535	19.7281	19.3752 (92)
Temperature adjustment												0.0000
adjusted MIT	19.3922	19.5616	19.8187	20.1756	20.4025	20.4895	20.5004	20.5002	20.4497	20.1535	19.7281	19.3752 (93)

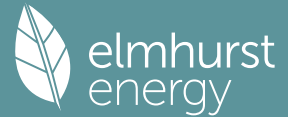
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9906	0.9824	0.9631	0.8950	0.7489	0.5375	0.3792	0.4329	0.7047	0.9277	0.9812	0.9922 (94)
Useful gains	427.9516	475.7140	507.4477	532.0708	480.6509	344.7279	231.6254	242.0450	356.3330	416.5383	413.3514	412.5147 (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	934.5747	905.2682	819.9497	684.0029	526.3458	350.8997	232.3912	243.5544	380.6078	577.8160	768.3286	928.7734 (97)
Space heating kWh	376.9276	288.6604	232.5015	109.3911	33.9970	0.0000	0.0000	0.0000	0.0000	119.9906	255.5836	384.0964 (98a)
Space heating requirement - total per year (kWh/year)												1801.1483
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	376.9276	288.6604	232.5015	109.3911	33.9970	0.0000	0.0000	0.0000	0.0000	119.9906	255.5836	384.0964 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1801.1483
Space heating per m2										(98c) / (4) =		28.5897 (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 %)												100.0000 (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	376.9276	288.6604	232.5015	109.3911	33.9970	0.0000	0.0000	0.0000	0.0000	119.9906	255.5836	384.0964 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	376.9276	288.6604	232.5015	109.3911	33.9970	0.0000	0.0000	0.0000	0.0000	119.9906	255.5836	384.0964 (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	128.3699	113.1586	120.1088	106.2780	103.2911	93.4536	92.9001	96.6284	97.6587	108.3759	114.4794	127.1337 (64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)
Fuel for water heating, kWh/month	128.3699	113.1586	120.1088	106.2780	103.2911	93.4536	92.9001	96.6284	97.6587	108.3759	114.4794	127.1337 (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	16.9622	15.3207	16.9622	16.4150	16.9622	16.4150	16.9622	16.9622	16.4150	16.9622	16.4150	16.9622 (231)
Lighting	18.0745	14.5001	13.0557	9.5652	7.3884	6.0364	6.7399	8.7608	11.3795	14.9305	16.8639	18.5769 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-10.2746	-18.9085	-36.0331	-51.4368	-63.6719	-61.8936	-60.6822	-52.0777	-38.7424	-24.8740	-12.5060	-8.3254 (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												1801.1483 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												100.0000
Water heating fuel used												1301.8362 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)												
mechanical ventilation fans (SFP = 0.8260)												158.7159 (230a)
central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												199.7159 (231)
Electricity for lighting (calculated in Appendix L)												145.8718 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-439.4263 (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)

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Total delivered energy for all uses

3545.1803 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1 (high-rate cost)	1621.0335	0.1636	265.2335 (261)
Space heating - main system 1 (low-rate cost)	180.1148	0.1374	24.7418 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	131.5922	0.1477	19.4354 (264)
Water heating - low rate cost	1170.2440	0.1240	145.0588 (264)
Energy for instantaneous electric shower(s)	536.0344	0.1436	76.9888 (264a)
Space and water heating			454.4695 (265)
Pumps, fans and electric keep-hot	199.7159	0.1432	27.8943 (267)
Energy for lighting	145.8718	0.1490	21.7378 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-439.4263	0.1346	-59.1671
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-59.1671 (269)
Total CO2, kg/year			521.9234 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			8.2800 (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 (high-rate cost)	1621.0335	1.4489	2609.7320 (275)
Space heating - main system 1 (low-rate cost)	180.1148	1.4973	269.6844 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	131.5922	1.5521	204.2449 (278)
Water heating - low rate cost	1170.2440	1.4435	1689.2586 (278)
Energy for instantaneous electric shower(s)	536.0344	1.5350	822.8319 (278a)
Space and water heating			4772.9199 (279)
Pumps, fans and electric keep-hot	199.7159	1.5335	303.0030 (281)
Energy for lighting	145.8718	1.5547	226.7933 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-439.4263	1.5022	-660.1244
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-660.1244 (283)
Total Primary energy kWh/year			5465.4237 (286)
Dwelling Primary energy Rate (DPER)			86.7500 (287)

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

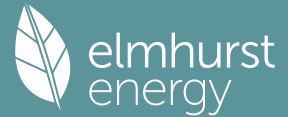
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	63.0000 (1b)	x 2.5000 (2b)	= 157.5000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 157.5000 (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	2 * 10 =	20.0000 (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) =	20.0000 / (5) = 0.1270 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.3770 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3487 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000	(22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750	(22a)
Adj infilt rate	0.4446 0.4359 0.4272 0.3836 0.3749 0.3313 0.3313 0.3226 0.3487 0.3749 0.3923 0.4097	(22b)
Effective ac	0.5988 0.5950 0.5912 0.5736 0.5703 0.5549 0.5549 0.5520 0.5608 0.5703 0.5769 0.5839	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Semi-glazed door			13.9800	1.0000	13.9800			(26a)
TER Opening Type (Uw = 1.20)			1.8700	1.1450	2.1412			(27)
3rd-S-Wall	11.4000		11.4000	0.1800	2.0520			(29a)
3rd-E-Wall	23.1000	6.1700	16.9300	0.1800	3.0474			(29a)
3rd-N-Wall	42.6000	6.4900	36.1100	0.1800	6.4998			(29a)
3rd-NW-Wall	12.0600	3.0900	8.9700	0.1800	1.6146			(29a)
External Roof	63.0000		63.0000	0.1100	6.9300			(30)
Total net area of external elements Aum(A, m2)			152.1600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26) ... (30) + (32) =		36.1650			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K

225.7905 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E5 Ground floor (normal)	16.9000	0.1600	2.7040	
E6 Intermediate floor within a dwelling	16.9000	0.0000	0.0000	
E16 Corner (normal)	6.0000	0.0900	0.5400	
E18 Party wall between dwellings	6.0000	0.0600	0.3600	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				3.6040 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	39.7690 (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	31.1246	30.9251	30.7296	29.8112	29.6393	28.8394	28.8394	28.6913	29.1476	29.6393	29.9869	30.3503	(38)
Average = Sum(39)m / 12 =	70.8936	70.6941	70.4986	69.5802	69.4084	68.6085	68.6085	68.4603	68.9166	69.4084	69.7560	70.1194	(39)
												69.5794	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.1253	1.1221	1.1190	1.1044	1.1017	1.0890	1.0890	1.0867	1.0939	1.1017	1.1072	1.1130	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

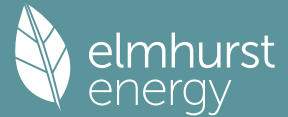
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.0651 (42)
Hot water usage for mixer showers													
Hot water usage for baths	58.8439	57.9596	56.6710	54.2054	52.3859	50.3569	49.2035	50.4824	51.8843	54.0629	56.5814	58.6184	(42a)
Hot water usage for other uses	25.4280	25.0504	24.5186	23.5380	22.8038	21.9897	21.5499	22.0780	22.6530	23.5241	24.5249	25.3421	(42b)
Average daily hot water use (litres/day)	35.7783	34.4773	33.1762	31.8752	30.5742	29.2732	29.2732	30.5742	31.8752	33.1762	34.4773	35.7783	(42c)
												110.3536	(43)
Daily hot water use	120.0502	117.4872	114.3658	109.6187	105.7640	101.6197	100.0266	103.1346	106.4125	110.7633	115.5835	119.7388	(44)
Energy content (annual)	190.1302	167.3003	175.7760	150.0625	142.3786	124.9533	120.9735	127.7022	131.2172	150.3047	164.6699	187.4820	(45)
Distribution loss (46)m = 0.15 x (45)m	28.5195	25.0950	26.3664	22.5094	21.3568	18.7430	18.1460	19.1553	19.6826	22.5457	24.7005	28.1223	(46)
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	236.7251	209.3860	222.3709	195.1544	188.9735	170.0451	167.5684	174.2971	176.3091	196.8996	209.7617	234.0769	(62)
WWHRS	-26.9010	-23.7914	-24.9130	-20.6290	-19.2255	-16.4514	-15.4205	-16.3982	-17.0212	-20.0661	-22.7325	-26.4028	(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	209.8241	185.5945	197.4578	174.5254	169.7481	153.5938	152.1479	157.8989	159.2878	176.8335	187.0293	207.6741	(64)
12Total per year (kWh/year)													2131.6152 (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	100.4942	89.2959	95.7214	85.9693	84.6168	77.6204	77.4996	79.7369	79.7032	87.2522	90.8262	99.6137	(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	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	103.2531	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.9186	138.3027	124.9186	129.0825	124.9186	129.0825	124.9186	124.9186	129.0825	124.9186	129.0825	124.9186	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	180.4447	182.3171	177.5986	167.5534	154.8732	142.9556	134.9939	133.1215	137.8400	147.8851	160.5654	172.4830	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	33.3253	(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)	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	-82.6025	(71)
Water heating gains (Table 5)	135.0729	132.8808	128.6578	119.4017	113.7323	107.8062	104.1662	107.1732	110.6989	117.2745	126.1475	133.8894	(72)
Total internal gains	497.4120	510.4765	488.1509	473.0136	450.5000	433.8202	418.0546	419.1892	431.5973	447.0541	472.7713	488.2668	(73)

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6. Solar gains

[Jan]	Area m2				Solar flux Table 6a W/m2	Specific data or Table 6b	g	Specific data or Table 6c	FF or Table 6c	Access factor Table 6d	Gains W
North	0.9400				10.6334		0.6300		0.7000	0.7700	3.0547 (74)
East	0.6200				19.6403		0.6300		0.7000	0.7700	3.7214 (76)
Northwest	0.3100				11.2829		0.6300		0.7000	0.7700	1.0689 (81)
Solar gains	7.8451	15.2935	25.8289	39.8570	51.5470	54.1403	50.9679	41.8399	30.6473	18.2464	6.4799 (83)
Total gains	505.2571	525.7701	513.9799	512.8706	502.0470	487.9605	469.0225	461.0291	462.2446	465.3005	494.7467 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	55.7361	55.8934	56.0484	56.7882	56.9288	57.5925	57.5925	57.7171	57.3350	56.9288	56.6451	56.3515
alpha	4.7157	4.7262	4.7366	4.7859	4.7953	4.8395	4.8395	4.8478	4.8223	4.7953	4.7763	4.7568
util living area												
	0.9896	0.9858	0.9805	0.9613	0.9132	0.7823	0.6142	0.6448	0.8398	0.9530	0.9818	0.9906 (86)
MIT	19.7336	19.8516	20.0391	20.3513	20.6520	20.8930	20.9742	20.9671	20.8373	20.4821	20.0785	19.7231 (87)
Th 2	19.9802	19.9828	19.9853	19.9972	19.9994	20.0098	20.0098	20.0117	20.0058	19.9994	19.9949	19.9902 (88)
util rest of house												
	0.9866	0.9817	0.9743	0.9477	0.8790	0.6999	0.4900	0.5239	0.7717	0.9340	0.9757	0.9879 (89)
MIT 2	18.5234	18.6750	18.9150	19.3146	19.6778	19.9389	20.0000	19.9980	19.8855	19.4795	18.9726	18.5172 (90)
Living area fraction									fLA =	Living area /	(4) =	0.4286 (91)
MIT	19.0421	19.1792	19.3968	19.7589	20.0953	20.3478	20.4175	20.4133	20.2934	19.9092	19.4466	19.0340 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0421	19.1792	19.3968	19.7589	20.0953	20.3478	20.4175	20.4133	20.2934	19.9092	19.4466	19.0340 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9830	0.9775	0.9697	0.9437	0.8828	0.7304	0.5432	0.5754	0.7937	0.9319	0.9714	0.9845 (94)
Useful gains	496.6480	513.9434	498.3986	484.0105	443.2268	356.4302	254.7799	265.2641	366.8618	433.5980	468.7048	487.0731 (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	1045.1193	1009.4571	909.2032	755.5668	582.7064	394.3478	261.9134	274.7534	426.8284	646.1335	861.2481	1040.1536 (97)
Space heating kWh	408.0627	332.9852	305.6387	195.5206	103.7729	0.0000	0.0000	0.0000	0.0000	158.1264	282.6312	411.4919 (98a)
Space heating requirement - total per year (kWh/year)												2198.2295
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	408.0627	332.9852	305.6387	195.5206	103.7729	0.0000	0.0000	0.0000	0.0000	158.1264	282.6312	411.4919 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2198.2295
Space heating per m2										(98c) / (4) =		34.8925 (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)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	408.0627	332.9852	305.6387	195.5206	103.7729	0.0000	0.0000	0.0000	0.0000	158.1264	282.6312	411.4919 (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)	442.1048	360.7641	331.1361	211.8316	112.4300	0.0000	0.0000	0.0000	0.0000	171.3179	306.2093	445.8200 (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	209.8241	185.5945	197.4578	174.5254	169.7481	153.5938	152.1479	157.8989	159.2878	176.8335	187.0293	207.6741 (64)
Efficiency of water heater	85.5245	85.3548	85.0359	84.3151	82.9912	79.8000	79.8000	79.8000	79.8000	83.8099	84.9832	79.8000 (216)
Fuel for water heating, kWh/month	245.3380	217.4389	232.2054	206.9917	204.5374	192.4734	190.6615	197.8683	199.6088	210.9935	220.0779	242.7140 (219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	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	25.9556	20.8226	18.7484	13.7359	10.6100	8.6685	9.6788	12.5809	16.3413	21.4407	24.2172	26.6770 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-17.0204	-25.2768	-38.2322	-45.2934	-50.8616	-48.2217	-47.6732	-44.0449	-37.9328	-29.9652	-19.1764	-14.5720 (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)	-6.0407	-13.0122	-26.4434	-40.5760	-54.4956	-55.0563	-54.3693	-45.6006	-32.8884	-18.8390	-8.1397	-4.7513 (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)

