

Summary for Input Data



Plot Reference	A 112		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	81 B	DER	6.03	TER	15.74
Environmental	95 A	% DER < TER			61.69
CO ₂ Emissions (t/year)	0.35	DFEE	42.94	TFEE	47.17
Compliance Check	See BREL	% DFEE < TFEE			8.96
% DPER < TPER	23.76	DPER	63.42	TPER	83.18

Assessor Details	Mr. Robert Tanner	Assessor ID	W344-0001
Client			

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

Orientation	Northwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	251.18	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	30.84 m	65.12 m ²	2.80 m

8.0 Living Area	30.97	m ²
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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
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.15	70.00	62.16	44.97	0.00	None	17.19	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	24.19	21.77	0.70	Stairwell Access Corridor 3	2.42	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	0.00	70.00	20.61	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	125.05

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	65.12

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
Heatloss Floor 1	Exposed Floor - Solid	Lowest occupied	Other	0.10	None	0.00	110.00	65.12

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	Door to Corridor				0.00			1.00
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.35		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	North West	2.42	
SW window	Window	External Wall 1	South West	1.36	
SE windows	Window	External Wall 1	South East	12.08	
NE windows	Window	External Wall 1	North East	3.74	

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
E1 Steel lintel with perforated steel base plate	Independently assessed	10.98	0.05	0.05	No
E3 Sill	Independently assessed	7.49	0.04	0.04	No
E4 Jamb	Independently assessed	27.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	17.84	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	8.64	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	4.36	0.05	0.05	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	4.36	0.10	0.10	No
E16 Corner (normal)	Independently assessed	8.40	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Table K1 - Default	2.80	0.00	0.00	No
E18 Party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
E20 Exposed floor (normal)	Independently assessed	17.84	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	8.64	0.10	0.10	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	7.36	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	7.36	0.08	0.08	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	1
Manufacturer SFP	0.63
Duct Type	Rigid
MVHR Efficiency	90.00
Wet Rooms	1
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

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0

Summary for Input Data

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m²/(h.m²) @ 50 Pa

Test Method

22.0 Lighting
No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	15.00	1125.00	6

24.0 Main Heating 1

25.0 Main Heating 2

26.0 Heat Networks

Space Community Heating

Distribution Loss

Distribution Loss Value

SAP Code

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	Heat pump	Electricity	Space and Water	232.00	100.00					
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

28.1 Showers

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

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Insulation Type

Cylinder Volume L

Loss kWh/day

32.0 Photovoltaic Unit

Export Capable Meter?

Connected To Dwelling

Diverter

Summary for Input Data



Battery Capacity [kWh]

0.00

PV Cells kWp

Orientation

Elevation

Overshading

FGHRS

MCS Certificate

**Overshading
Factor**

**MCS
Certificate
Reference**

**Panel
Manufacturer**

0.31

North East

Horizontal

Modest

No

0.80

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

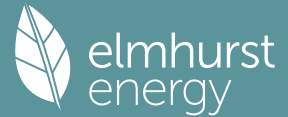
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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Environmental	95 A	% DER < TER				61.69	
CO ₂ Emissions (t/year)	0.35	DFEE	42.94	TFEE	47.17		
Compliance Check	See BREL	% DFEE < TFEE				8.96	
% DPER < TPER	23.76	DPER	63.42	TPER	83.18		
Assessor Details	Mr. Robert Tanner				Assessor ID	W344-0001	
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)
Main dwelling			
Ground floor	65.1200 (1b)	2.8000 (2b)	182.3360 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.1200		182.3360 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	182.3360 (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)

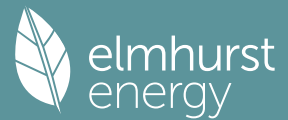
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1388 (21)

	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)
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	0.1769	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) =												81.0000 (23c)
Effective ac	0.2719	0.2684	0.2650	0.2476	0.2442	0.2268	0.2268	0.2233	0.2337	0.2442	0.2511	0.2580 (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
Main dwelling							
Door			2.4200	1.0000	2.4200		(26)
Window			17.1900	1.1450	19.6832		(27)
Heatloss Floor 1			65.1200	0.1000	6.5120	110.0000	7163.2000 (28b)
External Wall 1	62.1600	17.1900	44.9700	0.1500	6.7455	70.0000	3147.9000 (29a)
Corridor wall	24.1900	2.4200	21.7700	0.1900	4.1363	70.0000	1523.9000 (29a)
Total net area of external elements A _{um} (A, m ²)			151.4700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	39.4970		(33)
Main dwelling							
Party Wall 1			20.6100	0.0000	0.0000	70.0000	1442.7000 (32)
Party Ceiling 1			65.1200			30.0000	1953.6000 (32b)
Internal Wall 1			125.0500			9.0000	1125.4500 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		16356.7501 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							251.1786 (35)
List of Thermal Bridges							

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	10.9800	0.0500	0.5490
E3 Sill	7.4900	0.0400	0.2996
E4 Jamb	27.6000	0.0400	1.1040
E7 Party floor between dwellings (in blocks of flats)	17.8400	0.0500	0.8920
E7 Party floor between dwellings (in blocks of flats)	8.6400	0.0390	0.3370
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0500	0.2180
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.1000	0.4360
E16 Corner (normal)	8.4000	0.0500	0.4200
E16 Corner (normal)	2.8000	0.0390	0.1092
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E20 Exposed floor (normal)	17.8400	0.1000	1.7840
E21 Exposed floor (inverted)	8.6400	0.1000	0.8640
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.3600	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	7.3600	0.0800	0.5888
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.8508 (36)
Point Thermal bridges		(36a) =	0.0000
Total fabric heat loss		(33) + (36) + (36a) =	47.3478 (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	16.3608	16.1521	15.9434	14.8998	14.6911	13.6475	13.6475	13.4388	14.0649	14.6911	15.1085	15.5260	(38)
Heat transfer coeff	63.7086	63.4999	63.2912	62.2476	62.0389	60.9953	60.9953	60.7866	61.4127	62.0389	62.4563	62.8737	(39)
Average = Sum(39)m / 12 =												62.1954	
HLP	0.9783	0.9751	0.9719	0.9559	0.9527	0.9367	0.9367	0.9335	0.9431	0.9527	0.9591	0.9655	(40)
HLP (average)												0.9551	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

