

Summary for Input Data



Plot Reference	A 101		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	82 B	DER	5.56	TER	16.07
Environmental	96 A	% DER < TER			65.40
CO ₂ Emissions (t/year)	0.35	DFEE	40.87	TFEE	44.56
Compliance Check	See BREL	% DFEE < TFEE			8.28
% DPER < TPER	32.65	DPER	58.46	TPER	86.80

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

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

Orientation	Southeast	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
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	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	234.87	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:	28.77 m	72.34 m ²	2.80 m

8.0 Living Area	34.33	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	48.38	31.00	0.00	None	17.38	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	32.17	29.75	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	16.20	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	164.02

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	72.34

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	72.34

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South East	2.42	
NW windows	Windows	External Wall 1	North West	7.61	
SW windows	Windows	External Wall 1	South West	9.77	

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	8.25	0.05	0.05	No
E4 Jamb	Independently assessed	24.00	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	12.92	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	11.49	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	4.36	0.10	0.10	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	4.36	0.05	0.05	No
E16 Corner (normal)	Independently assessed	5.60	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
E18 Party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
E20 Exposed floor (normal)	Independently assessed	12.92	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	11.49	0.10	0.10	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	5.79	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	5.79	0.08	0.08	No
Y-value	0.04			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	2
Manufacturer SFP	0.61
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

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
Number of passive vents	0

Summary for Input Data

Number of flueless gas fires

0

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes

Designed AP₅₀

3.00

m³/(h.m²) @ 50 Pa

Test Method

Blower Door

22.0 Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	15.00	1125.00	6

24.0 Main Heating 1

None

25.0 Main Heating 2

None

26.0 Heat Networks

Space Community Heating

Space and Water Combined

Distribution Loss

Calculated

Distribution Loss Value

1.50

SAP Code

2306

	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

None

28.0 Water Heating

Water Heating

Community Heating

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

Cold Water Source

From header tank

Bath Count

1

28.1 Showers

Description

Shower Type

Flow Rate
[l/min]

Rated Power
[kW]

Connected

Connected To

Shower 1

Combi boiler or unvented hot water system

8.00

No

Shower 2

Combi boiler or unvented hot water system

8.00

No

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Internal Store

Insulation Type

Measured Loss

Cylinder Volume

180.00

L

Loss

1.20

kWh/day

32.0 Photovoltaic Unit

Multiple Dwellings – Not Connected

Export Capable Meter?

No

Connected To Dwelling

Yes

Diverter

No

Battery Capacity [kWh]

0.00

Summary for Input Data



PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.35	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
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Recommendations

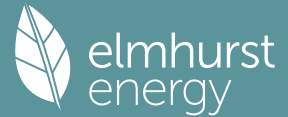
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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Environmental	96 A	% DER < TER				65.40	
CO ₂ Emissions (t/year)	0.35	DFEE	40.87	TFEE	44.56		
Compliance Check	See BREL	% DFEE < TFEE				8.28	
% DPER < TPER	32.65	DPER	58.46	TPER	86.80		
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	72.3400 (1b)	2.8000 (2b)	202.5520 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.3400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	202.5520 (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)

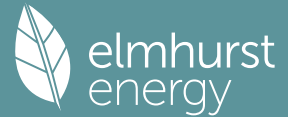
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1626	0.1594	0.1562	0.1403	0.1371	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
Main dwelling							
Windows			17.3800	1.1450	19.9008		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			72.3400	0.1000	7.2340	110.0000	7957.4000 (28b)
External Wall 1	48.3800	17.3800	31.0000	0.1500	4.6500	70.0000	2170.0001 (29a)
Corridor wall	32.1700	2.4200	29.7500	0.1900	5.6525	70.0000	2082.4999 (29a)
Total net area of external elements Aum(A, m ²)			152.8900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		39.8573		(33)
Main dwelling							
Party Wall 1			16.2000	0.0000	0.0000	70.0000	1134.0001 (32)
Party Ceiling 1			72.3400			30.0000	2170.2000 (32b)
Internal Wall 1			164.0200			9.0000	1476.1800 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		16990.2800 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							234.8670 (35)
List of Thermal Bridges							