Full SAP Calculation Printout



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												2381.6138	(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												2560.9088	(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)												209.4766	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-778.4832	(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												4459.5160	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2381.6138	0.2100	500.1389 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2560.9088	0.2100	537.7909 (264)
Space and water heating			1037.9297 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	209.4766	0.1443	30.2340 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-418.2706	0.1335	-55.8441
PV Unit electricity exported	-360.2126	0.1253	-45.1299
Total			-100.9740 (269)
Total CO2, kg/year			979.1189 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.5400 (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	2381.6138	1.1300	2691.2235 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2560.9088	1.1300	2893.8270 (278)
Space and water heating			5585.0505 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	209.4766	1.5338	321.3022 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-418.2706	1.4934	-624.6355
PV Unit electricity exported	-360.2126	0.4599	-165.6474
Total			-790.2829 (283)
Total Primary energy kWh/year			5246.1706 (286)
Target Primary Energy Rate (TPER)			83.2700 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	63

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

72

72

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 0.14 W/m ² K	Very Good
Roof	Average thermal transmittance 0.1 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 72 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

£583

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 3-2	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	75 C	DER	7.22	TER	15.09
Environmental	95 A	% DER < TER			52.15
CO ₂ Emissions (t/year)	0.37	DFEE	37.52	TFEE	39.30
Compliance Check	See BREL	% DFEE < TFEE			4.53
% DPER < TPER	5.68	DPER	76.04	TPER	80.62

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Top-floor flat	
Which Floor	3	
2.0 Number of Storeys	1	
3.0 Date Built	2022	
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	kJ/m²K
7.0 Electricity Tariff	10 Hour Off Peak	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

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:	26.67 m	61.00 m ²	2.50 m
1st Storey:	11.60 m	31.40 m ²	3.00 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	28.30	m ²
-----------------	-------	----------------

9.0 External Walls										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
3rd-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	36.30	27.97	0.00	None	8.33	Enter Gross Area
3rd-E-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	15.60	10.04	0.00	None	5.56	Enter Gross Area
3rd-NW-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	1.50	1.50	0.00	None	0.00	Enter Gross Area
3rd-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	24.90	11.02	0.00	None	13.88	Enter Gross Area

10.0 External Roofs										
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	61.00	61.00	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor	Lowest occupied	Precast concrete planks floor, screed, carpeted	30.00	61.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
3rd-E-Windows	Window	3rd-E-Wall	East	2.78	0
3rd-E-Door	Door	3rd-E-Wall	East	2.78	0
3rd-W-Doors	Door	3rd-W-Wall	West	5.55	0
3rd-W-Windows	Window	3rd-W-Wall	West	8.33	0
3rd-S-Door	Door	3rd-S-Wall	South	2.78	0
3rd-S-Windows	Window	3rd-S-Wall	South	5.55	0

14.0 Conservatory

None

15.0 Draught Proofing

100

 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

User Input

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		26.67	0.00	0.00	No
E6 Intermediate floor within a dwelling		26.67	0.00	0.00	No
E16 Corner (normal)		6.00	0.00	0.00	No
E18 Party wall between dwellings		6.00	0.00	0.00	No

Y-value

0.04

 W/m²K

Description

Bridge

18.0 Pressure Testing

Yes

Designed AP₅₀

3.00

 m²/(h.m²) @ 50 Pa

Property Tested?

Yes

Test Method

Blower Door

As Built AP₅₀

0.10

 m²/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Yes

Approved Installation

No

Mechanical Ventilation data Type

Database

Type

Balanced mechanical ventilation with heat recovery

MV Reference Number

500500

Configuration

2

Manufacturer SFP

0.59

Duct Type

Rigid

MVHR Efficiency

89.00

Wet Rooms

2

SFP from Installer Commissioning Certificate

No

MVHR System Location

Inside heated envelope (installed exclusively)

Duct Installation Specification

Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

No

22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	10

Summary for Input Data

24.0 Main Heating 1

.0 Main Heating 1		SAP table	
Percentage of Heat		100.00	%
Database Ref. No.		0	
Fuel Type		Electricity	
SAP Code		191	
In Winter		100.00	
In Summer		100.00	
Controls SAP Code		2106	
Delayed Start Stat		No	
Burner Control		On/Off	
HETAS approved System		No	
Oil Pump Inside		No	
Flue Type		Balanced	
Fan Assisted Flue		No	
Is MHS Pumped		Pump in heated space	
Heating Pump Age		2013 or later	
Heat Emitter		Radiators	
Flow Temperature		Unknown	
Boiler Interlock		No	
Electric CPSU Temperature		60.00	
Combi boiler type		No Combi	
Combi keep hot type		Electric, time clock	

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.30	No	

28.3 Waste Water Heat Recovery System

Summary for Input Data

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

One Dwelling
Export Capable Meter?
No
Connected To Dwelling
Yes
Diverter
No
Battery Capacity [kWh]
3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

None
Electricity Generated
0.00
Apportioned
0.00
Connected to dwelling's electricity meter
Yes
Electricity Generation
Annual

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

Recommendations

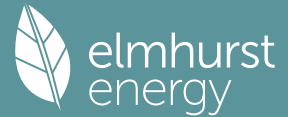
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023	
Assessment Reference	Flat 3-2			Prop Type Ref	22403		
Property	Braemar Avenue, London, Greater London, N22 7BY						
SAP Rating	75 C		DER	7.22		TER	15.09
Environmental	95 A		% DER < TER				52.15
CO ₂ Emissions (t/year)	0.37		DFEE	37.52		TFEE	39.30
Compliance Check	See BREL		% DFEE < TFEE				4.53
% DPER < TPER	5.68		DPER	76.04		TPER	80.62
Assessor Details	Mr. Kamran Afshar					Assessor ID	AM23-0001
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	61.0000 (1b)	2.5000 (2b)	152.5000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.0000		152.5000 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	152.5000 (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	0 * 10 = 0.0000 (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) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.0000	(17)
Infiltration rate	0.1500	(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) =	0.1275 (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	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (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
Door			11.1100	0.9000	9.9990		(26a)
Window (Uw = 0.90)			16.6600	0.8687	14.4730		(27)
3rd-S-Wall	36.3000	8.3300	27.9700	0.1400	3.9158	190.0000	5314.2999 (29a)
3rd-E-Wall	15.6000	5.5600	10.0400	0.1400	1.4056	190.0000	1907.6001 (29a)
3rd-NW-Wall	1.5000		1.5000	0.1400	0.2100	190.0000	285.0000 (29a)
3rd-W-Wall	24.9000	13.8800	11.0200	0.1400	1.5428	190.0000	2093.7999 (29a)
External Roof	61.0000		61.0000	0.1000	6.1000	9.0000	549.0000 (30)
Total net area of external elements Aum(A, m ²)			139.3000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	37.6462		(33)
Party Floor			61.0000			40.0000	2440.0000 (32d)
Heat capacity Cm = Sum(A x k)				(28)...(30) + (32) + (32a)...(32e) =			12589.6999 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							206.3885 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							5.5720 (36)
Point Thermal bridges						(36a) =	0.0000

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Total fabric heat loss (33) + (36) + (36a) = 43.2182 (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	13.1883	13.0279	12.8675	12.0654	11.9050	11.1030	11.1030	10.9425	11.4238	11.9050	12.2258	12.5467 (38)
Heat transfer coeff	56.4065	56.2461	56.0856	55.2836	55.1232	54.3211	54.3211	54.1607	54.6419	55.1232	55.4440	55.7648 (39)
Average = Sum(39)m / 12 =												55.2435
HLP	0.9247	0.9221	0.9194	0.9063	0.9037	0.8905	0.8905	0.8879	0.8958	0.9037	0.9089	Dec 0.9142 (40)
HLP (average)												0.9056
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0098 (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	25.0293	24.6576	24.1341	23.1690	22.4462	21.6449	21.2120	21.7318	22.2978	23.1553	24.1403	24.9447 (42b)
Hot water usage for other uses	35.2120	33.9315	32.6511	31.3707	30.0902	28.8098	28.8098	30.0902	31.3707	32.6511	33.9315	35.2120 (42c)
Average daily hot water use (litres/day)												55.2170 (43)
Daily hot water use	60.2413	58.5891	56.7852	54.5396	52.5365	50.4547	50.0218	51.8221	53.6685	55.8064	58.0719	60.1567 (44)
Energy conte	95.4075	83.4301	87.2768	74.6620	70.7242	62.0399	60.4971	64.1665	66.1786	75.7287	82.7340	94.1908 (45)
Energy content (annual)	Total = Sum(45)m =											917.0363
Distribution loss (46)m = 0.15 x (45)m	14.3111	12.5145	13.0915	11.1993	10.6086	9.3060	9.0746	9.6250	9.9268	11.3593	12.4101	14.1286 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												1.0140 (55)
Total storage loss	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340 (56)
If cylinder contains dedicated solar storage	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340 (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	126.8415	111.8221	118.7108	105.0820	102.1582	92.4599	91.9311	95.6005	96.5986	107.1627	113.1540	125.6248 (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	126.8415	111.8221	118.7108	105.0820	102.1582	92.4599	91.9311	95.6005	96.5986	107.1627	113.1540	125.6248 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											1287.1463 (64)
Electric shower(s)	46.3816	41.3264	45.1268	43.0640	43.8721	41.8497	43.2447	43.8721	43.0640	45.1268	44.2783	46.3816 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												527.5882 (64a)
Heat gains from water heating, kWh/month	43.3184	38.0721	40.3012	35.5911	34.4838	31.0907	30.9264	32.3034	32.7704	36.4615	38.5786	42.9138 (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	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	88.5003	97.9825	88.5003	91.4503	88.5003	91.4503	88.5003	88.5003	91.4503	88.5003	91.4503	88.5003 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	175.4617	177.2825	172.6943	162.9265	150.5964	139.0079	131.2661	129.4454	134.0336	143.8013	156.1314	167.7199 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488 (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)	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905 (71)
Water heating gains (Table 5)	58.2236	56.6549	54.1683	49.4321	46.3492	43.1815	41.5678	43.4185	45.5144	49.0074	53.5814	57.6799 (72)
Total internal gains	378.3321	388.0663	371.5093	359.9554	341.5924	326.7862	314.4806	314.5106	324.1447	337.4555	357.3096	370.0465 (73)

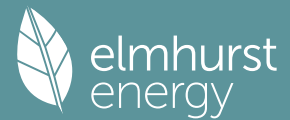
6. Solar gains

[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			
East				2.7800	19.6403	0.4000	0.7000	0.7700	10.5946 (76)			
South				5.5500	46.7521	0.4000	0.7000	0.7700	50.3483 (78)			
West				8.3300	19.6403	0.4000	0.7000	0.7700	31.7456 (80)			
Solar gains	92.6885	165.2839	241.4396	317.6498	367.5107	368.6276	353.9272	317.0639	268.3654	187.2187	112.4732	78.3241 (83)
Total gains	471.0206	553.3503	612.9489	677.6052	709.1031	695.4138	668.4078	631.5746	592.5102	524.6742	469.7827	448.3706 (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	61.9989	62.1757	62.3535	63.2582	63.4423	64.3790	64.3790	64.5697	64.0010	63.4423	63.0752	62.7123

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alpha	5.1333	5.1450	5.1569	5.2172	5.2295	5.2919	5.2919	5.3046	5.2667	5.2295	5.2050	5.1808
util living area	0.9855	0.9676	0.9305	0.8337	0.6806	0.4935	0.3566	0.3927	0.6136	0.8742	0.9689	0.9884 (86)
MIT	19.9774	20.2073	20.4795	20.7765	20.9355	20.9903	20.9986	20.9977	20.9710	20.7536	20.3223	19.9409 (87)
Th 2	20.1466	20.1488	20.1510	20.1622	20.1644	20.1756	20.1756	20.1778	20.1711	20.1644	20.1599	20.1555 (88)
util rest of house	0.9820	0.9601	0.9151	0.8017	0.6308	0.4325	0.2903	0.3234	0.5480	0.8415	0.9603	0.9855 (89)
MIT 2	19.2234	19.4497	19.7123	19.9915	20.1229	20.1710	20.1751	20.1771	20.1559	19.9801	19.5737	19.1947 (90)
Living area fraction	19.5732	19.8012	20.0682	20.3557	20.4999	20.5511	20.5572	20.5578	20.5340	20.3389	19.9210	19.5409 (92)
MIT	19.5732	19.8012	20.0682	20.3557	20.4999	20.5511	20.5572	20.5578	20.5340	20.3389	19.9210	19.5409 (93)
Temperature adjustment												0.0000
adjusted MIT												0.0000