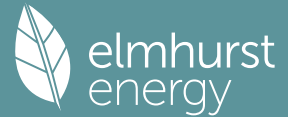
Assumed occupancy													2.1221 (42)
Hot water usage for mixer showers													
58.2894	57.3970	56.0818	54.0586	52.2459	49.7100	47.7042	50.0490	51.2284	53.7402	56.3560	58.2368	58.2368	(42a)
Hot water usage for baths													
25.2633	24.8819	24.3394	23.5269	22.7947	21.7867	21.0220	21.9571	22.4478	23.4466	24.4850	25.2432	25.2432	(42b)
Hot water usage for other uses													
36.3624	35.0401	33.7179	32.3956	31.0733	29.7511	29.7511	31.0733	32.3956	33.7179	35.0401	36.3624	36.3624	(42c)
Average daily hot water use (litres/day)												110.2200	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	119.9150	117.3190	114.1390	109.9811	106.1139	101.2477	98.4772	103.0795	106.0719	110.9047	115.8811	119.8424	(44)
Energy conte	176.5356	155.2368	163.1023	143.6628	136.7385	117.0896	108.8202	121.3264	123.0381	142.9119	156.6172	175.9974	(45)
Energy content (annual)										Total = Sum(45)m =		1721.0767	
Distribution loss (46)m = 0.15 x (45)m													
26.4803	23.2855	24.4653	21.5494	20.5108	17.5634	16.3230	18.1990	18.4557	21.4368	23.4926	26.3996	26.3996	(46)
Water storage loss (or HIU loss):													
Store volume												110.0000	(47)
b) If manufacturer declared loss factor is not known :													
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0152	(51)
Volume factor from Table 2a												1.0294	(52)
Temperature factor from Table 2b												0.6000	(53)
Enter (49) or (54) in (55)												1.0327	(55)
Total storage loss													
32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	(56)
If cylinder contains dedicated solar storage													
32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	(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													
231.8124	205.1642	218.3791	197.1565	192.0153	170.5833	164.0970	176.6032	176.5317	198.1887	210.1109	231.2742	231.2742	(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													
231.8124	205.1642	218.3791	197.1565	192.0153	170.5833	164.0970	176.6032	176.5317	198.1887	210.1109	231.2742	231.2742	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2371.9165	(64)
Electric shower(s)												2372	(64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
102.9195	91.5582	98.4530	90.5628	89.6870	81.7272	80.4042	84.5625	83.7051	91.7396	94.8702	102.7406	102.7406	(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	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
93.6397	103.6725	93.6397	96.7610	93.6397	96.7610	93.6397	93.6397	93.6397	96.7610	93.6397	96.7610	93.6397	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
185.6512	187.5776	182.7230	172.3880	159.3419	147.0804	138.8890	136.9625	141.8172	152.1522	165.1983	177.4597	177.4597	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	(71)
Water heating gains (Table 5)													
138.3327	136.2473	132.3293	125.7817	120.5470	113.5100	108.0701	113.6592	116.2571	123.3060	131.7641	138.0922	138.0922	(72)
Total internal gains													
472.4550	482.3289	463.5234	449.7622	428.3601	412.1829	395.4302	399.0929	409.6667	423.9293	448.5548	464.0231	464.0231	(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
Northeast	3.7400				11.2829	0.3500		0.7000		0.7700	7.1646 (75)
Southeast	12.0800				36.7938	0.3500		0.7000		0.7700	75.4643 (77)
Southwest	1.3700				36.7938	0.3500		0.7000		0.7700	8.5584 (79)
Solar gains	91.1873	157.7055	222.1008	285.7889	329.7782	331.6473	317.9731	284.5048	244.0544	176.0026	77.7569 (83)
Total gains	563.6423	640.0344	685.6241	735.5510	758.1383	743.8302	713.4033	683.5977	653.7212	599.9319	541.7800 (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	71.3176	71.5520	71.7879	72.9915	73.2370	74.4901	74.4901	74.7458	73.9837	73.2370	72.7475
alpha	5.7545	5.7701	5.7859	5.8661	5.8825	5.9660	5.9660	5.9831	5.9322	5.8825	5.8498
util living area	0.9877	0.9738	0.9457	0.8643	0.7180	0.5194	0.3755	0.4079	0.6299	0.8839	0.9717
MIT	20.1414	20.3241	20.5435	20.8003	20.9445	20.9932	20.9992	20.9987	20.9796	20.8045	20.4466
Th 2	20.1014	20.1041	20.1068	20.1203	20.1229	20.1365	20.1365	20.1392	20.1310	20.1229	20.1176
util rest of house	0.9840	0.9665	0.9308	0.8313	0.6633	0.4518	0.3022	0.3322	0.5580	0.8481	0.9624
MIT 2	19.1196	19.3502	19.6217	19.9306	20.0799	20.1328	20.1362	20.1387	20.1187	19.9439	19.5163
Living area fraction	19.6055	19.8134	20.0601	20.3442	20.4911	20.5420	20.5466	20.5477	20.5281	20.3532	19.9587
MIT	19.6055	19.8134	20.0601	20.3442	20.4911	20.5420	20.5466	20.5477	20.5281	20.3532	19.9587
Temperature adjustment	19.6055	19.8134	20.0601	20.3442	20.4911	20.5420	20.5466	20.5477	20.5281	20.3532	19.9587
adjusted MIT	19.6055	19.8134	20.0601	20.3442	20.4911	20.5420	20.5466	20.5477	20.5281	20.3532	19.9587
8. Space heating requirement											
Utilisation	0.9815	0.9636	0.9299	0.8403	0.6869	0.4838	0.3371	0.3682	0.5915	0.8583	0.9604
Useful gains	553.2358	616.7576	637.5356	618.1077	520.7912	359.8670	240.4798	251.7155	386.6772	514.9384	536.1096
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	975.0928	946.9964	858.2359	712.3754	545.3895	362.4326	240.7242	252.1232	394.7697	605.0782	803.1088
Space heating kWh	313.8616	221.9205	164.2010	67.8727	18.3011	0.0000	0.0000	0.0000	0.0000	67.0640	192.2394
Space heating requirement - total per year (kWh/year)											1368.1669
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)											0.0000
Space heating kWh	313.8616	221.9205	164.2010	67.8727	18.3011	0.0000	0.0000	0.0000	0.0000	67.0640	192.2394
Space heating requirement after solar contribution - total per year (kWh/year)											1368.1669
Space heating per m2										(98c) / (4) =	21.0099 (99)
9b. Energy requirements											
Fraction of space heat from secondary/supplementary system (Table 11)											0.0000 (301)
Fraction of space heat from community system											1.0000 (302)
Fraction of heat from community Heat pump-Space and Water											1.0000 (303a)
Factor for control and charging method (Table 4c(3)) for space heating											1.0000 (305)
Factor for charging method (Table 4c(3)) for water heating											1.0000 (305a)
Distribution loss factor (Table 12c) for community heating system											1.5000 (306)
Efficiency of secondary/supplementary heating system, %											0.0000 (208)
Space heating:											
Space heating requirement											
	313.8616	221.9205	164.2010	67.8727	18.3011	0.0000	0.0000	0.0000	0.0000	67.0640	192.2394
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50											322.7065 (98)
307a	470.7924	332.8807	246.3016	101.8091	27.4516	0.0000	0.0000	0.0000	0.0000	100.5961	288.3591
Space heating requirement	470.7924	332.8807	246.3016	101.8091	27.4516	0.0000	0.0000	0.0000	0.0000	100.5961	288.3591
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)											484.0598 (307)
Space heating fuel for secondary/supplementary system	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water heating											
Annual water heating requirement											
	231.8124	205.1642	218.3791	197.1565	192.0153	170.5833	164.0970	176.6032	176.5317	198.1887	210.1109
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50											231.2742 (64)
310a	347.7187	307.7463	327.5687	295.7347	288.0230	255.8749	246.1455	264.9048	264.7976	297.2830	315.1663
Water heating fuel	347.7187	307.7463	327.5687	295.7347	288.0230	255.8749	246.1455	264.9048	264.7976	297.2830	315.1663
Cooling System Energy Efficiency Ratio											346.9113 (310)
Space coolin	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	14.8782	13.4384	14.8782	14.3983	14.8782	14.3983	14.8782	14.8782	14.3983	14.8782	14.8782
Lighting	20.3954	16.3620	14.7321	10.7934	8.3371	6.8115	7.6054	9.8858	12.8407	16.8476	19.0294
Electricity generated by PVs (Appendix M) (negative quantity)											20.9623 (332)
(333a)m	-3.4053	-6.0512	-11.1771	-15.7515	-19.7124	-19.4508	-19.0437	-16.3773	-12.2985	-7.8960	-4.0908
Electricity generated by wind turbines (Appendix M) (negative quantity)											-2.7795 (333a)
(334a)m	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 (334a)
(335a)m	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)											0.0000 (335a)
(333b)m	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 wind turbines (Appendix M) (negative quantity)											0.0000 (333b)
(334b)m	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 (334b)
(335b)m	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											0.0000 (335b)
Space heating fuel - community heating											2052.2503 (307)
Space heating fuel - secondary											0.0000 (309)
Water heating fuel - community heating											3557.8747 (310)
Efficiency of water heater											0.0000 (311)
Electricity used for heat distribution											20.5225 (313)
Space cooling fuel											0.0000 (321)