[Jan]	Area	Solar flux	α	FF	Access	Gains
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Full SAP Calculation Printout



				m2	Table 6a W/m2	Specific data or Table 6b		Specific data or Table 6c		factor Table 6d		W	
Southwest				9.7700	36.7938	0.3500		0.7000		0.7700		61.0336 (79)	
Northwest				7.6100	11.2829	0.3500		0.7000		0.7700		14.5783 (81)	
Solar gains	75.6119	133.6373	195.7104	264.0535	315.4398	321.8143	306.6613	267.0015	219.1695	151.1656	91.4474	64.1374	(83)
Total gains	580.3719	649.2641	690.9676	744.5576	772.7939	761.7979	728.5799	692.6873	656.2922	603.5680	570.3854	559.7013	(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	73.6996	73.9456	74.1933	75.4570	75.7149	77.0314	77.0314	77.3002	76.4993	75.7149	75.2008	74.6936	
alpha	5.9133	5.9297	5.9462	6.0305	6.0477	6.1354	6.1354	6.1533	6.1000	6.0477	6.0134	5.9796	
util living area	0.9875	0.9748	0.9480	0.8647	0.7122	0.5104	0.3695	0.4045	0.6316	0.8868	0.9717	0.9896	(86)
MIT	20.1864	20.3526	20.5612	20.8140	20.9517	20.9946	20.9994	20.9989	20.9815	20.8139	20.4766	20.1658	(87)
Th 2	20.1801	20.1826	20.1851	20.1977	20.2002	20.2128	20.2128	20.2154	20.2078	20.2002	20.1952	20.1901	(88)
util rest of house	0.9841	0.9682	0.9346	0.8344	0.6620	0.4495	0.3037	0.3360	0.5657	0.8544	0.9631	0.9867	(89)
MIT 2	19.2423	19.4526	19.7118	20.0173	20.1616	20.2098	20.2126	20.2150	20.1960	20.0254	19.6199	19.2243	(90)
Living area fraction										fLA = Living area / (4) =		0.4746	(91)
MIT	19.6903	19.8797	20.1149	20.3954	20.5365	20.5822	20.5860	20.5870	20.5688	20.3996	20.0265	19.6711	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.6903	19.8797	20.1149	20.3954	20.5365	20.5822	20.5860	20.5870	20.5688	20.3996	20.0265	19.6711	(93)
8. Space heating requirement													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9816	0.9653	0.9333	0.8423	0.6837	0.4783	0.3349	0.3685	0.5963	0.8632	0.9610	0.9845	(94)
Useful gains	569.6795	626.7220	644.9062	627.1749	528.3290	364.3690	244.0127	255.2855	391.3335	520.9949	548.1433	550.9986	(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	985.5563	956.0685	866.0602	718.9890	550.8070	366.5168	244.2113	255.6355	399.0845	610.8349	811.2519	977.5420	(97)
Space heating kWh	309.4123	221.3208	164.5386	66.1062	16.7236	0.0000	0.0000	0.0000	0.0000	66.8410	189.4382	317.3483	(98a)
Space heating requirement - total per year (kWh/year)												1351.7291	
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	309.4123	221.3208	164.5386	66.1062	16.7236	0.0000	0.0000	0.0000	0.0000	66.8410	189.4382	317.3483	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1351.7291	
Space heating per m2										(98c) / (4) =		18.6858	(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													
	309.4123	221.3208	164.5386	66.1062	16.7236	0.0000	0.0000	0.0000	0.0000	66.8410	189.4382	317.3483	(98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50													
307a	464.1185	331.9813	246.8079	99.1593	25.0855	0.0000	0.0000	0.0000	0.0000	100.2614	284.1573	476.0225	
Space heating requirement	464.1185	331.9813	246.8079	99.1593	25.0855	0.0000	0.0000	0.0000	0.0000	100.2614	284.1573	476.0225	(307)
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)												0.0000	(308)
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	0.0000	(309)
Water heating													
Annual water heating requirement													
	240.6989	212.9783	226.5890	204.3878	198.8980	176.4769	169.5747	182.7104	182.7253	205.3826	217.9946	240.1336	(64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50													
310a	361.0483	319.4674	339.8835	306.5817	298.3470	264.7154	254.3620	274.0656	274.0879	308.0739	326.9919	360.2004	
Water heating fuel	361.0483	319.4674	339.8835	306.5817	298.3470	264.7154	254.3620	274.0656	274.0879	308.0739	326.9919	360.2004	(310)
Cooling System Energy Efficiency Ratio	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(314)
Space coolin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(315)
Pumps and Fa	16.0031	14.4544	16.0031	15.4869	16.0031	15.4869	16.0031	16.0031	15.4869	16.0031	15.4869	16.0031	(331)
Lighting	23.1370	18.5614	16.7125	12.2443	9.4578	7.7271	8.6277	11.2147	14.5667	19.1123	21.5874	23.7801	(332)
Electricity generated by PVs (Appendix M) (negative quantity)	-3.8364	-6.8103	-12.5635	-17.6799	-22.0991	-21.7942	-21.3388	-18.3652	-13.8087	-8.8799	-4.6067	-3.1320	(333a)
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	(334a)
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	(335a)
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	(333b)
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	(334b)
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	(335b)
Annual totals kWh/year													
Space heating fuel - community heating												2027.5936	(307)
Space heating fuel - secondary												0.0000	(309)
Water heating fuel - community heating												3687.8251	(310)
Efficiency of water heater												0.0000	(311)
Electricity used for heat distribution												20.2759	(313)
Space cooling fuel												0.0000	(321)
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)													