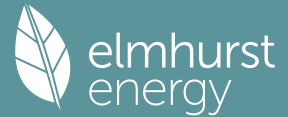
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9791	0.9565	0.9134	0.8095	0.6513	0.4605	0.3211	0.3556	0.5773	0.8489	0.9575	0.9829 (94)
Useful gains	461.1536	529.2656	559.8581	548.5249	461.8547	320.2441	214.5967	224.5765	342.0587	445.4158	449.8045	440.7213 (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	861.5084	838.1329	760.9838	633.3109	485.0766	323.2714	214.9572	225.1872	351.5678	536.8412	710.8481	855.4808 (97)
Space heating kWh	297.8639	207.5588	149.6376	61.0459	17.2771	0.0000	0.0000	0.0000	0.0000	68.0205	187.9514	308.5811 (98a)
Space heating requirement - total per year (kWh/year)												1297.9363
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	297.8639	207.5588	149.6376	61.0459	17.2771	0.0000	0.0000	0.0000	0.0000	68.0205	187.9514	308.5811 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1297.9363
Space heating per m2										(98c) / (4) =		21.2776 (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 %)												100.0000 (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	297.8639	207.5588	149.6376	61.0459	17.2771	0.0000	0.0000	0.0000	0.0000	68.0205	187.9514	308.5811 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	297.8639	207.5588	149.6376	61.0459	17.2771	0.0000	0.0000	0.0000	0.0000	68.0205	187.9514	308.5811 (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	126.8415	111.8221	118.7108	105.0820	102.1582	92.4599	91.9311	95.6005	96.5986	107.1627	113.1540	125.6248 (64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)
Fuel for water heating, kWh/month	126.8415	111.8221	118.7108	105.0820	102.1582	92.4599	91.9311	95.6005	96.5986	107.1627	113.1540	125.6248 (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	16.5342	14.9341	16.5342	16.0009	16.5342	16.0009	16.5342	16.5342	16.0009	16.5342	16.0009	16.5342 (231)
Lighting	17.5754	14.0996	12.6952	9.3010	7.1844	5.8697	6.5538	8.5189	11.0652	14.5182	16.3982	18.0639 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-10.1973	-18.6352	-35.1784	-49.9324	-62.2482	-61.1859	-60.0034	-51.5671	-38.4544	-24.4590	-12.3821	-8.2721 (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												1297.9363 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												100.0000
Water heating fuel used												1287.1463 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8260)												
mechanical ventilation fans (SFP = 0.8260)												153.6773 (230a)
central heating pump												41.0000 (230c)
Total electricity for the above, kWh/year												194.6773 (231)
Electricity for lighting (calculated in Appendix L)												141.8436 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-432.5154 (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)

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Total delivered energy for all uses

3016.6763 (238)

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

	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1 (high-rate cost)	648.9682	0.1620	105.1091 (261)
Space heating - main system 1 (low-rate cost)	648.9682	0.1495	97.0252 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating - high rate cost	13.6910	0.1455	1.9917 (264)
Water heating - low rate cost	1273.4553	0.1342	170.9483 (264)
Energy for instantaneous electric shower(s)	527.5882	0.1416	74.6940 (264a)
Space and water heating			375.0742 (265)
Pumps, fans and electric keep-hot	194.6773	0.1412	27.1065 (267)
Energy for lighting	141.8436	0.1468	20.8285 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-432.5154	0.1328	-57.4194
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-57.4194 (269)
Total CO ₂ , kg/year			440.2838 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			7.2200 (273)

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

	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year
Space heating - main system 1 (high-rate cost)	648.9682	0.8014	1040.1937 (275)
Space heating - main system 1 (low-rate cost)	648.9682	1.5496	1005.6098 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating - high rate cost	13.6910	1.5419	21.1096 (278)
Water heating - low rate cost	1273.4553	1.4905	1898.1442 (278)
Energy for instantaneous electric shower(s)	527.5882	1.5255	804.8125 (278a)
Space and water heating			3965.0573 (279)
Pumps, fans and electric keep-hot	194.6773	1.5239	294.9448 (281)
Energy for lighting	141.8436	1.5451	219.1586 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-432.5154	1.4926	-645.5686
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-645.5686 (283)
Total Primary energy kWh/year			4638.4046 (286)
Dwelling Primary energy Rate (DPER)			76.0400 (287)

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

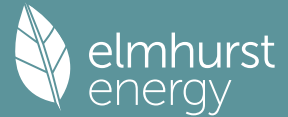
1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	61.0000 (1b)	x 2.5000 (2b)	= 152.5000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 152.5000 (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	2 * 10 = 20.0000 (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) = 20.0000 / (5) = 0.1311 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3811 (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) = 0.3240 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	0.4131 0.4050 0.3969 0.3564 0.3483 0.3078 0.3078 0.2997 0.3240 0.3483 0.3645 0.3807 (22b)
Effective ac	0.5853 0.5820 0.5788 0.5635 0.5606 0.5474 0.5474 0.5449 0.5525 0.5606 0.5664 0.5725 (25)

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3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K	
TER Semi-glazed door			11.1100	1.0000	11.1100			(26a)
TER Opening Type (Uw = 1.20)			4.1400	1.1450	4.7405			(27)
3rd-S-Wall	36.3000	4.1600	32.1400	0.1800	5.7852			(29a)
3rd-E-Wall	15.6000	3.4700	12.1300	0.1800	2.1834			(29a)
3rd-NW-Wall	1.5000		1.5000	0.1800	0.2700			(29a)
3rd-W-Wall	24.9000	7.6200	17.2800	0.1800	3.1104			(29a)
External Roof	61.0000		61.0000	0.1100	6.7100			(30)
Total net area of external elements Aum(A, m ²)			139.3000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26) ... (30) + (32) =		33.9095			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K

206.3885 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E5 Ground floor (normal)	26.6700	0.1600	4.2672	
E6 Intermediate floor within a dwelling	26.6700	0.0000	0.0000	
E16 Corner (normal)	6.0000	0.0900	0.5400	
E18 Party wall between dwellings	6.0000	0.0600	0.3600	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				5.1672 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	39.0767 (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	29.4559	29.2892	29.1257	28.3582	28.2146	27.5461	27.5461	27.4223	27.8036	28.2146	28.5051	28.8088	(38)
Heat transfer coeff	68.5325	68.3658	68.2024	67.4348	67.2912	66.6227	66.6227	66.4989	66.8802	67.2912	67.5817	67.8855	(39)
Average = Sum(39)m / 12 =												67.4341	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1235	1.1208	1.1181	1.1055	1.1031	1.0922	1.0922	1.0901	1.0964	1.1031	1.1079	1.1129 (40)
HLP (average)												1.1055
Days in month	31	28	31	30	31	30	31	31	30	31	30	31

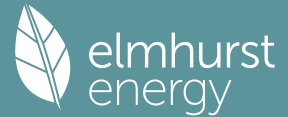
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.0098 (42)
Hot water usage for mixer showers	57.9167	57.0463	55.7780	53.3513	51.5605	49.5634	48.4282	49.6869	51.0667	53.2110	55.6898	57.6948 (42a)	
Hot water usage for baths	25.0293	24.6576	24.1341	23.1690	22.4462	21.6449	21.2120	21.7318	22.2978	23.1553	24.1403	24.9447 (42b)	
Hot water usage for other uses	35.2120	33.9315	32.6511	31.3707	30.0902	28.8098	28.8098	30.0902	31.3707	32.6511	33.9315	35.2120 (42c)	
Average daily hot water use (litres/day)												108.6142 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	118.1580	115.6354	112.5632	107.8910	104.0970	100.0181	98.4501	101.5090	104.7352	109.0174	113.7617	117.8515 (44)	
Energy content	187.1333	164.6633	173.0055	147.6973	140.1346	122.9839	119.0668	125.6893	129.1490	147.9356	162.0744	184.5269 (45)	
Energy content (annual)										Total = Sum(45)m =		1804.0599	
Distribution loss (46)m = 0.15 x (45)m	28.0700	24.6995	25.9508	22.1546	21.0202	18.4476	17.8600	18.8534	19.3723	22.1903	24.3112	27.6790 (46)	
Water storage loss:													
Store volume												150.0000 (47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.3938 (48)	
Temperature factor from Table 2b												0.5400 (49)	
Enter (49) or (54) in (55)												0.7527 (55)	
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)	
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)	
Total heat required for water heating calculated for each month	233.7282	206.7490	219.6004	192.7892	186.7295	168.0757	165.6617	172.2843	174.2408	194.5305	207.1662	231.1218 (62)	
WWHRS	-26.4771	-23.4166	-24.5205	-20.3039	-18.9225	-16.1921	-15.1775	-16.1398	-16.7530	-19.7500	-22.3743	-25.9868 (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	207.2512	183.3325	195.0799	172.4853	167.8069	151.8836	150.4842	156.1445	157.4878	174.7805	184.7919	205.1350 (64)	
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				2106.6633 (64)	
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)	
												0.0000 (64a)	
Heat gains from water heating, kWh/month	99.4978	88.4191	94.8003	85.1828	83.8707	76.9656	76.8656	79.0676	79.0155	86.4645	89.9632	98.6311 (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	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	100.4881	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	109.9681	121.7504	109.9681	113.6337	109.9681	113.6337	109.9681	109.9681	113.6337	109.9681	113.6337	109.9681	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	175.4617	177.2825	172.6943	162.9265	150.5964	139.0079	131.2661	129.4454	134.0336	143.8013	156.1314	167.7199	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	33.0488	(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)	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	-80.3905	(71)
Water heating gains (Table 5)	133.7335	131.5761	127.4197	118.3095	112.7294	106.8967	103.3140	106.2737	109.7437	116.2157	124.9489	132.5687	(72)
Total internal gains	475.3098	486.7554	466.2285	451.0161	429.4403	412.6847	397.6946	398.8336	410.5574	426.1316	450.8604	466.4031	(73)

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6. Solar gains

[Jan]	Area m2				Solar flux Table 6a W/m2	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d	Gains W	
East	0.6900				19.6403		0.6300		0.7000	0.7700	4.1416 (76)	
South	1.3800				46.7521		0.6300		0.7000	0.7700	19.7175 (78)	
West	2.0700				19.6403		0.6300		0.7000	0.7700	12.4248 (80)	
Solar gains	36.2839	64.6996	94.5049	124.3284	143.8392	144.2746	138.5218	124.0971	105.0418	73.2842	44.0283	30.6611 (83)
Total gains	511.5937	551.4549	560.7333	575.3445	573.2795	556.9593	536.2164	522.9307	515.5992	499.4158	494.8887	497.0642 (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	51.0289	51.1533	51.2759	51.8595	51.9702	52.4917	52.4917	52.5894	52.2896	51.9702	51.7468	51.5153
util living area	4.4019	4.4102	4.4184	4.4573	4.4647	4.4994	4.4994	4.5060	4.4860	4.4647	4.4498	4.4344
	0.9838	0.9757	0.9630	0.9270	0.8509	0.6955	0.5297	0.5621	0.7697	0.9246	0.9718	0.9857 (86)
MIT	19.6856	19.8460	20.0786	20.4185	20.7159	20.9195	20.9812	20.9753	20.8668	20.5098	20.0571	19.6634 (87)
Th 2	19.9817	19.9839	19.9861	19.9964	19.9983	20.0072	20.0072	20.0089	20.0038	19.9983	19.9944	19.9903 (88)
util rest of house	0.9797	0.9695	0.9529	0.9060	0.8061	0.6114	0.4182	0.4514	0.6953	0.8989	0.9635	0.9820 (89)
MIT 2	18.4731	18.6770	18.9711	19.3968	19.7439	19.9550	19.9999	19.9985	19.9076	19.5135	18.9529	18.4511 (90)
Living area fraction										fLA = Living area /	(4) =	0.4639 (91)
MIT	19.0356	19.2193	19.4849	19.8708	20.1949	20.4025	20.4552	20.4517	20.3526	19.9757	19.4652	19.0135 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0356	19.2193	19.4849	19.8708	20.1949	20.4025	20.4552	20.4517	20.3526	19.9757	19.4652	19.0135 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9746	0.9636	0.9468	0.9029	0.8158	0.6467	0.4697	0.5023	0.7234	0.8982	0.9580	0.9773 (94)
Useful gains	498.6150	531.3944	530.9219	519.4737	467.6968	360.1595	251.8782	262.6744	372.9625	448.5794	474.0795	485.7704 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1009.8704	978.9530	885.6011	739.8149	571.6290	386.5760	256.8419	269.4306	418.1751	630.9039	835.6619	1005.6247 (97)
Space heating kWh	380.3740	300.7594	263.8814	158.6457	77.3255	0.0000	0.0000	0.0000	0.0000	135.6494	260.3394	386.7716 (98a)
Space heating requirement - total per year (kWh/year)												1963.7463
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	380.3740	300.7594	263.8814	158.6457	77.3255	0.0000	0.0000	0.0000	0.0000	135.6494	260.3394	386.7716 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1963.7463
Space heating per m2										(98c) / (4) =		32.1926 (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	380.3740	300.7594	263.8814	158.6457	77.3255	0.0000	0.0000	0.0000	0.0000	135.6494	260.3394	386.7716	(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)	412.1062	325.8498	285.8953	171.8805	83.7763	0.0000	0.0000	0.0000	0.0000	146.9658	282.0578	419.0375	(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	207.2512	183.3325	195.0799	172.4853	167.8069	151.8836	150.4842	156.1445	157.4878	174.7805	184.7919	205.1350	(64)
Efficiency of water heater	85.4029	85.1625	84.7379	83.8727	82.4355	79.8000	79.8000	79.8000	79.8000	83.4979	84.8283	79.8000	(216)
Fuel for water heating, kWh/month	242.6746	215.2737	230.2158	205.6513	203.5615	190.3303	188.5767	195.6697	197.3531	209.3232	217.8423	240.0372	(219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	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	22.8492	18.3305	16.5046	12.0919	9.3402	7.6310	8.5204	11.0752	14.3855	18.8746	21.3188	23.4842	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	-16.4713	-24.4623	-37.0097	-43.8654	-49.2841	-46.7394	-46.1998	-42.6582	-36.7146	-28.9932	-18.5549	-14.1014	(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)	-5.8577	-12.6112	-25.6128	-39.2781	-52.7284	-53.2599	-52.6032	-44.1415	-31.8583	-18.2616	-7.8941	-4.6086	(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)