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Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)	
mechanical ventilation fans (SFP = 0.7875)	175.1793 (330a)
Total electricity for the above, kWh/year	175.1793 (331)
Electricity for lighting (calculated in Appendix L)	164.6027 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-138.0341 (333)
Wind generation	0.0000 (334)
Hydro-electric generation (Appendix N)	0.0000 (335a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (335)
Appendix Q - special features	
Energy saved or generated	-0.0000 (336)
Energy used	0.0000 (337)
Total delivered energy for all uses	5811.8729 (338)

12b. Carbon dioxide emissions - Community heating scheme

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Efficiency of heat source Heat pump			232.0000 (367)
Space and Water heating from Heat pump	2418.1574	0.1569	138.7895 (367)
Electrical energy for heat distribution (space & water)	20.5225	0.0000	8.2291 (372)
Overall CO2 factor for heat network			0.0647 (386)
Total CO2 associated with community systems			362.9295 (373)
Space and water heating			362.9295 (376)
Pumps, fans and electric keep-hot	175.1793	0.1387	24.2995 (378)
Energy for lighting	164.6027	0.1443	23.7573 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-138.0341	0.1305	-18.0151
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-18.0151 (380)
Total CO2, kg/year			392.9712 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.0300 (384)

13b. Primary energy - Community heating scheme

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Efficiency of heat source Heat pump			232.0000 (467a)
Space and Water heating from Heat pump	2418.1574	1.5808	1398.3920 (467)
Electrical energy for heat distribution (space & water)	20.5225	0.0000	86.5432 (472)
Overall CO2 factor for heat network			0.6804 (486)
Total CO2 associated with community systems			3816.8528 (473)
Space and water heating			3816.8528 (476)
Pumps, fans and electric keep-hot	175.1793	1.5128	265.0113 (478)
Energy for lighting	164.6027	1.5338	252.4731 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-138.0341	1.4821	-204.5819
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-204.5819 (480)
Total Primary energy kWh/year			4129.7552 (483)
Dwelling Primary energy Rate (DPER)			63.4200 (484)

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

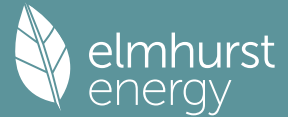
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	65.1200	2.8000	182.3360
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.1200		
Dwelling volume			