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mechanical ventilation fans (SFP = 0.7625) 188.4240 (330a)
 Total electricity for the above, kWh/year 188.4240 (331)
 Electricity for lighting (calculated in Appendix L) 186.7290 (332)

Energy saving/generation technologies (Appendices M ,N and Q)
 PV generation -154.9147 (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 5935.6570 (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	2463.5426	0.1569	137.1362 (367)
Electrical energy for heat distribution (space & water)	20.2759	0.0000	8.3747 (372)
Overall CO2 factor for heat network			0.0646 (386)
Total CO2 associated with community systems			369.3520 (373)
Space and water heating			369.3520 (376)
Pumps, fans and electric keep-hot	188.4240	0.1387	26.1367 (378)
Energy for lighting	186.7290	0.1443	26.9508 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-154.9147	0.1305	-20.2218
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-20.2218 (380)
Total CO2, kg/year			402.2177 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.5600 (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	2463.5426	1.5809	1381.6487 (467)
Electrical energy for heat distribution (space & water)	20.2759	0.0000	88.1346 (472)
Overall CO2 factor for heat network			0.6801 (486)
Total CO2 associated with community systems			3887.0383 (473)
Space and water heating			3887.0383 (476)
Pumps, fans and electric keep-hot	188.4240	1.5128	285.0478 (478)
Energy for lighting	186.7290	1.5338	286.4111 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-154.9147	1.4822	-229.6143
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-229.6143 (480)
Total Primary energy kWh/year			4228.8830 (483)
Dwelling Primary energy Rate (DPER)			58.4600 (484)

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

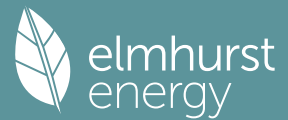
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	72.3400 (1b)	2.8000 (2b)	202.5520 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.3400		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 202.5520 (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) = 0.1481 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3981 (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) = 0.3384 (21)

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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	0.4315	0.4230	0.4145	0.3722	0.3638	0.3215	0.3215	0.3130	0.3384	0.3638	0.3807	0.3976	(22b)
	0.5931	0.5895	0.5859	0.5693	0.5662	0.5517	0.5517	0.5490	0.5573	0.5662	0.5725	0.5790	(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			15.6600	1.1450	17.9313			(27)
Heatloss Floor 1			72.3400	0.1300	9.4042			(28b)
External Wall 1	48.3800	15.6600	32.7200	0.1800	5.8896			(29a)
Corridor wall	32.1700	2.4200	29.7500	0.1800	5.3550			(29a)
Total net area of external elements Aum(A, m2)			152.8900					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	41.0001		(33)
Main dwelling								
Party Wall 1			16.2000	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							234.8670	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	8.2500	0.0500	0.4125	
E4 Jamb	24.0000	0.0500	1.2000	
E7 Party floor between dwellings (in blocks of flats)	12.9200	0.0700	0.9044	
E7 Party floor between dwellings (in blocks of flats)	11.4900	0.0700	0.8043	
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)	5.6000	0.0900	0.5040	
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	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E20 Exposed floor (normal)	12.9200	0.3200	4.1344	
E21 Exposed floor (inverted)	11.4900	0.3200	3.6768	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	5.7900	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)	5.7900	0.1600	0.9264	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				13.0732 (36)
Point Thermal bridges				0.0000
Total fabric heat loss			(33) + (36) + (36a) =	54.0733 (37)