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Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2127.5692	(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												2536.5093	(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)												184.4061	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-753.7695	(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												4180.7151	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2127.5692	0.2100	446.7895 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2536.5093	0.2100	532.6670 (264)
Space and water heating			979.4565 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	184.4061	0.1443	26.6155 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-405.0541	0.1335	-54.0767
PV Unit electricity exported	-348.7154	0.1253	-43.6947
Total			-97.7714 (269)
Total CO2, kg/year			920.2298 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.0900 (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	2127.5692	1.1300	2404.1532 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2536.5093	1.1300	2866.2555 (278)
Space and water heating			5270.4087 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	184.4061	1.5338	282.8482 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-405.0541	1.4933	-604.8875
PV Unit electricity exported	-348.7154	0.4599	-160.3799
Total			-765.2673 (283)
Total Primary energy kWh/year			4918.0903 (286)
Target Primary Energy Rate (TPER)			80.6200 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	61

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

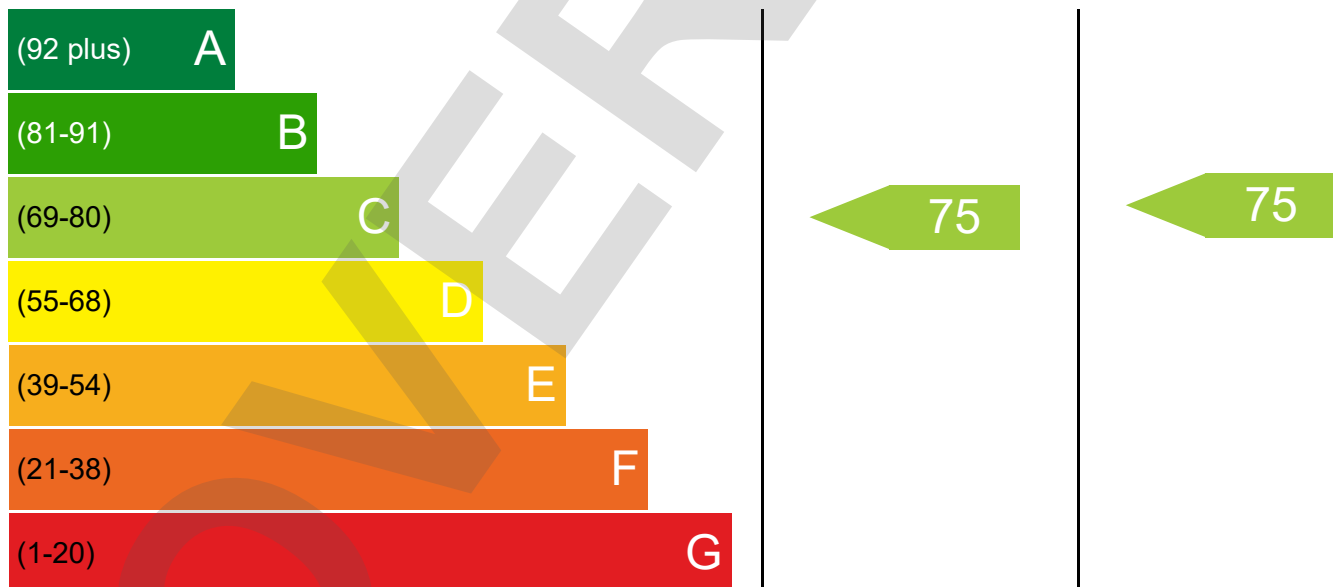
Energy Rating

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



Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
-----------	------	---------	------	-----------

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.14 W/m ² K	Very Good
Roof	Average thermal transmittance 0.1 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

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

£690

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 0-1	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	82 B	DER	5.13	TER	12.97
Environmental	96 A	% DER < TER			60.45
CO ₂ Emissions (t/year)	0.32	DFEE	30.27	TFEE	34.45
Compliance Check	See BREL	% DFEE < TFEE			12.13
% DPER < TPER	20.38	DPER	54.77	TPER	68.79

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, Semi-Detached
Position of Flat	Basement flat
Which Floor	0
2.0 Number of Storeys	2
3.0 Date Built	2022
3.0 Property Age Band	L
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	N/A
7.0 Electricity Tariff	7 Hour Off Peak
Smart electricity meter fitted	No
Smart gas meter fitted	No

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:	9.27 m	41.80 m ²	3.00 m
1st Storey:	11.60 m	31.40 m ²	2.50 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	28.00	m ²
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9.0 External Walls			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
LGF-N-Wall	Cavity Wall	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.14	140.00	21.60	18.82	0.00	None	2.78	Enter Gross Area
LGF-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	15.00	7.55	0.00	None	7.45	Enter Gross Area
GF-N-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	16.80	16.80	0.00	None	0.00	Enter Gross Area
GF-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	16.80	8.52	0.00	None	8.28	Enter Gross Area

10.1 Party Ceilings	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Party Ceiling	Precast concrete planks floor, screed, carpeted	30.00	31.40

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
-----------------------	-------------	------	--------------	--------------	------------------------------	--------------	----------------	-----------------------------	------------------------

Summary for Input Data

LGF-Floor Basement Floor Lowest occupied Slab on ground, screed over insulation 0.09 None 0.00 110.00 41.80

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Triple glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
LGF-W-Door	Door	LGF-W-Wall	West	2.78	0
LGF-N-Door	Door	LGF-N-Wall	North	2.78	0
GF-W-Door	Door	GF-W-Wall	West	2.78	0
LGF-W-Windows	Window	LGF-W-Wall	West	4.67	0
GF-W-Windows	Window	GF-W-Wall	West	5.50	0

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

User Input

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		9.27	0.00	0.00	No
E6 Intermediate floor within a dwelling		20.10	0.00	0.00	No
E16 Corner (normal)		12.00	0.00	0.00	No
E18 Party wall between dwellings		12.00	0.00	0.00	No

Y-value 0.04 W/m²K

Description Bridge

18.0 Pressure Testing

Yes

Designed AP₅₀ 3.00 m³/(h.m²) @ 50 Pa

Property Tested? Yes

Test Method Blower Door

As Built AP₅₀ 0.10 m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present Yes

Approved Installation No

Mechanical Ventilation data Type Database

Type Balanced mechanical ventilation with heat recovery

MV Reference Number 500624

Configuration 2

Manufacturer SFP 0.64

Duct Type Rigid

MVHR Efficiency 91.00

Wet Rooms 2

SFP from Installer Commissioning Certificate No

MVHR System Location Inside heated envelope (installed exclusively)

Duct Installation Specification Level 1

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.14	In Room Fan Kitchen	0
0.11	In Room Fan Other Wet Room	0
0.00	In Duct Fan Kitchen	0
0.00	In Duct Fan Other Wet Room	0
0.08	Through Wall Fan Kitchen	0
0.08	Through Wall Fan Other Wet Room	0

20.0 Fans, Open Fireplaces, Flues

Summary for Input Data

21.0 Fixed Cooling System

	Yes	
Cooled Area	28	m ²
Data Source	SAP table	
Energy Class	A+	

22.0 Lighting

No Fixed Lighting	No				
	Name LEDs	Efficacy 114.00	Power 10	Capacity 1140	Count 10

24.0 Main Heating 1

	SAP table	
Description	Electric Boiler	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	191	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2106	
Delayed Start Stat	No	
Burner Control	On/Off	
Boiler Compensator	200113	
HETAS approved System	No	
Oil Pump Inside	No	
Flue Type	Balanced	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	
Flow Temperature	Enter value	
Flow Temperature Value	55.00	
Boiler Interlock	Yes	
Electric CPSU Temperature	60.00	
Combi boiler type	No Combi	
Combi keep hot type	Electric, time clock	

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No

Summary for Input Data

Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
shower	Instantaneous electric shower	7.00	9.30	No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.39	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

Multiple Dwellings – Connected	
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	5.80

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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

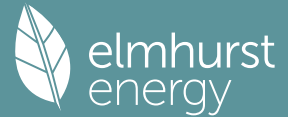
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Property Reference	2023-10-15_GREEN_1.2				Issued on Date	20/10/2023
Assessment Reference	Flat 0-1	Prop Type Ref	22403			
Property	Braemar Avenue, London, Greater London, N22 7BY					
SAP Rating	82 B	DER	5.13	TER	12.97	
Environmental	96 A	% DER < TER				60.45
CO ₂ Emissions (t/year)	0.32	DFEE	30.27	TFEE	34.45	
Compliance Check	See BREL	% DFEE < TFEE				12.13
% DPER < TPER	20.38	DPER	54.77	TPER	68.79	
Assessor Details	Mr. Kamran Afshar				Assessor ID	AM23-0001
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	41.8000 (1b)	x 3.0000 (2b)	= 125.4000 (1b) - (3b)
First floor	31.4000 (1c)	x 2.5000 (2c)	= 78.5000 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 203.9000 (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	0 * 10 = 0.0000 (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) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.1500 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1162 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	0.1482 0.1453 0.1424 0.1279 0.1250 0.1104 0.1104 0.1075 0.1162 0.1250 0.1308 0.1366 (22b)
Balanced mechanical ventilation with heat recovery	
If mechanical ventilation	0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)	0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =	81.9000 (23c)
Effective ac	0.2387 0.2358 0.2329 0.2184 0.2155 0.2009 0.2009 0.1980 0.2067 0.2155 0.2213 0.2271 (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
Door			8.3400	0.9000	7.5060		(26a)
Window (Uw = 0.90)			10.1700	0.8687	8.8349		(27)
LGF-Floor			41.8000	0.0900	3.7620	110.0000	4598.0000 (28)
LGF-N-Wall	21.6000	2.7800	18.8200	0.1400	2.6348	140.0000	2634.8001 (29a)
LGF-W-Wall	15.0000	7.4500	7.5500	0.1400	1.0570	190.0000	1434.5000 (29a)
GF-N-Wall	16.8000		16.8000	0.1400	2.3520	190.0000	3191.9999 (29a)
GF-W-Wall	16.8000	8.2800	8.5200	0.1400	1.1928	190.0000	1618.7999 (29a)
Total net area of external elements Aum(A, m ²)			112.0000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.3395		(33)
Party Ceiling			31.4000			30.0000	942.0000 (32b)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =				14420.0998 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							196.9959 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							4.4800 (36)

$$\begin{aligned} & (36a) = 0.0000 \\ (33) + (36) + (36a) &= 31.8195 \quad (37) \end{aligned}$$
[illegible]

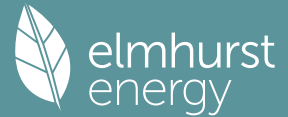
4. Water heating energy requirements (kWh/year)												
Assumed occupancy												
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.3212 (42)
Hot water usage for baths	27.2752	26.8701	26.2997	25.2479	24.4603	23.5871	23.1154	23.6818	24.2986	25.2330	26.3064	27.1830 (42b)
Hot water usage for other uses	38.4018	37.0054	35.6090	34.2125	32.8161	31.4197	31.4197	32.8161	34.2125	35.6090	37.0054	38.4018 (42c)
Average daily hot water use (litres/day)												60.1991 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	65.6770	63.8755	61.9086	59.4604	57.2764	55.0067	54.5350	56.4979	58.5111	60.8420	63.3118	65.5848 (44)
Energy content (annual)	104.0163	90.9578	95.1513	81.3984	77.1051	67.6372	65.9554	69.9562	72.1500	82.5620	90.1993	102.6899 (45)
Distribution loss (46)m = 0.15 x (45)m												999.7790
Water storage loss:	15.6024	13.6437	14.2727	12.2098	11.5658	10.1456	9.8933	10.4934	10.8225	12.3843	13.5299	15.4035 (46)
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3900 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												0.8340 (55)
Total storage loss	25.8540	23.3520	25.8540	25.0200	25.8540	25.0200	25.8540	25.8540	25.0200	25.8540	25.0200	25.8540 (56)
If cylinder contains dedicated solar storage	25.8540	23.3520	25.8540	25.0200	25.8540	25.0200	25.8540	25.8540	25.0200	25.8540	25.0200	25.8540 (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	129.8703	114.3098	121.0053	106.4184	102.9591	92.6572	91.8094	95.8102	97.1700	108.4160	115.2193	128.5439 (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	129.8703	114.3098	121.0053	106.4184	102.9591	92.6572	91.8094	95.8102	97.1700	108.4160	115.2193	128.5439 (64)
12Total per year (kWh/year)												1304.1890 (64)
Electric shower(s)	50.5640	45.0530	49.1961	46.9472	47.8282	45.6234	47.1442	47.8282	46.9472	49.1961	48.2710	50.5640 (64a)
												575.1627 (64a)m =
Heat gains from water heating, kWh/month	67.9096	60.1883	64.6200	58.8178	58.2777	53.9112	54.3994	55.9007	55.7427	60.4341	62.0750	67.4686 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	110.9218	122.8063	110.9218	114.6192	110.9218	114.6192	110.9218	110.9218	114.6192	110.9218	114.6192	110.9218 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	204.6475	206.7711	201.4197	190.0272	175.6462	162.1301	153.1005	150.9769	156.3283	167.7208	182.1018	195.6179 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062 (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)	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496 (71)
Water heating gains (Table 5)	91.2764	89.5660	86.8549	81.6913	78.3302	74.8767	73.1175	75.1353	77.4204	81.2286	86.2153	90.6836 (72)
Total internal gains	467.6643	479.9620	460.0150	447.1564	425.7169	409.4446	394.9585	394.8527	406.1865	420.6899	443.7549	458.0420 (73)