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	20.0000 / (5) = 0.1097 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3597 (18)
Number of sides sheltered	1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.9250 (20)

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Infiltration rate adjusted to include shelter factor

(21) = (18) x (20) = 0.3327 (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	0.4242	0.4159	0.4076	0.3660	0.3577	0.3161	0.3161	0.3078	0.3327	0.3577	0.3743	0.3909	(22b)
	0.5900	0.5865	0.5831	0.5670	0.5640	0.5500	0.5500	0.5474	0.5553	0.5640	0.5701	0.5764	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.4200	1.0000	2.4200			(26)
TER Opening Type			13.8700	1.1450	15.8817			(27)
Heatloss Floor 1			65.1200	0.1300	8.4656			(28b)
External Wall 1	62.1600	13.8700	48.2900	0.1800	8.6922			(29a)
Corridor wall	24.1900	2.4200	21.7700	0.1800	3.9186			(29a)
Total net area of external elements Aum(A, m2)			151.4700					(31)
Fabric heat loss, W/K = Sum (A x U)						39.3781		(33)
Main dwelling								
Party Wall 1			20.6100	0.0000	0.0000			(32)

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

251.1786 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	10.9800	0.0500	0.5490	
E3 Sill	7.4900	0.0500	0.3745	
E4 Jamb	27.6000	0.0500	1.3800	
E7 Party floor between dwellings (in blocks of flats)	17.8400	0.0700	1.2488	
E7 Party floor between dwellings (in blocks of flats)	8.6400	0.0700	0.6048	
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872	
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872	
E16 Corner (normal)	8.4000	0.0900	0.7560	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E20 Exposed floor (normal)	17.8400	0.3200	5.7088	
E21 Exposed floor (inverted)	8.6400	0.3200	2.7648	
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.3600	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)	7.3600	0.1600	1.1776	

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

15.0747 (36)

Point Thermal Bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 54.4528 (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	35.4994	35.2891	35.0831	34.1152	33.9341	33.0911	33.0911	32.9350	33.4158	33.9341	34.3004	34.6834	(38)
Average = Sum(39)m / 12 =	89.9521	89.7419	89.5358	88.5680	88.3869	87.5439	87.5439	87.3878	87.8686	88.3869	88.7532	89.1362	(39)
												88.5671	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.3813	1.3781	1.3749	1.3601	1.3573	1.3443	1.3443	1.3419	1.3493	1.3573	1.3629	1.3688	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	
												1.3601	
												31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.1221 (42)
Hot water usage for mixer showers													
Hot water usage for baths	59.8002	58.9015	57.5920	55.0864	53.2373	51.1753	50.0032	51.3028	52.7275	54.9415	57.5009	59.5711	(42a)
Hot water usage for other uses	25.8393	25.4555	24.9151	23.9187	23.1726	22.3453	21.8985	22.4351	23.0194	23.9046	24.9215	25.7519	(42b)
Average daily hot water use (litres/day)	36.3624	35.0401	33.7179	32.3956	31.0733	29.7511	29.7511	31.0733	32.3956	33.7179	35.0401	36.3624	(42c)
												112.1476	(43)

Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	122.0019	119.3972	116.2250	111.4007	107.4833	103.2716	101.6527	104.8112	108.1424	112.5640	117.4626	121.6854	(44)
Energy content (annual)	193.2212	170.0200	178.6335	152.5020	144.6931	126.9845	122.9401	129.7782	133.3504	152.7482	167.3470	190.5300	(45)
Distribution loss (46)m = 0.15 x (45)m													
Water storage loss (or HIU loss):	28.9832	25.5030	26.7950	22.8753	21.7040	19.0477	18.4410	19.4667	20.0026	22.9122	25.1020	28.5795	(46)

Store volume 180.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.5520 (48)

Temperature factor from Table 2b 0.5400 (49)

Enter (49) or (54) in (55) 0.8381 (55)

Total storage loss 25.9803 23.4661 25.9803 25.1422 25.9803 25.1422 25.9803 25.9803 25.1422 25.9803 25.1422 25.9803 25.9803 (56)

If cylinder contains dedicated solar storage 25.9803 23.4661 25.9803 25.1422 25.9803 25.1422 25.9803 25.9803 25.1422 25.9803 25.1422 25.9803 25.9803 (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 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 0.0000 (61)

Total heat required for water heating calculated for each month 242.4638 214.4973 227.8761 200.1562 193.9358 174.6387 172.1828 179.0209 181.0046 201.9909 215.0012 239.7726 (62)

WWHRS -27.3382 -24.1781 -25.3179 -20.9642 -19.5379 -16.7187 -15.6711 -16.6647 -17.2978 -20.3922 -23.1019 -26.8319 (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 215.1257 190.3192 202.5582 179.1920 174.3979 157.9200 156.5117 162.3562 163.7068 181.5987 191.8992 212.9407 (64)

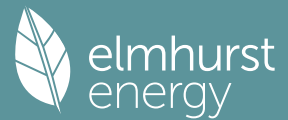
Total per year (kWh/year) Total per year (kWh/year) = Sum(64)m = 2188.5263 (64)