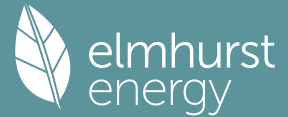
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	39.6424	39.4009	39.1641	38.0518	37.8437	36.8750	36.8750	36.6956	37.2481	37.8437	38.2647	38.7048	(38)
Average = Sum(39)m / 12 =	93.7157	93.4741	93.2374	92.1251	91.9170	90.9483	90.9483	90.7689	91.3214	91.9170	92.3380	92.7781	(39)
												92.1241	
HLP	1.2955	1.2922	1.2889	1.2735	1.2706	1.2572	1.2572	1.2548	1.2624	1.2706	1.2764	1.2825	(40)
HLP (average)												1.2735	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3016 (42)
Hot water usage for mixer showers													
62.8094	61.8655	60.4900	57.8584	55.9162	53.7504	52.5194	53.8844	55.3807	57.7062	60.3944	62.5687	(42a)	
Hot water usage for baths	27.1333	26.7303	26.1629	25.1166	24.3331	23.4644	22.9952	23.5586	24.1722	25.1018	26.1696	27.0416	(42b)
Hot water usage for other uses	38.2004	36.8113	35.4221	34.0330	32.6439	31.2548	31.2548	32.6439	34.0330	35.4221	36.8113	38.2004	(42c)
Average daily hot water use (litres/day)												117.7926	(43)
Daily hot water use	128.1431	125.4071	122.0751	117.0080	112.8933	108.4696	106.7693	110.0870	113.5860	118.2301	123.3752	127.8107	(44)
Energy conte	202.9473	178.5780	187.6248	160.1781	151.9761	133.3761	129.1283	136.3107	140.0629	160.4371	175.7706	200.1206	(45)
Energy content (annual)										Total = Sum(45)m =		1956.5106	
Distribution loss (46)m = 0.15 x (45)m	30.4421	26.7867	28.1437	24.0267	22.7964	20.0064	19.3692	20.4466	21.0094	24.0656	26.3656	30.0181	(46)
Water storage loss (or HIU loss):													
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	(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	(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	252.1899	223.0553	236.8675	207.8323	201.2188	181.0303	178.3709	185.5534	187.7171	209.6798	223.4248	249.3633	(62)
WWHRS	-28.7138	-25.3947	-26.5919	-22.0192	-20.5211	-17.5600	-16.4597	-17.5033	-18.1683	-21.4184	-24.2644	-28.1821	(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	223.4761	197.6605	210.2756	185.8131	180.6977	163.4703	161.9112	168.0501	169.5488	188.2614	199.1604	221.1812	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2269.5064	(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	106.8741	94.9590	101.7794	91.3826	89.9262	82.4709	82.3293	84.7174	84.6943	92.7395	96.5671	105.9342	(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	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.3361	113.3007	102.3361	105.7473	102.3361	105.7473	102.3361	102.3361	105.7473	102.3361	105.7473	102.3361	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	202.6957	204.7990	199.4987	188.2148	173.9710	160.5838	151.6403	149.5370	154.8373	166.1212	180.3650	193.7522	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	(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)	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	(71)
Water heating gains (Table 5)	143.6480	141.3080	136.8003	126.9202	120.8685	114.5429	110.6576	113.8675	117.6309	124.6498	134.1210	142.3847	(72)
Total internal gains	509.2033	519.9312	499.1585	481.4058	457.6991	438.3975	422.1575	423.2641	435.7390	453.6306	480.7568	498.9965	(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		
Southwest				8.8000	36.7938	0.6300	0.7000	0.7700		98.9531 (79)		
Northwest				6.8600	11.2829	0.6300	0.7000	0.7700		23.6547 (81)		
Solar gains	122.6079	216.7037	317.3735	428.2224	511.5741	521.9193	497.3412	433.0099	355.4228	245.1309	148.2868	104.0009 (83)
Total gains	631.8111	736.6349	816.5320	909.6283	969.2732	960.3168	919.4987	856.2740	791.1618	698.7614	629.0436	602.9974 (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	50.3600	50.4901	50.6184	51.2295	51.3455	51.8924	51.8924	51.9949	51.6803	51.3455	51.1114	50.8689		
alpha	4.3573	4.3660	4.3746	4.4153	4.4230	4.4595	4.4595	4.4663	4.4454	4.4230	4.4074	4.3913		
util living area	0.9885	0.9769	0.9533	0.8877	0.7610	0.5787	0.4291	0.4773	0.7135	0.9177	0.9775	0.9905	(86)	
MIT	19.5759	19.8102	20.1304	20.5328	20.8217	20.9599	20.9915	20.9865	20.9000	20.5213	19.9840	19.5407	(87)	
Th 2	19.8444	19.8470	19.8496	19.8616	19.8639	19.8745	19.8745	19.8764	19.8704	19.8639	19.8593	19.8545	(88)	
util rest of house	0.9850	0.9701	0.9393	0.8553	0.6991	0.4880	0.3224	0.3658	0.6250	0.8862	0.9696	0.9876	(89)	
MIT 2	18.2231	18.5200	18.9202	19.4093	19.7218	19.8527	19.8719	19.8719	19.8070	19.4106	18.7514	18.1856	(90)	
Living area fraction									fLA = Living area / (4) =			0.4746	(91)	
MIT	18.8651	19.1323	19.4946	19.9425	20.2438	20.3782	20.4032	20.4009	20.3257	19.9377	19.3363	18.8287	(92)	
Temperature adjustment												0.0000		
adjusted MIT	18.8651	19.1323	19.4946	19.9425	20.2438	20.3782	20.4032	20.4009	20.3257	19.9377	19.3363	18.8287	(93)	