[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
West						10.1700	19.6403	0.4000	0.7000	0.7700		38.7578 (80)
Solar gains	38.7578	75.8186	124.8624	182.1043	223.1757	228.4600	217.5032	186.8321	145.2201	89.9651	48.3265	31.8726 (83)
Total gains	506.4222	555.7805	584.8774	629.2607	648.8925	637.9046	612.4617	581.6847	551.4066	510.6550	492.0814	489.9145 (84)

Temperature during heating periods in the living area from Table 9, T_{hl} (C)												21.0000 (85)
Utilisation factor for gains for living area, $n_{l,m}$ (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
τ_{au}	83.6549	83.9980	84.3439	86.1169	86.4805	88.3454	88.3454	88.7281	87.5899	86.4805	85.7563	85.0442
α_{pha}	6.5770	6.5999	6.6229	6.7411	6.7654	6.8897	6.8897	6.9152	6.8393	6.7654	6.7171	6.6696

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util living area	0.9812	0.9642	0.9282	0.8175	0.6493	0.4538	0.3256	0.3568	0.5668	0.8444	0.9574	0.9840 (86)
MIT	20.4026	20.5421	20.7121	20.9040	20.9813	20.9986	20.9999	20.9998	20.9940	20.8998	20.6470	20.3882 (87)
Th 2	20.3815	20.3839	20.3863	20.3982	20.4006	20.4126	20.4126	20.4150	20.4078	20.4006	20.3958	20.3911 (88)
util rest of house												
MIT 2	0.9773	0.9571	0.9148	0.7904	0.6114	0.4126	0.2822	0.3115	0.5202	0.8146	0.9479	0.9807 (89)
Living area fraction	19.8386	19.9763	20.1404	20.3240	20.3882	20.4119	20.4125	20.4149	20.4045	20.3253	20.0895	19.8328 (90)
MIT	20.0544	20.1927	20.3591	20.5458	20.6151	20.6363	20.6372	20.6386	20.6300	20.5451	20.3028	20.0452 (91)
Temperature adjustment												0.0000 (92)
adjusted MIT	20.0544	20.1927	20.3591	20.5458	20.6151	20.6363	20.6372	20.6386	20.6300	20.5451	20.3028	20.0452 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9749	0.9546	0.9141	0.7973	0.6251	0.4283	0.2988	0.3289	0.5378	0.8222	0.9462	0.9784 (94)
Useful gains	493.6936	530.5718	534.6646	501.7014	405.6537	273.2268	183.0156	191.2915	296.5433	419.8584	465.6150	479.3349 (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												
	754.3541	729.2584	658.1830	541.6867	412.9263	273.6864	183.0468	191.3503	298.6246	460.6345	616.6870	746.3109 (97)
Space heating kWh	193.9315	133.5174	91.8977	28.7895	5.4108	0.0000	0.0000	0.0000	0.0000	30.3374	108.7718	198.6301 (98a)
Space heating requirement - total per year (kWh/year)												791.2861
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	193.9315	133.5174	91.8977	28.7895	5.4108	0.0000	0.0000	0.0000	0.0000	30.3374	108.7718	198.6301 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												791.2861
Space heating per m2										(98c) / (4) =		10.8099 (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	0.0000	426.1962	335.5162	343.0980	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9858	0.9954	0.9930	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	420.1533	333.9814	340.6968	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	689.7119	662.3250	627.9628	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	194.0822	244.2877	213.7259	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			0.3825 (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	18.5598	23.3608	20.4383	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												62.3589 (107)

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 %)												100.0000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Cooling System Energy Efficiency Ratio (see Table 10c)												5.6000 (209)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	193.9315	133.5174	91.8977	28.7895	5.4108	0.0000	0.0000	0.0000	0.0000	30.3374	108.7718	198.6301 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	193.9315	133.5174	91.8977	28.7895	5.4108	0.0000	0.0000	0.0000	0.0000	30.3374	108.7718	198.6301 (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	129.8703	114.3098	121.0053	106.4184	102.9591	92.6572	91.8094	95.8102	97.1700	108.4160	115.2193	128.5439 (64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)
Fuel for water heating, kWh/month	129.8703	114.3098	121.0053	106.4184	102.9591	92.6572	91.8094	95.8102	97.1700	108.4160	115.2193	128.5439 (219)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	3.3142	4.1716	3.6497	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	22.4123	20.2434	22.4123	21.6894	22.4123	21.6894	22.4123	22.4123	21.6894	22.4123	21.6894	22.4123 (231)
Lighting	20.6589	16.5734	14.9225	10.9328	8.4448	6.8995	7.7037	10.0135	13.0066	17.0653	19.2752	21.2331 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-10.4106	-19.3496	-37.4298	-54.8816	-70.4504	-70.1748	-68.6810	-58.1003	-42.2533	-25.8403	-12.7339	-8.4199 (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												

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Space heating fuel - main system 1	791.2861 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	100.0000
Water heating fuel used	1304.1890 (219)
Space cooling fuel	11.1355 (221)
Electricity for pumps and fans:	
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8960)	
mechanical ventilation fans (SFP = 0.8960)	222.8872 (230a)
central heating pump	41.0000 (230c)
Total electricity for the above, kWh/year	263.8872 (231)
Electricity for lighting (calculated in Appendix L)	166.7293 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-478.7255 (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	2633.6642 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1 (high-rate cost)	712.1575	0.1655	117.8494 (261)
Space heating - main system 1 (low-rate cost)	79.1286	0.1389	10.9929 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	142.5214	0.1478	21.0714 (264)
Water heating - low rate cost	1161.6676	0.1241	144.1452 (264)
Energy for instantaneous electric shower(s)	575.1627	0.1436	82.6087 (264a)
Space and water heating			294.0590 (265)
Space cooling	11.1355	0.1178	1.3115 (266)
Pumps, fans and electric keep-hot	263.8872	0.1432	36.7985 (267)
Energy for lighting	166.7293	0.1490	24.8460 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-478.7255	0.1341	-64.1809
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-64.1809 (269)
Total CO2, kg/year			375.4429 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.1300 (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 (high-rate cost)	712.1575	1.4549	1151.2598 (275)
Space heating - main system 1 (low-rate cost)	79.1286	1.5035	118.9677 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	142.5214	1.5527	221.2874 (278)
Water heating - low rate cost	1161.6676	1.4440	1677.4791 (278)
Energy for instantaneous electric shower(s)	575.1627	1.5350	882.8952 (278a)
Space and water heating			3168.9939 (279)
Space cooling	11.1355	1.4401	16.0357 (280)
Pumps, fans and electric keep-hot	263.8872	1.5335	400.0912 (281)
Energy for lighting	166.7293	1.5547	259.2215 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-478.7255	1.5001	-718.1436
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-718.1436 (283)
Total Primary energy kWh/year			4009.0940 (286)
Dwelling Primary energy Rate (DPER)			54.7700 (287)

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

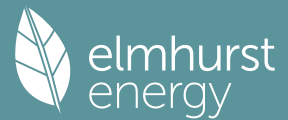
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	41.8000 (1b)	x 3.0000 (2b)	= 125.4000 (1b) - (3b)
First floor	31.4000 (1c)	x 2.5000 (2c)	= 78.5000 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 203.9000 (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)

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Number of intermittent extract fans
Number of passive vents
Number of flueless gas fires

3 * 10 = 30.0000 (7a)
0 * 10 = 0.0000 (7b)
0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =
Pressure test
Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Air changes per hour
30.0000 / (5) = 0.1471 (8)
Yes
Blower Door
5.0000 (17)
0.3971 (18)
3 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3078 (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												
Effective ac	0.3924	0.3847	0.3770	0.3386	0.3309	0.2924	0.2924	0.2847	0.3078	0.3309	0.3462	0.3616 (22b)
	0.5770	0.5740	0.5711	0.5573	0.5547	0.5427	0.5427	0.5405	0.5474	0.5547	0.5599	0.5654 (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 Semi-glazed door			8.3400	1.0000	8.3400		(26a)
TER Opening Type (Uw = 1.20)			9.9600	1.1450	11.4046		(27)
LGF-Floor			41.8000	0.1300	5.4340		(28)
LGF-N-Wall	21.6000	2.7800	18.8200	0.1800	3.3876		(29a)
LGF-W-Wall	15.0000	7.3500	7.6500	0.1800	1.3770		(29a)
GF-N-Wall	16.8000		16.8000	0.1800	3.0240		(29a)
GF-W-Wall	16.8000	8.1700	8.6300	0.1800	1.5534		(29a)
Total net area of external elements Aum(A, m2)			112.0000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 34.5206		(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 201.2855 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E5 Ground floor (normal)	9.2700	0.1600	1.4832
E6 Intermediate floor within a dwelling	20.1000	0.0000	0.0000
E16 Corner (normal)	12.0000	0.0900	1.0800
E18 Party wall between dwellings	12.0000	0.0600	0.7200

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 3.2832 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 37.8038 (37)

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

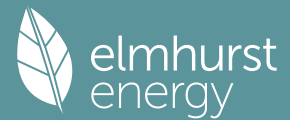
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	38.8242	38.6231	38.4259	37.4997	37.3264	36.5197	36.5197	36.3703	36.8304	37.3264	37.6770	38.0434 (38)
Heat transfer coeff	76.6280	76.4269	76.2297	75.3035	75.1302	74.3235	74.3235	74.1741	74.6342	75.1302	75.4807	75.8472 (39)
Average = Sum(39)m / 12 =												75.3026

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0468	1.0441	1.0414	1.0287	1.0264	1.0153	1.0153	1.0133	1.0196	1.0264	1.0312	1.0362 (40)
HLP (average)												1.0287
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3212 (42)
Hot water usage for mixer showers													
63.1392	62.1904	60.8077	58.1622	56.2099	54.0327	52.7952	54.1674	55.6716	58.0092	60.7116	62.8973	(42a)	
Hot water usage for baths													
27.2752	26.8701	26.2997	25.2479	24.4603	23.5871	23.1154	23.6818	24.2986	25.2330	26.3064	27.1830	(42b)	
Hot water usage for other uses													
38.4018	37.0054	35.6090	34.2125	32.8161	31.4197	31.4197	32.8161	34.2125	35.6090	37.0054	38.4018	(42c)	
Average daily hot water use (litres/day)													118.4114 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
128.8162	126.0659	122.7163	117.6226	113.4863	109.0394	107.3302	110.6653	114.1827	118.8512	124.0234	128.4821	(44)	
Energy content (annual)	204.0134	179.5161	188.6104	161.0195	152.7744	134.0767	129.8066	137.0268	140.7987	161.2800	176.6940	201.1720	(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =			1966.7887
30.6020	26.9274	28.2916	24.1529	22.9162	20.1115	19.4710	20.5540	21.1198	24.1920	26.5041	30.1758	(46)	
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss													
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)	
If cylinder contains dedicated solar storage													
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
250.6083	221.6018	235.2054	206.1114	199.3693	179.1686	176.4015	183.6217	185.8905	207.8749	221.7859	247.7669	(62)	
WWHRS	-28.8646	-25.5281	-26.7316	-22.1348	-20.6288	-17.6522	-16.5462	-17.5952	-18.2637	-21.5309	-24.3919	-28.3301	(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													
221.7437	196.0737	208.4738	183.9766	178.7405	161.5163	159.8554	166.0265	167.6268	186.3440	197.3940	219.4368	(64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =			2247.2081 (64)
Electric shower(s)													2247 (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													
105.1104	93.3577	99.9889	89.6125	88.0734	80.6540	80.4366	82.8373	82.8890	90.9015	94.8242	104.1656	(65)	

Full SAP Calculation Printout



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	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620	116.0620 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	111.4296	123.3685	111.4296	115.1439	111.4296	115.1439	111.4296	111.4296	115.1439	111.4296	115.1439	111.4296 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	204.6475	206.7711	201.4197	190.0272	175.6462	162.1301	153.1005	150.9769	156.3283	167.7208	182.1018	195.6179 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062	34.6062 (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)	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496	-92.8496 (71)
Water heating gains (Table 5)	141.2774	138.9251	134.3937	124.4618	118.3783	112.0194	108.1137	111.3405	115.1237	122.1794	131.7003	140.0075 (72)
Total internal gains	518.1731	529.8833	508.0616	490.4515	466.2727	447.1120	430.4624	431.5656	444.4145	462.1485	489.7647	507.8736 (73)