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 103.6402 92.1135 98.7898 88.8303 87.5046 80.3457 80.2717 82.5454 82.4624 90.1829 93.7662 102.7453 (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	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	93.8107	103.8618	93.8107	96.9377	93.8107	96.9377	93.8107	93.8107	96.9377	93.8107	96.9377	93.8107 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	185.6512	187.5776	182.7230	172.3880	159.3419	147.0804	138.8890	136.9625	141.8172	152.1522	165.1983	177.4597 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839 (71)
Water heating gains (Table 5)	139.3013	137.0736	132.7819	123.3754	117.6137	111.5913	107.8921	110.9481	114.5311	121.2136	130.2309	138.0986 (72)
Total internal gains	476.5946	486.3445	467.1470	450.5325	428.5977	410.4408	395.4232	396.5527	408.1174	425.0079	450.1983	467.2004 (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	
Northeast	3.0200		11.2829		0.6300		0.7000		0.7700		10.4136 (75)	
Southeast	9.7500		36.7938		0.6300		0.7000		0.7700		109.6356 (77)	
Southwest	1.1000		36.7938		0.6300		0.7000		0.7700		12.3691 (79)	
Solar gains	132.4183	229.0164	322.5378	415.0399	478.9357	481.6552	461.7939	413.1796	354.4238	255.5891	159.2365	112.9149 (83)
Total gains	609.0129	715.3608	789.6849	865.5724	907.5334	892.0960	857.2172	809.7323	762.5412	680.5970	609.4348	580.1153 (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	50.5107	50.6290	50.7455	51.3001	51.4052	51.9002	51.9002	51.9929	51.7084	51.4052	51.1930	50.9730
alpha	4.3674	4.3753	4.3830	4.4200	4.4270	4.4600	4.4600	4.4662	4.4472	4.4270	4.4129	4.3982
util living area	0.9884	0.9762	0.9524	0.8909	0.7732	0.5962	0.4423	0.4852	0.7127	0.9147	0.9770	0.9905 (86)
MIT	19.5830	19.8243	20.1394	20.5252	20.8099	20.9550	20.9904	20.9856	20.9006	20.5311	19.9922	19.5442 (87)
Th 2	19.7777	19.7802	19.7826	19.7941	19.7962	19.8063	19.8063	19.8081	19.8024	19.7962	19.7919	19.7873 (88)
util rest of house	0.9846	0.9687	0.9372	0.8569	0.7081	0.4981	0.3259	0.3651	0.6183	0.8801	0.9683	0.9874 (89)
MIT 2	18.1769	18.4819	18.8745	19.3416	19.6483	19.7830	19.8036	19.8037	19.7424	19.3626	18.7052	18.1345 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	18.8456	19.1203	19.4760	19.9045	20.2007	20.3404	20.3680	20.3658	20.2932	19.9183	19.3173	18.8049 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.8456	19.1203	19.4760	19.9045	20.2007	20.3404	20.3680	20.3658	20.2932	19.9183	19.3173	18.8049 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9807	0.9635	0.9326	0.8604	0.7316	0.5434	0.3814	0.4224	0.6594	0.8842	0.9640	0.9840 (94)
Useful gains	597.2815	689.2175	736.4617	744.7402	663.9484	484.7910	326.9842	342.0410	502.8479	601.8172	587.4683	570.8053 (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	1308.4083	1276.1596	1161.8202	974.6483	751.3531	502.5343	329.8677	346.5631	544.1869	823.6152	1084.3221	1301.8268 (97)
Space heating kWh	529.0783	394.4251	316.4667	165.5338	65.0292	0.0000	0.0000	0.0000	0.0000	165.0177	357.7348	543.8800 (98a)
Space heating requirement - total per year (kWh/year)	2537.1656											
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	529.0783	394.4251	316.4667	165.5338	65.0292	0.0000	0.0000	0.0000	0.0000	165.0177	357.7348	543.8800 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2537.1656											
Space heating per m ²	(98c) / (4) = 38.9614 (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	529.0783	394.4251	316.4667	165.5338	65.0292	0.0000	0.0000	0.0000	0.0000	165.0177	357.7348	543.8800 (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)	573.2160	427.3295	342.8675	179.3433	70.4541	0.0000	0.0000	0.0000	0.0000	178.7840	387.5783	589.2525 (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

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Water heating requirement	215.1257	190.3192	202.5582	179.1920	174.3979	157.9200	156.5117	162.3562	163.7068	181.5987	191.8992	212.9407	(64)
Efficiency of water heater												79.8000	(216)
(217)m	85.9964	85.6558	85.0562	83.8824	82.0589	79.8000	79.8000	79.8000	79.8000	83.8457	85.4358	86.0688	(217)
Fuel for water heating, kWh/month	250.1567	222.1907	238.1462	213.6229	212.5278	197.8948	196.1299	203.4539	205.1464	216.5868	224.6122	247.4075	(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	19.4920	15.6372	14.0796	10.3153	7.9678	6.5098	7.2685	9.4479	12.2719	16.1014	18.1865	20.0337	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-22.2132	-32.3604	-48.0547	-55.8889	-61.8888	-58.3710	-57.6664	-53.6422	-46.8083	-37.8367	-24.7927	-19.0854	(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	-9.5696	-20.4095	-41.0813	-62.4565	-83.3146	-83.9668	-82.9687	-69.9074	-50.7976	-29.4253	-12.8544	-7.5460	(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												2748.8252	(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												2627.8757	(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)												157.3116	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1072.9064	(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												4547.1061	(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	2748.8252	0.2100	577.2533	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2627.8757	0.2100	551.8539	(264)
Space and water heating			1129.1072	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	157.3116	0.1443	22.7049	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-518.6088	0.1339	-69.4367	
PV Unit electricity exported	-554.2976	0.1255	-69.5885	
Total			-139.0251	(269)
Total CO2, kg/year			1024.7162	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.7400	(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	2748.8252	1.1300	3106.1725	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2627.8757	1.1300	2969.4995	(278)
Space and water heating			6075.6720	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	157.3116	1.5338	241.2898	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-518.6088	1.4948	-775.2146	
PV Unit electricity exported	-554.2976	0.4608	-255.4285	
Total			-1030.6430	(283)
Total Primary energy kWh/year			5416.4196	(286)
Target Primary Energy Rate (TPER)			83.1800	(287)

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Plot Reference	A 112				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	81 B	DER	6.03	TER	15.74		
Environmental	95 A	% DER < TER				61.69	
CO ₂ Emissions (t/year)	0.35	DFEE	42.94	TFEE	47.17		
Compliance Check	See BREL	% DFEE < TFEE				8.96	
% DPER < TPER	23.76	DPER	63.42	TPER	83.18		
Assessor Details	Mr. Robert Tanner				Assessor ID	W344-0001	
Client							

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling	65.1200 (1b)	2.8000 (2b)	182.3360 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.1200		182.3360 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 182.3360 (5)