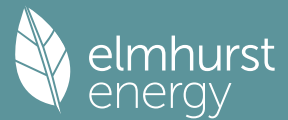
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9810	0.9647	0.9341	0.8579	0.7212	0.5297	0.3732	0.4188	0.6628	0.8886	0.9650	0.9840	(94)
Useful gains	619.7874	710.6543	762.6991	780.3281	698.9918	508.7138	343.1247	358.5770	524.4156	620.9443	607.0141	593.3708	(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	1364.9746	1330.3521	1211.5776	1017.2895	785.3205	525.5132	345.8953	363.1546	568.5378	858.2917	1129.8794	1357.2215	(97)
Space heating kWh	554.4193	416.4369	333.9656	170.6122	64.2285	0.0000	0.0000	0.0000	0.0000	176.5865	376.4630	568.3049	(98a)
Space heating requirement - total per year (kWh/year)												2661.0169	
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	554.4193	416.4369	333.9656	170.6122	64.2285	0.0000	0.0000	0.0000	0.0000	176.5865	376.4630	568.3049	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2661.0169	
Space heating per m ²										(98c) / (4) =		36.7849	(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	554.4193	416.4369	333.9656	170.6122	64.2285	0.0000	0.0000	0.0000	0.0000	176.5865	376.4630	568.3049	(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)	600.6709	451.1776	361.8263	184.8453	69.5867	0.0000	0.0000	0.0000	0.0000	191.3180	407.8689	615.7150	(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	223.4761	197.6605	210.2756	185.8131	180.6977	163.4703	161.9112	168.0501	169.5488	188.2614	199.1604	221.1812	(64)	
Efficiency of water heater												79.8000	(216)	
(217)m	86.0131	85.6894	85.0921	83.8689	81.9788	79.8000	79.8000	79.8000	79.8000	83.9164	85.4650	86.0801	(217)	