6. Solar gains

[Jan]	Area		Solar flux		Specific data		FF		Access		Gains	
	m2		Table 6a		or Table 6b		or Table 6c		factor		W	
			W/m2						Table 6d			
West	9.9600		19.6403		0.6300		0.7000		0.7700		59.7831 (80)	
Solar gains	59.7831	116.9484	192.5974	280.8919	344.2435	352.3945	335.4939	288.1843	223.9988	138.7692	74.5425	49.1627 (83)
Total gains	577.9562	646.8318	700.6590	771.3433	810.5162	799.5065	765.9564	719.7499	668.4132	600.9176	564.3072	557.0364 (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	53.4113	53.5519	53.6905	54.3508	54.4762	55.0675	55.0675	55.1784	54.8382	54.4762	54.2232	53.9612
alpha	4.5608	4.5701	4.5794	4.6234	4.6317	4.6712	4.6712	4.6786	4.6559	4.6317	4.6149	4.5974
util living area	0.9852	0.9742	0.9507	0.8832	0.7565	0.5725	0.4223	0.4664	0.7023	0.9114	0.9727	0.9873 (86)
MIT	19.7425	19.9365	20.2215	20.5913	20.8479	20.9679	20.9937	20.9901	20.9189	20.5844	20.1113	19.7147 (87)
Th 2	20.0445	20.0468	20.0490	20.0595	20.0614	20.0706	20.0706	20.0723	20.0670	20.0614	20.0574	20.0533 (88)
util rest of house	0.9815	0.9679	0.9385	0.8555	0.7048	0.4977	0.3354	0.3759	0.6289	0.8839	0.9650	0.9842 (89)
MIT 2	18.5924	18.8384	19.1955	19.6478	19.9314	20.0507	20.0681	20.0681	20.0100	19.6514	19.0692	18.5636 (90)
Living area fraction	fLA = Living area / (4) = 0.3825 (91)											
MIT	19.0323	19.2585	19.5880	20.0087	20.2820	20.4016	20.4222	20.4208	20.3577	20.0082	19.4678	19.0039 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.0323	19.2585	19.5880	20.0087	20.2820	20.4016	20.4222	20.4208	20.3577	20.0082	19.4678	19.0039 (93)

8. Space heating requirement

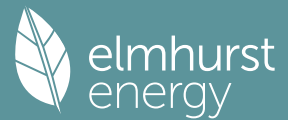
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9764	0.9613	0.9314	0.8538	0.7177	0.5250	0.3686	0.4104	0.6530	0.8821	0.9588	0.9795 (94)
Useful gains	564.3145	621.7980	652.6276	658.5803	581.6739	419.7430	282.3328	295.3883	436.5073	530.0681	541.0629	545.6260 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1128.9089	1097.3712	997.6917	836.5242	644.7640	431.1925	284.0768	298.2394	467.0374	706.8433	933.5321	1122.8362 (97)
Space heating kWh	420.0582	319.5852	256.7277	128.1196	46.9390	0.0000	0.0000	0.0000	0.0000	131.5208	282.5779	429.4444 (98a)
Space heating requirement - total per year (kWh/year)	2014.9727											
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	420.0582	319.5852	256.7277	128.1196	46.9390	0.0000	0.0000	0.0000	0.0000	131.5208	282.5779	429.4444 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2014.9727											
Space heating per m2	(98c) / (4) = 27.5269 (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	420.0582	319.5852	256.7277	128.1196	46.9390	0.0000	0.0000	0.0000	0.0000	131.5208	282.5779	429.4444 (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)	455.1010	346.2461	278.1449	138.8078	50.8548	0.0000	0.0000	0.0000	0.0000	142.4927	306.1515	465.2702 (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

Full SAP Calculation Printout



Efficiency of water heater (217)m	221.7437	196.0737	208.4738	183.9766	178.7405	161.5163	159.8554	166.0265	167.6268	186.3440	197.3940	219.4368 (64)
Fuel for water heating, kWh/month	85.4696	85.1485	84.5278	83.2643	81.5184	79.8000	79.8000	79.8000	79.8000	83.2929	84.8638	79.8000 (216)
Space cooling fuel requirement (221)m	259.4417	230.2727	246.6333	220.9549	219.2640	202.4014	200.3200	208.0532	210.0587	223.7213	232.6010	256.5384 (219)
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 (221)
Lighting	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685 (231)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	23.1529	18.5741	16.7239	12.2527	9.4643	7.7324	8.6337	11.2223	14.5767	19.1254	21.6021	23.7964 (232)
Electricity generated by wind turbines (Appendix M) (negative quantity) (234a)m	-19.6024	-29.0329	-43.8124	-51.7934	-58.0701	-55.0147	-54.3496	-50.2139	-43.2956	-34.3137	-22.0438	-16.7888 (233a)
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 (234a)
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 (235a)
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 (235c)
Electricity generated by wind turbines (Appendix M) (negative quantity) (234b)m	-7.1924	-15.4553	-31.3346	-47.9788	-64.3449	-64.9844	-64.2140	-53.9457	-38.9919	-22.3921	-9.6950	-5.6631 (233b)
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 (234b)
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 (235b)
Annual totals kWh/year												
Space heating fuel - main system 1												2183.0690 (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												2710.2608 (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)												186.8569 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-904.5233 (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												4261.6633 (238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2183.0690	0.2100	458.4445 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2710.2608	0.2100	569.1548 (264)
Space and water heating			1027.5992 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	186.8569	0.1443	26.9692 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-478.3312	0.1336	-63.8879
PV Unit electricity exported	-426.1921	0.1253	-53.4173
Total			-117.3052 (269)
Total CO2, kg/year			949.1926 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.9700 (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	2183.0690	1.1300	2466.8680 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2710.2608	1.1300	3062.5947 (278)
Space and water heating			5529.4626 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	186.8569	1.5338	286.6073 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-478.3312	1.4936	-714.4223
PV Unit electricity exported	-426.1921	0.4600	-196.0667
Total			-910.4891 (283)
Total Primary energy kWh/year			5035.6817 (286)
Target Primary Energy Rate (TPER)			68.7900 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	73

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

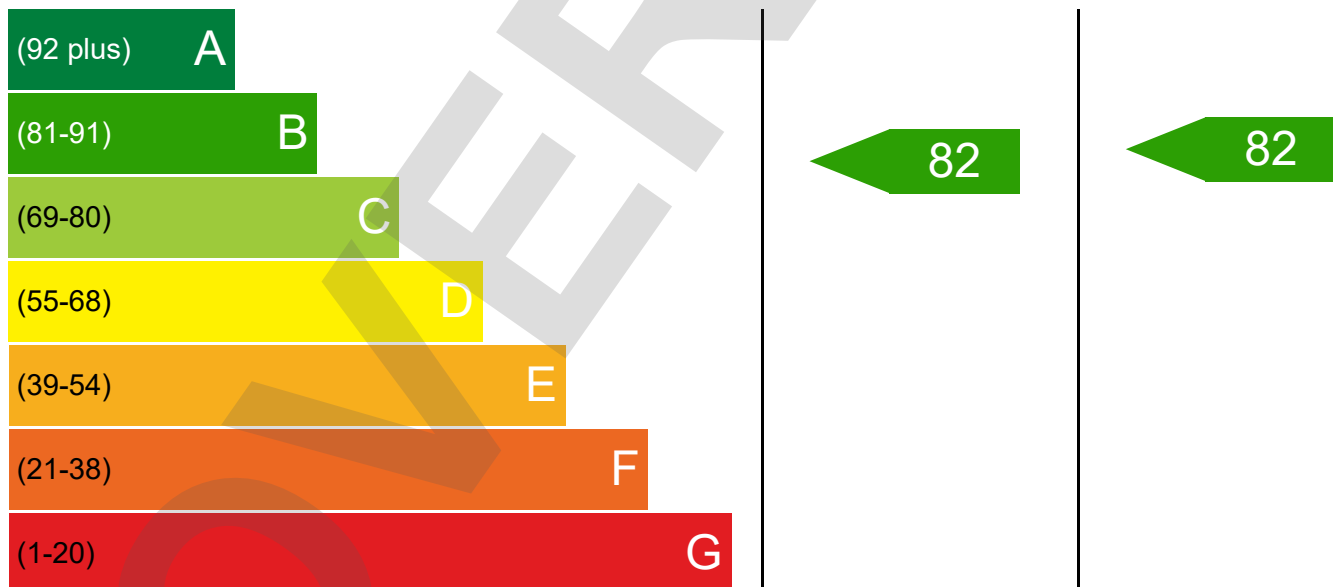
Energy Rating

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



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 0.14 W/m ² K	Very Good
Floor	Average thermal transmittance 0.09 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Very Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 47 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: **0.3** 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

£412

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling

Summary for Input Data

Property Reference	2023-10-15_GREEN_1.2		Issued on Date	20/10/2023
Assessment Reference	Flat 0-2	Prop Type Ref	22403	
Property	Braemar Avenue, London, Greater London, N22 7BY			

SAP Rating	83 B	DER	4.88	TER	12.05
Environmental	96 A	% DER < TER			59.50
CO ₂ Emissions (t/year)	0.3	DFEE	24.48	TFEE	29.07
Compliance Check	See BREL	% DFEE < TFEE			15.78
% DPER < TPER	17.51	DPER	52.70	TPER	63.88

Assessor Details	Mr. Kamran Afshar	Assessor ID	AM23-0001
Client			

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

Orientation	West
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, Semi-Detached
Position of Flat	Basement flat
Which Floor	0
2.0 Number of Storeys	2
3.0 Date Built	2022
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	7 Hour Off Peak
Smart electricity meter fitted	No
Smart gas meter fitted	No

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:	7.30 m	39.00 m ²	3.00 m
1st Storey:	4.30 m	31.20 m ²	2.50 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	27.60	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
LGF-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	13.83	6.38	0.00	None	7.45	Enter Gross Area
GF-W-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	13.00	7.50	0.00	None	5.50	Enter Gross Area
LGF-S-Wall	Cavity Wall	Cavity wall : dense plaster, dense block, filled cavity, any outside structure	0.14	190.00	4.14	1.36	0.00	None	2.78	Enter Gross Area

10.1 Party Ceilings				
Description	Construction	Kappa (kJ/m ² K)	Area (m ²)	
Party Ceiling	Precast concrete planks floor, screed, carpeted	30.00	31.20	

11.0 Heat Loss Floors									
Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)	
LGF-Floor	Basement Floor	Lowest occupied	Slab on ground, screed over insulation	0.09	None	0.00	110.00	39.00	

Summary for Input Data

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Half Glazed Door	Double glazed		Air Filled	0.40	Wood	0.70	0.90
Window	Manufacturer	Window	Double glazed		Air Filled	0.40	Wood	0.70	0.90

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
LGF-W-Door	Door	LGF-W-Wall	West	2.78	0
LGF-S-Door	Door	LGF-S-Wall	South	2.78	0
LGF-W-Window	Window	LGF-W-Wall	West	4.67	0
GF-W-Window	Window	GF-W-Wall	West	5.50	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)		7.30	0.00	0.00	No
E6 Intermediate floor within a dwelling		11.60	0.00	0.00	No
E16 Corner (normal)		12.00	0.00	0.00	No
E18 Party wall between dwellings		12.00	0.00	0.00	No

Y-value W/m²K

Description

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System

Cooled Area m²

Data Source

Energy Class

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
LEDs	91.67	12	1100	15

24.0 Main Heating 1

Summary for Input Data

Description	Electric Boiler	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	191	
In Winter	100.00	
In Summer	100.00	
Controls SAP Code	2106	
Delayed Start Stat	No	
Burner Control	On/Off	
HETAS approved System	No	
Oil Pump Inside	No	
Flue Type	Balanced	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	No	
Electric CPSU Temperature	60.00	
Combi boiler type	No Combi	
Combi keep hot type	Electric, time clock	

25.0 Main Heating 2

None

26.0 Heat Networks

None

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

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Dual
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
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
Shower	Instantaneous electric shower		9.00	No	

28.3 Waste Water Heat Recovery System

Summary for Input Data

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Insulation Thickness Type	12 mm	
Insulation Thickness	12	
Cylinder Volume	150.00	L
Loss	1.69	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

32.0 Photovoltaic Unit

One Dwelling	One Dwelling
Export Capable Meter?	No
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	3.50

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.85	South	Horizontal	Modest	No	No	0.80		

34.0 Small-scale Hydro

None	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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

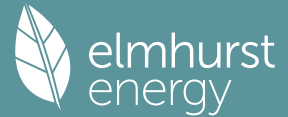
Lower cost measures

None

Further measures to achieve even higher standards

None

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Property Reference	2023-10-15_GREEN_1.2			Issued on Date	20/10/2023
Assessment Reference	Flat 0-2	Prop Type Ref	22403		
Property	Braemar Avenue, London, Greater London, N22 7BY				
SAP Rating	83 B	DER	4.88	TER	12.05
Environmental	96 A	% DER < TER			59.50
CO ₂ Emissions (t/year)	0.3	DFEE	24.48	TFEE	29.07
Compliance Check	See BREL	% DFEE < TFEE			15.78
% DPER < TPER	17.51	DPER	52.70	TPER	63.88
Assessor Details	Mr. Kamran Afshar			Assessor ID	AM23-0001
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	39.0000 (1b)	x 3.0000 (2b)	= 117.0000 (1b) - (3b)
First floor	31.2000 (1c)	x 2.5000 (2c)	= 78.0000 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 195.0000 (5)