2. Ventilation rate

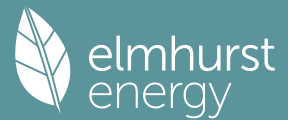
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) = 0.1097 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2597 (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) = 0.2402 (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	0.3063	0.3003	0.2943	0.2642	0.2582	0.2282	0.2282	0.2222	0.2402	0.2582	0.2702	0.2822 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.5469	0.5451	0.5433	0.5349	0.5333	0.5260	0.5260	0.5247	0.5289	0.5333	0.5365	0.5398 (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
Main dwelling							
Door			2.4200	1.0000	2.4200		(26)
Window			17.1900	1.1450	19.6832		(27)
Heatloss Floor 1			65.1200	0.1000	6.5120	110.0000	7163.2000 (28b)
External Wall 1	62.1600	17.1900	44.9700	0.1500	6.7455	70.0000	3147.9000 (29a)
Corridor wall	24.1900	2.4200	21.7700	0.1900	4.1363	70.0000	1523.9000 (29a)
Total net area of external elements Aum(A, m ²)			151.4700				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 39.4970		(33)
Main dwelling							
Party Wall 1			20.6100	0.0000	0.0000	70.0000	1442.7000 (32)
Party Ceiling 1			65.1200			30.0000	1953.6000 (32b)
Internal Wall 1			125.0500			9.0000	1125.4500 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 16356.7501 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							251.1786 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					10.9800	0.0500	0.5490
E3 Sill					7.4900	0.0400	0.2996

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E4 Jamb	27.6000	0.0400	1.1040
E7 Party floor between dwellings (in blocks of flats)	17.8400	0.0500	0.8920
E7 Party floor between dwellings (in blocks of flats)	8.6400	0.0390	0.3370
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0500	0.2180
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.1000	0.4360
E16 Corner (normal)	8.4000	0.0500	0.4200
E16 Corner (normal)	2.8000	0.0390	0.1092
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E20 Exposed floor (normal)	17.8400	0.1000	1.7840
E21 Exposed floor (inverted)	8.6400	0.1000	0.8640
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.3600	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	7.3600	0.0800	0.5888
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.8508 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	47.3478 (37)

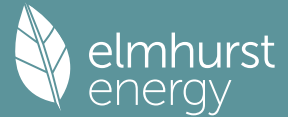
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	32.9075	32.7979	32.6905	32.1860	32.0916	31.6522	31.6522	31.5708	31.8214	32.0916	32.2825	32.4822 (38)
Average = Sum(39)m / 12 =	80.2552	80.1457	80.0382	79.5337	79.4393	78.9999	78.9999	78.9185	79.1692	79.4393	79.6303	79.8299 (39)
												79.5333
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2324	1.2307	1.2291	1.2213	1.2199	1.2131	1.2131	1.2119	1.2157	1.2199	1.2228	1.2259 (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												2.1221 (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	25.2633	24.8819	24.3394	23.5269	22.7947	21.7867	21.0220	21.9571	22.4478	23.4466	24.4850	25.2432 (42b)
Hot water usage for other uses	36.3624	35.0401	33.7179	32.3956	31.0733	29.7511	29.7511	31.0733	32.3956	33.7179	35.0401	36.3624 (42c)
Average daily hot water use (litres/day)												56.4818 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	61.6257	59.9220	58.0572	55.9225	53.8680	51.5377	50.7730	53.0304	54.8434	57.1645	59.5251	61.6056 (44)
Energy content (annual)	90.7236	79.2890	82.9626	73.0487	69.4143	59.6017	56.1057	62.4178	63.6157	73.6622	80.4502	90.4724 (45)
Distribution loss (46)m = 0.15 x (45)m												881.7638
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (or HIU loss):												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
WWHRS	77.1151	67.3956	70.5182	62.0914	59.0022	50.6614	47.6898	53.0551	54.0733	62.6129	68.3827	76.9015 (62)
FV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	77.1151	67.3956	70.5182	62.0914	59.0022	50.6614	47.6898	53.0551	54.0733	62.6129	68.3827	76.9015 (64)
12Total per year (kWh/year)												749.4992 (64)
Electric shower(s)	47.8900	42.6704	46.5944	44.4645	45.2989	43.2107	44.6511	45.2989	44.4645	46.5944	45.7183	47.8900 (64a)
												544.7460 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												
Heat gains from water heating, kWh/month	31.2513	27.5165	29.2782	26.6390	26.0753	23.4680	23.0852	24.5885	24.6344	27.3018	28.5252	31.1979 (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	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	93.6397	103.6725	93.6397	96.7610	93.6397	96.7610	93.6397	93.6397	96.7610	93.6397	96.7610	93.6397 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	185.6512	187.5776	182.7230	172.3880	159.3419	147.0804	138.8890	136.9625	141.8172	152.1522	165.1983	177.4597 (68)
Pumps, fans	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105 (69)
Losses e.g. evaporation (negative values) (Table 5)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Water heating gains (Table 5)	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839 (71)
Total internal gains	42.0044	40.9472	39.3524	36.9986	35.0474	32.5945	31.0285	33.0490	34.2145	36.6960	39.6184	41.9326 (72)
	376.1267	387.0288	370.5465	360.9790	342.8604	331.2674	318.3887	318.4827	327.6242	337.3193	356.4091	367.8635 (73)

6. Solar gains												
[Jan]												
		Area	Solar flux	g	FF							
		m2	Table 6a	W/m2	Specific data	Specific data	Access					
					or Table 6b	or Table 6c	factor					
							Table 6d					
Northeast		3.7400	11.2829	0.3500	0.7000		0.7700					7.1646 (75)
Southeast		12.0800	36.7938	0.3500	0.7000		0.7700					75.4643 (77)
Southwest		1.3700	36.7938	0.3500	0.7000		0.7700					8.5584 (79)