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Fuel for water heating, kWh/month	259.8162	230.6710	247.1152	221.5520	220.4199	204.8500	202.8963	210.5891	212.4672	224.3439	233.0315	256.9480	(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	21.2634	17.0583	15.3591	11.2527	8.6919	7.1014	7.9291	10.3065	13.3871	17.5647	19.8392	21.8544	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-9.5697	-14.7332	-23.1016	-28.4111	-32.8489	-31.4857	-31.1038	-28.2435	-23.6348	-17.8625	-10.9518	-8.1354	(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	-2.1992	-4.8070	-9.9046	-15.4111	-20.9185	-21.2207	-20.9720	-17.5058	-12.5077	-7.0440	-2.9886	-1.7260	(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												2883.0086	(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												2724.7003	(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)												171.6079	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-397.2873	(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												5468.0295	(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	2883.0086	0.2100	605.4318	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2724.7003	0.2100	572.1871	(264)
Space and water heating			1177.6189	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	171.6079	0.1443	24.7683	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-260.0820	0.1328	-34.5372	
PV Unit electricity exported	-137.2053	0.1249	-17.1339	
Total			-51.6711	(269)
Total CO2, kg/year			1162.6453	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			16.0700	(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	2883.0086	1.1300	3257.7997	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2724.7003	1.1300	3078.9113	(278)
Space and water heating			6336.7110	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	171.6079	1.5338	263.2180	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-260.0820	1.4907	-387.6987	
PV Unit electricity exported	-137.2053	0.4583	-62.8864	
Total			-450.5852	(283)
Total Primary energy kWh/year			6279.4446	(286)
Target Primary Energy Rate (TPER)			86.8000	(287)

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Plot Reference	A 101				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	5.56	TER	16.07		
Environmental	96 A	% DER < TER				65.40	
CO ₂ Emissions (t/year)	0.35	DFEE	40.87	TFEE	44.56		
Compliance Check	See BREL	% DFEE < TFEE				8.28	
% DPER < TPER	32.65	DPER	58.46	TPER	86.80		
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			
Ground floor	72.3400 (1b)	2.8000 (2b)	202.5520 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.3400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	202.5520 (5)

2. Ventilation rate

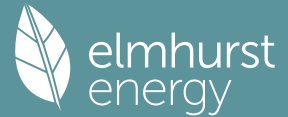
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1481 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2981 (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) = 0.2534 (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	0.3231	0.3167	0.3104	0.2787	0.2724	0.2407	0.2407	0.2344	0.2534	0.2724	0.2851	0.2977 (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	0.5522	0.5502	0.5482	0.5388	0.5371	0.5290	0.5290	0.5275	0.5321	0.5371	0.5406	0.5443 (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							
Windows			17.3800	1.1450	19.9008		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			72.3400	0.1000	7.2340	110.0000	7957.4000 (28b)
External Wall 1	48.3800	17.3800	31.0000	0.1500	4.6500	70.0000	2170.0001 (29a)
Corridor wall	32.1700	2.4200	29.7500	0.1900	5.6525	70.0000	2082.4999 (29a)
Total net area of external elements Aum(A, m ²)			152.8900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	39.8573		(33)
Main dwelling							
Party Wall 1			16.2000	0.0000	0.0000	70.0000	1134.0001 (32)
Party Ceiling 1			72.3400			30.0000	2170.2000 (32b)
Internal Wall 1			164.0200			9.0000	1476.1800 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16990.2800 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							234.8670 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				8.2500	0.0500	0.4125	
E4 Jamb				24.0000	0.0400	0.9600	

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E7 Party floor between dwellings (in blocks of flats)	12.9200	0.0500	0.6460										
E7 Party floor between dwellings (in blocks of flats)	11.4900	0.0390	0.4481										
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.1000	0.4360										
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0500	0.2180										
E16 Corner (normal)	5.6000	0.0500	0.2800										
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										
E18 Party wall between dwellings	2.8000	0.0390	0.1092										
E20 Exposed floor (normal)	12.9200	0.1000	1.2920										
E21 Exposed floor (inverted)	11.4900	0.1000	1.1490										
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	5.7900	0.0000	0.0000										
P7 Party Wall - Exposed floor (normal)	5.7900	0.0800	0.4632										
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				6.6632 (36)									
Point Thermal bridges				0.0000									
Total fabric heat loss		(33) + (36) + (36a) =		46.5205 (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	36.9095	36.7741	36.6413	36.0176	35.9009	35.3578	35.3578	35.2572	35.5670	35.9009	36.1370	36.3838	(38)
Average = Sum(39)m / 12 =	83.4300	83.2945	83.1618	82.5381	82.4214	81.8782	81.8782	81.7776	82.0875	82.4214	82.6575	82.9042	(39)
												82.5375	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.1533	1.1514	1.1496	1.1410	1.1394	1.1319	1.1319	1.1305	1.1347	1.1394	1.1426	1.1460	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	
												1.1410	
												31	