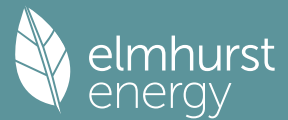
2. Ventilation rate

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	0 * 10 =	0.0000 (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) =	
Pressure test	0.0000 / (5) =	
Pressure Test Method	Yes	
Measured/design AP50	Blower Door	
Infiltration rate	3.0000 (17)	
Number of sides sheltered	0.1500 (18)	
	2 (19)	
Shelter factor	(20) = 1 - [0.075 x (19)] =	
Infiltration rate adjusted to include shelter factor	0.8500 (20)	
	(21) = (18) x (20) =	
	0.1275 (21)	
Wind speed	Jan 5.1000	Feb 5.0000
Wind factor	Mar 4.9000	Apr 4.4000
Adj infilt rate	May 4.3000	Jun 3.8000
	Jul 3.8000	Aug 3.7000
	Sep 4.0000	Oct 4.3000
	Nov 4.5000	Dec 4.7000 (22)
	1.2750	1.1750 (22a)
	0.1626	0.1594
	0.1562	0.1403
	0.1371	0.1211
	0.1211	0.1179
	0.1275	0.1371
	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery		
If mechanical ventilation	0.5000 (23a)	
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)	0.5000 (23b)	
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =	79.2000 (23c)	
Effective ac	0.2666	0.2634
	0.2602	0.2442
	0.2411	0.2251
	0.2251	0.2219
	0.2315	0.2411
	0.2474	0.2538 (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
Door			5.5600	0.9000	5.0040		(26a)
Window (Uw = 0.90)			10.1700	0.8687	8.8349		(27)
LGF-Floor			39.0000	0.0900	3.5100	110.0000	4290.0000 (28)
LGF-W-Wall	13.8300	7.4500	6.3800	0.1400	0.8932	190.0000	1212.2000 (29a)
GF-W-Wall	13.0000	5.5000	7.5000	0.1400	1.0500	190.0000	1425.0000 (29a)
LGF-S-Wall	4.1400	2.7800	1.3600	0.1400	0.1904	190.0000	258.4000 (29a)
Total net area of external elements Aum(A, m ²)			69.9700				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		19.4825		(33)
Party Ceiling			31.2000			30.0000	936.0000 (32b)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =				8121.6000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							115.6923 (35)
Thermal bridges (User defined value 0.040 * total exposed area)							2.7988 (36)
Point Thermal bridges						(36a) =	0.0000

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Total fabric heat loss (33) + (36) + (36a) = 22.2813 (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	17.1533	16.9482	16.7431	15.7175	15.5124	14.4868	14.4868	14.2817	14.8970	15.5124	15.9226	16.3328 (38)
Heat transfer coeff	39.4346	39.2295	39.0244	37.9988	37.7937	36.7681	36.7681	36.5630	37.1784	37.7937	38.2039	38.6142 (39)
Average = Sum(39)m / 12 =												37.9476

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.5617	0.5588	0.5559	0.5413	0.5384	0.5238	0.5238	0.5208	0.5296	0.5384	0.5442	Dec 0.5501 (40)
HLP (average)												0.5406
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.2510 (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 26.7685 26.3709 25.8111 24.7789 24.0060 23.1489 22.6860 23.2419 23.8472 24.7643 25.8177 26.6780 (42b)

Hot water usage for other uses 37.6822 36.3119 34.9417 33.5714 32.2011 30.8309 30.8309 32.2011 33.5714 34.9417 36.3119 37.6822 (42c)

Average daily hot water use (litres/day) 59.0751 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	64.4507	62.6829	60.7528	58.3503	56.2071	53.9798	53.5169	55.4430	57.4186	59.7059	62.1297	64.3602 (44)
Energy conte	102.0741	89.2596	93.3748	79.8786	75.6656	66.3744	64.7240	68.6501	70.8029	81.0204	88.5151	100.7725 (45)
Energy content (annual)												Total = Sum(45)m = 981.1120
Distribution loss (46)m = 0.15 x (45)m	15.3111	13.3889	14.0062	11.9818	11.3498	9.9562	9.7086	10.2975	10.6204	12.1531	13.2773	15.1159 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												1.0140 (55)
Total storage loss	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340 (56)
If cylinder contains dedicated solar storage	31.4340	28.3920	31.4340	30.4200	31.4340	30.4200	31.4340	31.4340	30.4200	31.4340	30.4200	31.4340 (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	133.5081	117.6516	124.8088	110.2986	107.0996	96.7944	96.1580	100.0841	101.2229	112.4544	118.9351	132.2065 (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	133.5081	117.6516	124.8088	110.2986	107.0996	96.7944	96.1580	100.0841	101.2229	112.4544	118.9351	132.2065 (64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 1351.2220 (64)
Electric shower(s)	48.0198	42.7860	46.7207	44.5850	45.4216	43.3278	44.7721	45.4216	44.5850	46.7207	45.8422	48.0198 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												546.2224 (64a)
Heat gains from water heating, kWh/month	45.9446	40.3753	42.7273	37.7059	36.5142	32.9015	32.7137	34.1815	34.6882	38.6195	40.8918	45.5118 (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	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.2246	117.6058	106.2246	109.7654	106.2246	109.7654	106.2246	106.2246	109.7654	106.2246	109.7654	106.2246 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.7634	199.8156	194.6442	183.6349	169.7377	156.6762	147.9504	145.8982	151.0696	162.0789	175.9761	189.0376 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549 (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)	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388 (71)
Water heating gains (Table 5)	61.7535	60.0823	57.4291	52.3693	49.0782	45.6965	43.9701	45.9429	48.1781	51.9079	56.7942	61.1718 (72)
Total internal gains	425.5061	437.2683	418.0625	405.5342	384.8051	368.9027	354.9097	354.8303	365.7777	379.9759	402.3003	416.1985 (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
West	10.1700	19.6403	0.4000	0.7000	0.7700	38.7578 (80)
Solar gains	38.7578	75.8186	124.8624	182.1043	223.1757	228.4600
Total gains	464.2639	513.0868	542.9249	587.6385	607.9807	597.3627
						217.5032
						572.4129
						541.6624
						510.9978
						469.9410
						450.6268
						448.0711 (84)

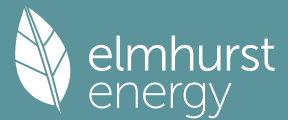
7. Mean internal temperature (heating season)

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	57.2086	57.5077	57.8100	59.3702	59.6925	61.3575	61.3575	61.7017	60.6804	59.6925	59.0515	58.4241
alpha	4.8139	4.8338	4.8540	4.9580	4.9795	5.0905	5.0905	5.1134	5.0454	4.9795	4.9368	4.8949
util living area												

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	0.9369	0.9022	0.8459	0.7168	0.5616	0.3918	0.2823	0.3100	0.4942	0.7508	0.8919	0.9430 (86)
MIT	20.2707	20.4491	20.6514	20.8731	20.9669	20.9959	20.9994	20.9990	20.9868	20.8675	20.5759	20.2589 (87)
Th 2	20.4645	20.4672	20.4698	20.4831	20.4858	20.4991	20.4991	20.5018	20.4938	20.4858	20.4805	20.4752 (88)
util rest of house	0.9298	0.8920	0.8309	0.6944	0.5336	0.3618	0.2503	0.2766	0.4599	0.7254	0.8794	0.9366 (89)
MIT 2	19.7934	19.9676	20.1623	20.3776	20.4607	20.4965	20.4988	20.5013	20.4848	20.3780	20.1030	19.7910 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	19.9811	20.1569	20.3546	20.5724	20.6597	20.6928	20.6956	20.6970	20.6822	20.5705	20.2890	19.9749 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9811	20.1569	20.3546	20.5724	20.6597	20.6928	20.6956	20.6970	20.6822	20.5705	20.2890	19.9749 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9227	0.8856	0.8274	0.6983	0.5432	0.3734	0.2629	0.2897	0.4727	0.7297	0.8744	0.9297 (94)
Useful gains	428.3716	454.4069	449.2410	410.3735	330.2298	223.0685	150.4637	156.9109	241.5713	342.9004	394.0229	416.5647 (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	618.3773	598.5207	540.6692	443.5384	338.6207	224.0212	150.5877	157.1100	244.7146	376.8204	503.8704	609.1363 (97)
Space heating kWh	141.3642	96.8445	68.0226	23.8787	6.2428	0.0000	0.0000	0.0000	0.0000	25.2364	79.0902	143.2733 (98a)
Space heating requirement - total per year (kWh/year)												583.9527
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	141.3642	96.8445	68.0226	23.8787	6.2428	0.0000	0.0000	0.0000	0.0000	25.2364	79.0902	143.2733 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												583.9527
Space heating per m2										(98c) / (4) =		8.3184 (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	345.6205	272.0842	277.8790	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.9809	0.9917	0.9886	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	339.0096	269.8228	274.7087	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	650.6663	623.7795	589.5346	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	224.3928	263.3437	234.2305	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 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	22.3753	26.2593	23.3563	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												71.9910 (107)

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 %)												100.0000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Cooling System Energy Efficiency Ratio (see Table 10c)												5.6000 (209)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	141.3642	96.8445	68.0226	23.8787	6.2428	0.0000	0.0000	0.0000	0.0000	25.2364	79.0902	143.2733 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	141.3642	96.8445	68.0226	23.8787	6.2428	0.0000	0.0000	0.0000	0.0000	25.2364	79.0902	143.2733 (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	133.5081	117.6516	124.8088	110.2986	107.0996	96.7944	96.1580	100.0841	101.2229	112.4544	118.9351	132.2065 (64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000 (216)
Fuel for water heating, kWh/month	133.5081	117.6516	124.8088	110.2986	107.0996	96.7944	96.1580	100.0841	101.2229	112.4544	118.9351	132.2065 (219)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	3.9956	4.6892	4.1708	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	18.7573	16.9421	18.7573	18.1523	18.7573	18.1523	18.7573	18.7573	18.1523	18.7573	18.1523	18.7573 (231)
Lighting	21.0953	16.9234	15.2377	11.1638	8.6232	7.0452	7.8664	10.2250	13.2813	17.4258	19.6824	21.6816 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-10.2093	-18.6862	-35.3912	-50.5460	-63.5646	-62.7767	-61.5286	-52.7032	-39.0973	-24.6062	-12.4010	-8.2787 (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												583.9527 (211)

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Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1351.2220	(219)
Space cooling fuel	12.8555	(221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.7560)		
mechanical ventilation fans (SFP = 0.7560)	179.8524	(230a)
central heating pump	41.0000	(230c)
Total electricity for the above, kWh/year	220.8524	(231)
Electricity for lighting (calculated in Appendix L)	170.2512	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-439.7888	(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	2445.5673	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1 (high-rate cost)	525.5574	0.1652	86.7986 (261)
Space heating - main system 1 (low-rate cost)	58.3953	0.1386	8.0965 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating - high rate cost	144.6227	0.1477	21.3645 (264)
Water heating - low rate cost	1206.5993	0.1240	149.5969 (264)
Energy for instantaneous electric shower(s)	546.2224	0.1436	78.4521 (264a)
Space and water heating			265.8565 (265)
Space cooling	12.8555	0.1179	1.5154 (266)
Pumps, fans and electric keep-hot	220.8524	0.1432	30.8271 (267)
Energy for lighting	170.2512	0.1490	25.3708 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-439.7888	0.1345	-59.1331
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-59.1331 (269)
Total CO2, kg/year			342.8889 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.8800 (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 (high-rate cost)	525.5574	1.4539	848.9877 (275)
Space heating - main system 1 (low-rate cost)	58.3953	1.5024	87.7319 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating - high rate cost	144.6227	1.5522	224.4861 (278)
Water heating - low rate cost	1206.5993	1.4436	1741.8652 (278)
Energy for instantaneous electric shower(s)	546.2224	1.5350	838.4707 (278a)
Space and water heating			2903.0709 (279)
Space cooling	12.8555	1.4404	18.5177 (280)
Pumps, fans and electric keep-hot	220.8524	1.5335	334.9815 (281)
Energy for lighting	170.2512	1.5547	264.6971 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-439.7888	1.5015	-660.3635
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-660.3635 (283)
Total Primary energy kWh/year			3699.3744 (286)
Dwelling Primary energy Rate (DPER)			52.7000 (287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)

CALCULATION OF TARGET EMISSIONS

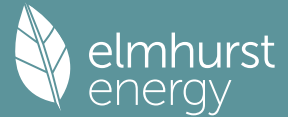
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	39.0000 (1b)	x 3.0000 (2b)	= 117.0000 (1b) - (3b)
First floor	31.2000 (1c)	x 2.5000 (2c)	= 78.0000 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.2000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 195.0000 (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)

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Number of passive vents
Number of flueless gas fires

0 * 10 = 0.0000 (7b)
0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =
Pressure test
Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Air changes per hour
30.0000 / (5) = 0.1538 (8)
Yes
Blower Door
5.0000 (17)
0.4038 (18)
2 (19)

Shelter factor
Infiltration rate adjusted to include shelter factor (20) = 1 - [0.075 x (19)] = 0.8500 (20)
(21) = (18) x (20) = 0.3433 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Effective ac	0.4377	0.4291	0.4205	0.3776	0.3690	0.3261	0.3261	0.3175	0.3433	0.3690	0.3862	0.4033 (22b)
	0.5958	0.5921	0.5884	0.5713	0.5681	0.5532	0.5532	0.5504	0.5589	0.5681	0.5746	0.5813 (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 Semi-glazed door			5.5600	1.0000	5.5600		(26a)
TER Opening Type (Uw = 1.20)			10.1700	1.1450	11.6450		(27)
LGF-Floor			39.0000	0.1300	5.0700		(28)
LGF-W-Wall	13.8300	7.4500	6.3800	0.1800	1.1484		(29a)
GF-W-Wall	13.0000	5.5000	7.5000	0.1800	1.3500		(29a)
LGF-S-Wall	4.1400	2.7800	1.3600	0.1800	0.2448		(29a)
Total net area of external elements Aum (A, m2)			69.9700				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 25.0182		(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 120.1368 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E5 Ground floor (normal)	7.3000	0.1600	1.1680
E6 Intermediate floor within a dwelling	11.6000	0.0000	0.0000
E16 Corner (normal)	12.0000	0.0900	1.0800
E18 Party wall between dwellings	12.0000	0.0600	0.7200