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Solar gains	91.1873	157.7055	222.1008	285.7889	329.7782	331.6473	317.9731	284.5048	244.0544	176.0026	109.6548	77.7569 (83)
Total gains	467.3140	544.7343	592.6473	646.7679	672.6386	662.9147	636.3618	602.9875	571.6786	513.3219	466.0639	445.6204 (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	56.6136	56.6911	56.7671	57.1272	57.1951	57.5132	57.5132	57.5725	57.3903	57.1951	57.0580	56.9153
alpha	4.7742	4.7794	4.7845	4.8085	4.8130	4.8342	4.8342	4.8382	4.8260	4.8130	4.8039	4.7944
util living area	0.9957	0.9906	0.9799	0.9461	0.8644	0.7012	0.5325	0.5804	0.8090	0.9591	0.9909	0.9966 (86)
MIT	19.5862	19.7865	20.0626	20.4326	20.7451	20.9339	20.9858	20.9788	20.8642	20.4593	19.9559	19.5488 (87)
Th 2	19.8942	19.8955	19.8968	19.9030	19.9041	19.9095	19.9095	19.9105	19.9074	19.9041	19.9018	19.8993 (88)
util rest of house	0.9943	0.9874	0.9729	0.9263	0.8146	0.6054	0.4075	0.4536	0.7277	0.9399	0.9872	0.9955 (89)
MIT 2	18.6227	18.8223	19.0954	19.4561	19.7361	19.8801	19.9061	19.9048	19.8365	19.4885	18.9965	18.5895 (90)
Living area fraction												0.4756 (91)
MIT	19.0809	19.2809	19.5554	19.9205	20.2160	20.3813	20.4196	20.4156	20.3253	19.9502	19.4528	19.0457 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0809	19.2809	19.5554	19.9205	20.2160	20.3813	20.4196	20.4156	20.3253	19.9502	19.4528	19.0457 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9929	0.9851	0.9702	0.9267	0.8303	0.6490	0.4673	0.5142	0.7617	0.9409	0.9853	0.9942 (94)
Useful gains	463.9826	536.6350	574.9707	599.3461	558.5150	430.2533	297.3877	310.0528	435.4628	482.9968	459.1939	443.0560 (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	1186.2465	1152.5650	1044.9288	876.5027	676.5021	456.7204	301.7481	316.9028	492.8500	742.7761	983.6534	1185.1330 (97)
Space heating kWh	537.3643	413.9049	349.6489	199.5527	87.7824	0.0000	0.0000	0.0000	0.0000	193.2758	377.6108	552.1053 (98a)
Space heating requirement - total per year (kWh/year)												2711.2452
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	537.3643	413.9049	349.6489	199.5527	87.7824	0.0000	0.0000	0.0000	0.0000	193.2758	377.6108	552.1053 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2711.2452
Space heating per m2												(98c) / (4) = 41.6346 (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	742.5992	584.5994	599.7810	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8273	0.8987	0.8731	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	614.3377	525.3750	523.6850	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	740.2469	711.1320	673.8127	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	90.6546	138.2032	111.6951	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction												1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	22.6637	34.5508	27.9238	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												85.1382 (107)
Energy for space heating												41.6346 (99)
Energy for space cooling												1.3074 (108)
Total												42.9420 (109)
Fabric Energy Efficiency (DFEE)												42.9 (109)

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

1. Overall dwelling characteristics

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	65.1200 (1b)	x 2.8000 (2b)	= 182.3360 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.1200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 182.3360 (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 2 * 10 = 20.0000 (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) = 20.0000 / (5) = 0.1097 (8)
Pressure test Yes
Pressure Test Method Blower Door
Measured/design AP50 5.0000 (17)
Infiltration rate 0.3597 (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) = 0.3327 (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	0.4242	0.4159	0.4076	0.3660	0.3577	0.3161	0.3161	0.3078	0.3327	0.3577	0.3743	0.3909	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.5900	0.5865	0.5831	0.5670	0.5640	0.5500	0.5500	0.5474	0.5553	0.5640	0.5701	0.5764	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.4200	1.0000	2.4200			(26)
TER Opening Type			13.8700	1.1450	15.8817			(27)
Heatloss Floor 1			65.1200	0.1300	8.4656			(28b)
External Wall 1	62.1600	13.8700	48.2900	0.1800	8.6922			(29a)
Corridor wall	24.1900	2.4200	21.7700	0.1800	3.9186			(29a)
Total net area of external elements Aum(A, m2)			151.4700					(31)
Fabric heat loss, W/K = Sum (A x U)						39.3781		(33)
Main dwelling								
Party Wall 1			20.6100	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							251.1786	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	10.9800	0.0500	0.5490
E3 Sill	7.4900	0.0500	0.3745
E4 Jamb	27.6000	0.0500	1.3800
E7 Party floor between dwellings (in blocks of flats)	17.8400	0.0700	1.2488
E7 Party floor between dwellings (in blocks of flats)	8.6400	0.0700	0.6048
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872
E16 Corner (normal)	8.4000	0.0900	0.7560
E16 Corner (normal)	2.8000	0.0900	0.2520
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	17.8400	0.3200	5.7088
E21 Exposed floor (inverted)	8.6400	0.3200	2.7648
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.3600	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	7.3600	0.1600	1.1776
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			15.0747 (36)
Point Thermal bridges			0.0000 (36a)
Total fabric heat loss			54.4528 (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	35.4994	35.2891	35.0831	34.1152	33.9341	33.0911	33.0911	32.9350	33.4158	33.9341	34.3004	34.6834	(38)
Heat transfer coeff	89.9521	89.7419	89.5358	88.5680	88.3869	87.5439	87.5439	87.3878	87.8686	88.3869	88.7532	89.1362	(39)
Average = Sum(39)m / 12 =												88.5671	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3813	1.3781	1.3749	1.3601	1.3573	1.3443	1.3443	1.3419	1.3493	1.3573	1.3629	1.3688	(40)
HLP (average)												1.3601	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.1221 (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 25.8393 25.4555 24.9151 23.9187 23.1726 22.3453 21.8985 22.4351 23.0194 23.9046 24.9215 25.7519 (42b)