4. Water heating energy requirements (kWh/year)													

Assumed occupancy													2.3016 (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	26.5284	26.1280	25.5583	24.7051	23.9362	22.8778	22.0747	23.0567	23.5720	24.6208	25.7112	26.5074	(42b)
Hot water usage for other uses	38.2004	36.8113	35.4221	34.0330	32.6439	31.2548	31.2548	32.6439	34.0330	35.4221	36.8113	38.2004	(42c)
Average daily hot water use (litres/day)												59.3258	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	64.7288	62.9392	60.9804	58.7382	56.5802	54.1326	53.3296	55.7006	57.6051	60.0430	62.5225	64.7078	(44)
Energy content (annual)	95.2920	83.2813	87.1398	76.7267	72.9093	62.6025	58.9307	65.5607	66.8190	77.3714	84.5012	95.0281	(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		926.1628	
	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													
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Total heat required for water heating calculated for each month													
	80.9982	70.7891	74.0688	65.2177	61.9729	53.2122	50.0911	55.7266	56.7962	65.7657	71.8260	80.7739	(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	80.9982	70.7891	74.0688	65.2177	61.9729	53.2122	50.0911	55.7266	56.7962	65.7657	71.8260	80.7739	(64)
12Total per year (kWh/year)									Total per year (kWh/year) = Sum(64)m =			787.2384	(64)
Electric shower(s)												787	(64)
	50.2998	44.8176	48.9391	46.7020	47.5783	45.3851	46.8979	47.5783	46.7020	48.9391	48.0188	50.2998	(64a)
												572.1578	(64a)
Heat gains from water heating, kWh/month	32.8245	28.9017	30.7520	27.9799	27.3878	24.6493	24.2473	25.8262	25.8745	28.6762	29.9612	32.7684	(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	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.2367	113.1906	102.2367	105.6446	102.2367	105.6446	102.2367	102.2367	105.6446	102.2367	105.6446	102.2367	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	202.6957	204.7990	199.4987	188.2148	173.9710	160.5838	151.6403	149.5370	154.8373	166.1212	180.3650	193.7522	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	(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)	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	(71)
Water heating gains (Table 5)	44.1190	43.0085	41.3333	38.8610	36.8116	34.2352	32.5904	34.7127	35.9369	38.5433	41.6128	44.0436	(72)
Total internal gains	406.5748	418.5216	400.5922	390.2439	370.5427	357.9870	343.9909	344.0098	353.9423	364.4247	385.1459	397.5560	(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						
Southwest			9.7700	36.7938	0.3500	0.7000	0.7700	61.0336	(79)				
Northwest			7.6100	11.2829	0.3500	0.7000	0.7700	14.5783	(81)				
Solar gains	75.6119	133.6373	195.7104	264.0535	315.4398	321.8143	306.6613	267.0015	219.1695	151.1656	91.4474	64.1374	(83)
Total gains	482.1867	552.1589	596.3026	654.2974	685.9825	679.8013	650.6522	611.0113	573.1118	515.5903	476.5933	461.6934	(84)