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 2.9680 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 27.9862 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	38.3382	38.0989	37.8643	36.7625	36.5563	35.5966	35.5966	35.4189	35.9663	36.5563	36.9734	37.4094 (38)
Average = Sum(39)m / 12 =	66.3245	66.0851	65.8506	64.7487	64.5426	63.5829	63.5829	63.4052	63.9525	64.5426	64.9596	65.3956 (39)
												64.7477

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9448	0.9414	0.9380	0.9223	0.9194	0.9057	0.9057	0.9032	0.9110	0.9194	0.9254	0.9316 (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												2.2510 (42)
Hot water usage for mixer showers												
61.9610	61.0299	59.6730	57.0769	55.1610	53.0244	51.8100	53.1566	54.6327	56.9267	59.5786	61.7236	(42a)
Hot water usage for baths												
26.7685	26.3709	25.8111	24.7789	24.0060	23.1489	22.6860	23.2419	23.8472	24.7643	25.8177	26.6780	(42b)
Hot water usage for other uses												
37.6822	36.3119	34.9417	33.5714	32.2011	30.8309	30.8309	32.2011	33.5714	34.9417	36.3119	37.6822	(42c)
Average daily hot water use (litres/day)												116.2011 (43)

Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
126.4117	123.7127	120.4258	115.4272	111.3681	107.0042	105.3268	108.5996	112.0513	116.6327	121.7083	126.0838	126.0838 (44)
Energy conte	200.2052	176.1653	185.0899	158.0140	149.9228	131.5741	127.3837	134.4690	138.1705	158.2694	173.3958	197.4168 (45)
Energy content (annual)										Total = Sum(45)m =		1930.0767
Distribution loss (46)m = 0.15 x (45)m	30.0308	26.4248	27.7635	23.7021	22.4884	19.7361	19.1076	20.1704	20.7256	23.7404	26.0094	29.6125 (46)

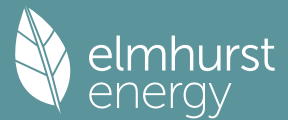
Water storage loss:
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3938 (48)
Temperature factor from Table 2b 0.5400 (49)
Enter (49) or (54) in (55) 0.7527 (55)
Total storage loss

23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325 (56)
If cylinder contains dedicated solar storage												
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325 (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												
246.8001	218.2510	231.6848	203.1058	196.5178	176.6660	173.9786	181.0639	183.2623	204.8643	218.4876	244.0117	244.0117 (62)
WWHRS	-28.3260	-25.0517	-26.2327	-21.7217	-20.2439	-17.3228	-16.2374	-17.2668	-17.9229	-21.1291	-23.9367	-27.8014 (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 218.4742 193.1993 205.4521 181.3841 176.2739 159.3432 157.7412 163.7971 165.3394 183.7352 194.5509 216.2103 (64)
Total per year (kWh/year) = Sum(64)m = 2215.5008 (64)
Electric shower(s) 2216 (64)

Heat gains from water heating, kWh/month 103.8442 92.2435 98.8183 88.6131 87.1253 79.8219 79.6310 81.9869 82.0152 89.9005 93.7276 102.9170 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	112.5485	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.2246	117.6058	106.2246	109.7654	106.2246	109.7654	106.2246	106.2246	109.7654	106.2246	109.7654	106.2246	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.7634	199.8156	194.6442	183.6349	169.7377	156.6762	147.9504	145.8982	151.0696	162.0789	175.9761	189.0376	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	34.2549	(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)	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	-90.0388	(71)
Water heating gains (Table 5)	139.5755	137.2672	132.8203	123.0738	117.1039	110.8637	107.0309	110.1974	113.9099	120.8340	130.1772	138.3293	(72)
Total internal gains	503.3281	514.4531	493.4537	476.2387	452.8307	434.0699	417.9705	419.0848	431.5095	448.9021	475.6833	493.3560	(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
West					10.1700	19.6403	0.6300	0.7000			0.7700	61.0436 (80)
Solar gains	61.0436	119.4142	196.6582	286.8143	351.5017	359.8245	342.5676	294.2605	228.7216	141.6950	76.1142	50.1993 (83)
Total gains	564.3717	633.8674	690.1119	763.0530	804.3324	793.8944	760.5381	713.3453	660.2312	590.5971	551.7975	543.5553 (84)

7. Mean internal temperature (heating season)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation factor for gains for living area, nil,m (see Table 9a)													21.0000 (85)
tau	35.3213	35.4492	35.5755	36.1809	36.2965	36.8443	36.8443	36.9476	36.6313	36.2965	36.0634	35.8230	
alpha	3.3548	3.3633	3.3717	3.4121	3.4198	3.4563	3.4563	3.4632	3.4421	3.4198	3.4042	3.3882	
util living area	0.9461	0.9209	0.8776	0.7834	0.6504	0.4864	0.3604	0.3977	0.6019	0.8205	0.9179	0.9512	(86)
MIT	19.4129	19.6700	20.0319	20.4826	20.7848	20.9419	20.9842	20.9777	20.8772	20.4793	19.8961	19.3839	(87)
Th 2	20.1296	20.1325	20.1353	20.1485	20.1510	20.1626	20.1626	20.1648	20.1582	20.1510	20.1460	20.1408	(88)
util rest of house	0.9382	0.9099	0.8606	0.7550	0.6076	0.4300	0.2947	0.3296	0.5441	0.7900	0.9046	0.9441	(89)
MIT 2	18.2823	18.6046	19.0538	19.6042	19.9481	20.1183	20.1539	20.1518	20.0569	19.6145	18.9016	18.2536	(90)
Living area fraction	18.7268	19.0235	19.4384	19.9495	20.2770	20.4421	20.4803	20.4765	20.3794	19.9545	19.2926	18.6980	(91)
MIT	18.7268	19.0235	19.4384	19.9495	20.2770	20.4421	20.4803	20.4765	20.3794	19.9545	19.2926	18.6980	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7268	19.0235	19.4384	19.9495	20.2770	20.4421	20.4803	20.4765	20.3794	19.9545	19.2926	18.6980	(93)

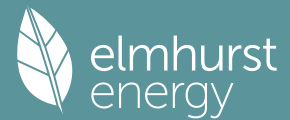
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9224	0.8929	0.8449	0.7478	0.6143	0.4492	0.3199	0.3554	0.5599	0.7822	0.8887	0.9290	(94)
Useful gains	520.5899	565.9646	583.0748	570.6278	494.0705	356.6381	243.2952	253.5194	369.6609	461.9633	490.3946	504.9829	(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	956.8504	933.3525	851.9980	715.4426	553.5833	371.4568	246.7226	258.4721	401.5854	603.7642	792.0273	948.1066	(97)
Space heating kWh	324.5778	246.8846	200.0789	104.2666	44.2775	0.0000	0.0000	0.0000	0.0000	105.4999	217.1756	329.6840	(98a)
Space heating requirement - total per year (kWh/year)												1572.4449	
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	324.5778	246.8846	200.0789	104.2666	44.2775	0.0000	0.0000	0.0000	0.0000	105.4999	217.1756	329.6840	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1572.4449	
Space heating per m ²												22.3995	(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	324.5778	246.8846	200.0789	104.2666	44.2775	0.0000	0.0000	0.0000	0.0000	105.4999	217.1756	329.6840	(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)	351.6552	267.4806	216.7702	112.9649	47.9713	0.0000	0.0000	0.0000	0.0000	114.3011	235.2931	357.1874	(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	218.4742	193.1993	205.4521	181.3841	176.2739	159.3432	157.7412	163.7971	165.3394	183.7352	194.5509	216.2103	(64)
Efficiency of water heater												79.8000	(216)

Full SAP Calculation Printout



(217)m	84.9457	84.6108	84.0004	82.8656	81.4574	79.8000	79.8000	79.8000	79.8000	82.8633	84.3071	85.0030	(217)
Fuel for water heating, kWh/month	257.1926	228.3389	244.5847	218.8895	216.4000	199.6781	197.6707	205.2595	207.1923	221.7329	230.7647	254.3560	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	(231)
Lighting	22.0714	17.7065	15.9427	11.6803	9.0222	7.3712	8.2304	10.6981	13.8958	18.2321	20.5931	22.6848	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-18.8259	-27.8981	-42.1249	-49.8317	-55.9032	-52.9770	-52.3382	-48.3395	-41.6555	-32.9873	-21.1763	-16.1222	(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	-6.8707	-14.7667	-29.9422	-45.8514	-61.4948	-62.1042	-61.3663	-51.5513	-37.2595	-21.3945	-9.2616	-5.4095	(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												1703.6239	(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												2682.0599	(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)												178.1287	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-867.4527	(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												3782.3597	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1703.6239	0.2100	357.7610 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2682.0599	0.2100	563.2326 (264)
Space and water heating			920.9936 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	178.1287	0.1443	25.7095 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-460.1798	0.1336	-61.4572
PV Unit electricity exported	-407.2729	0.1253	-51.0452
Total			-112.5024 (269)
Total CO2, kg/year			846.1299 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.0500 (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	1703.6239	1.1300	1925.0950 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2682.0599	1.1300	3030.7277 (278)
Space and water heating			4955.8227 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	178.1287	1.5338	273.2197 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-460.1798	1.4935	-687.2880
PV Unit electricity exported	-407.2729	0.4600	-187.3602
Total			-874.6482 (283)
Total Primary energy kWh/year			4484.4950 (286)
Target Primary Energy Rate (TPER)			63.8800 (287)

Overview Report

Dwelling Address	Braemar Avenue, London, Greater London, N22 7BY
Report Date	20/10/2023
Property Type	Flat, Semi-Detached
Floor Area [m ²]	70

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

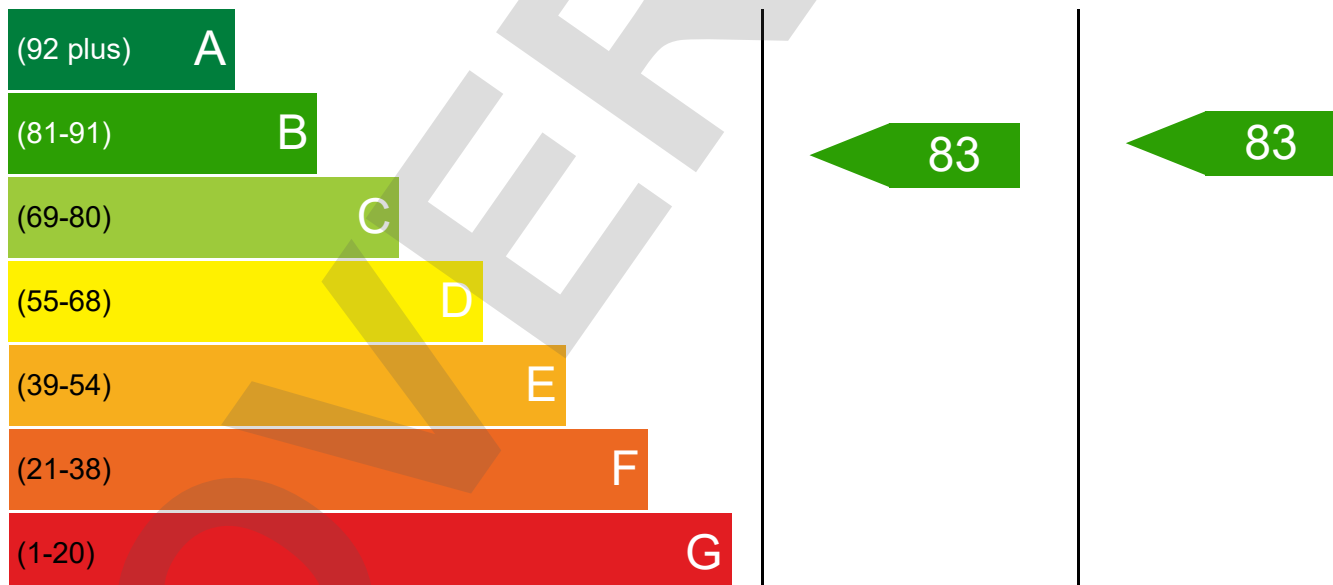
Energy Rating

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



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 0.14 W/m ² K	Very Good
Floor	Average thermal transmittance 0.09 W/m ² K	Very Good
Windows	High performance glazing	Very Good
Main heating	Boiler and radiators, electric	Very Poor
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Poor
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 46 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: **0.3** per year

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

Recommendations

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

Recommended measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
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Estimated energy use and potential savings

Estimated energy cost for this property over a year

£383

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. Kamran Afshar
Assessor's accreditation number	
Email Address	kamran.afshar@energy-lab.co.uk

Accreditation scheme contact details

Accreditation scheme	[Organization Name]
Telephone	
Email Address	

Assessment details

Related party disclosure	No related party
Date of assessment	19/10/2023
Date of certificate	19/10/2023
Type of assessment	SAP, new dwelling