Hot water usage for other uses 36.3624 35.0401 33.7179 32.3956 31.0733 29.7511 29.7511 31.0733 32.3956 33.7179 35.0401 36.3624 (42c)

Average daily hot water use (litres/day) 57.0138 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	62.2017	60.4957	58.6330	56.3143	54.2460	52.0964	51.6495	53.5084	55.4150	57.6225	59.9617	62.1143	(44)
Energy conte	98.5123	86.1450	90.1167	77.0915	73.0255	64.0586	62.4656	66.2546	68.3322	78.1932	85.4264	97.2560	(45)
Energy content (annual)												946.8776	
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss (or HIU loss):													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	83.7354	73.2233	76.5992	65.5278	62.0717	54.4498	53.0958	56.3164	58.0824	66.4642	72.6124	82.6676	(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)

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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	83.7354	73.2233	76.5992	65.5278	62.0717	54.4498	53.0958	56.3164	58.0824	66.4642	72.6124	82.6676 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											804.8459 (64)
Electric shower(s)	47.8900	42.6704	46.5944	44.4645	45.2989	43.2107	44.6511	45.2989	44.4645	46.5944	45.7183	47.8900 (64a)
Heat gains from water heating, kWh/month	32.9064	28.9734	30.7984	27.4981	26.8426	24.4151	24.4367	25.4038	25.6367	28.2647	29.5827	32.6394 (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	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	106.1049	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	93.8107	103.8618	93.8107	96.9377	93.8107	96.9377	93.8107	93.8107	96.9377	93.8107	96.9377	93.8107	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	185.6512	187.5776	182.7230	172.3880	159.3419	147.0804	138.8890	136.9625	141.8172	152.1522	165.1983	177.4597	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	33.6105	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	-84.8839	(71)
Water heating gains (Table 5)	44.2290	43.1152	41.3957	38.1918	36.0788	33.9099	32.8450	34.1449	35.6065	37.9901	41.0870	43.8702	(72)
Total internal gains	378.5223	389.3861	372.7608	362.3489	344.0628	332.7595	320.3762	319.7495	329.1929	338.7844	358.0545	369.9720	(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
Northeast					3.0200	11.2829	0.6300	0.7000			0.7700			10.4136 (75)
Southeast					9.7500	36.7938	0.6300	0.7000			0.7700			109.6356 (77)
Southwest					1.1000	36.7938	0.6300	0.7000			0.7700			12.3691 (79)
Solar gains	132.4183	229.0164	322.5378	415.0399	478.9357	481.6552	461.7939	413.1796	354.4238	255.5891	159.2365	112.9149 (83)		
Total gains	510.9406	618.4025	695.2986	777.3888	822.9985	814.4146	782.1701	732.9292	683.6166	594.3735	517.2910	482.8869 (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	50.5107	50.6290	50.7455	51.3001	51.4052	51.9002	51.9002	51.9929	51.7084	51.4052	51.1930	50.9730	
alpha	4.3674	4.3753	4.3830	4.4200	4.4270	4.4600	4.4600	4.4662	4.4472	4.4270	4.4129	4.3982	
util living area	0.9940	0.9859	0.9688	0.9194	0.8152	0.6414	0.4816	0.5309	0.7643	0.9434	0.9873	0.9953 (86)	
MIT	19.4350	19.6847	20.0157	20.4361	20.7612	20.9400	20.9866	20.9796	20.8674	20.4334	19.8585	19.3960 (87)	
Th 2	19.7777	19.7802	19.7826	19.7941	19.7962	19.8063	19.8063	19.8081	19.8024	19.7962	19.7919	19.7873 (88)	
util rest of house	0.9920	0.9812	0.9582	0.8916	0.7546	0.5403	0.3565	0.4020	0.6727	0.9177	0.9823	0.9937 (89)	
MIT 2	18.3841	18.6327	18.9584	19.3648	19.6468	19.7813	19.8033	19.8031	19.7372	19.3736	18.8155	18.3526 (90)	
Living area fraction	fLA = Living area / (4) =												0.4756 (91)
MIT	18.8839	19.1331	19.4613	19.8743	20.1768	20.3324	20.3660	20.3626	20.2747	19.8776	19.3116	18.8488 (92)	
Temperature adjustment													0.0000
adjusted MIT	18.8839	19.1331	19.4613	19.8743	20.1768	20.3324	20.3660	20.3626	20.2747	19.8776	19.3116	18.8488 (93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9900	0.9780	0.9547	0.8938	0.7755	0.5868	0.4163	0.4636	0.7118	0.9198	0.9796	0.9920	(94)
Ext temp.	505.8317	604.7761	663.7829	694.7987	638.2528	477.9098	325.6111	339.7560	486.6165	546.7152	506.7593	479.0387	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Space heating kWh	1311.8525	1277.3011	1160.4975	971.9710	749.2379	501.8335	329.6938	346.2814	542.5620	820.0216	1083.8143	1305.7417	(97)
Space heating requirement - total per year (kWh/year)	599.6795	451.9368	369.5557	199.5641	82.5729	0.0000	0.0000	0.0000	0.0000	203.3400	415.4796	615.0670	(98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Space heating contribution - total per year (kWh/year)	599.6795	451.9368	369.5557	199.5641	82.5729	0.0000	0.0000	0.0000	0.0000	203.3400	415.4796	615.0670	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2937.1956	
Space heating per m2												45.1044	(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	822.9124	647.8246	664.1470	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8581	0.9174	0.8935	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	706.1434	594.3329	593.4371	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	916.9112	881.0669	825.3288	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	151.7528	213.3301	172.5274	0.0000	0.0000	0.0000	0.0000	(104)

Full SAP Calculation Printout



Cooled fraction	fC = cooled area / (4) =										1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	37.9382	53.3325	43.1319	0.0000	0.0000	0.0000 (107)
Space cooling requirement											134.4026 (107)
Energy for space heating											45.1044 (99)
Energy for space cooling											2.0639 (108)
Total											47.1683 (109)
Fabric Energy Efficiency (TFEE)											47.2 (109)