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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	56.5686	56.6606	56.7511	57.1799	57.2609	57.6407	57.6407	57.7116	57.4938	57.2609	57.0973	56.9274
alpha	4.7712	4.7774	4.7834	4.8120	4.8174	4.8427	4.8427	4.8474	4.8329	4.8174	4.8065	4.7952
util living area	0.9959	0.9915	0.9823	0.9507	0.8706	0.7068	0.5391	0.5917	0.8236	0.9637	0.9914	0.9966 (86)
MIT	19.5798	19.7652	20.0348	20.4128	20.7360	20.9320	20.9852	20.9771	20.8527	20.4381	19.9458	19.5474 (87)
Th 2	19.9575	19.9591	19.9605	19.9675	19.9688	19.9749	19.9749	19.9760	19.9726	19.9688	19.9662	19.9634 (88)
util rest of house	0.9946	0.9888	0.9764	0.9335	0.8254	0.6172	0.4208	0.4715	0.7500	0.9475	0.9882	0.9956 (89)
MIT 2	18.6717	18.8569	19.1245	19.4956	19.7890	19.9429	19.9710	19.9692	19.8910	19.5264	19.0428	18.6439 (90)
Living area fraction									fLA = Living area / (4) =			0.4746 (91)
MIT	19.1026	19.2880	19.5565	19.9308	20.2384	20.4123	20.4523	20.4476	20.3474	19.9591	19.4713	19.0727 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1026	19.2880	19.5565	19.9308	20.2384	20.4123	20.4523	20.4476	20.3474	19.9591	19.4713	19.0727 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9931	0.9865	0.9735	0.9328	0.8385	0.6574	0.4772	0.5286	0.7795	0.9473	0.9862	0.9943 (94)
Useful gains	478.8651	544.7288	580.5189	610.3023	575.2050	446.9029	310.4698	323.0075	446.7476	488.4350	470.0283	459.0848 (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	1234.9846	1198.4396	1085.8012	910.4651	703.7468	475.8971	315.4174	331.0001	512.8341	771.3887	1022.5796	1233.0070 (97)
Space heating kWh	562.5529	439.2937	375.9300	216.1173	95.6351	0.0000	0.0000	0.0000	0.0000	210.5176	397.8369	575.7982 (98a)
Space heating requirement - total per year (kWh/year)												2873.6816
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	562.5529	439.2937	375.9300	216.1173	95.6351	0.0000	0.0000	0.0000	0.0000	210.5176	397.8369	575.7982 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2873.6816
Space heating per m2												(98c) / (4) = 39.7247 (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	769.6554	605.8989	621.5101	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8214	0.8936	0.8638	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	632.2150	541.4232	536.8858	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	756.1467	724.1625	679.6880	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	89.2308	135.9580	106.2448	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)												
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	22.3077	33.9895	26.5612	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												82.8584 (107)
Energy for space heating												39.7247 (99)
Energy for space cooling												1.1454 (108)
Total												40.8701 (109)
Fabric Energy Efficiency (DFEE)												40.9 (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	72.3400 (1b)	x 2.8000 (2b)	= 202.5520 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.3400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	202.5520 (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)

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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) =

Air changes per hour
30.0000 / (5) = 0.1481 (8)

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

Yes
Blower Door
5.0000 (17)
0.3981 (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) = 0.3384 (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	0.4315	0.4230	0.4145	0.3722	0.3638	0.3215	0.3215	0.3130	0.3384	0.3638	0.3807	0.3976 (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	0.5931	0.5895	0.5859	0.5693	0.5662	0.5517	0.5517	0.5490	0.5573	0.5662	0.5725	0.5790 (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			15.6600	1.1450	17.9313		(27)
Heatloss Floor 1			72.3400	0.1300	9.4042		(28b)
External Wall 1	48.3800	15.6600	32.7200	0.1800	5.8896		(29a)
Corridor wall	32.1700	2.4200	29.7500	0.1800	5.3550		(29a)
Total net area of external elements Aum(A, m2)			152.8900				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 41.0001		(33)
Main dwelling							
Party Wall 1			16.2000	0.0000	0.0000		(32)

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

234.8670 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	8.2500	0.0500	0.4125
E4 Jamb	24.0000	0.0500	1.2000
E7 Party floor between dwellings (in blocks of flats)	12.9200	0.0700	0.9044
E7 Party floor between dwellings (in blocks of flats)	11.4900	0.0700	0.8043
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)	5.6000	0.0900	0.5040
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
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	12.9200	0.3200	4.1344
E21 Exposed floor (inverted)	11.4900	0.3200	3.6768
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	5.7900	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	5.7900	0.1600	0.9264

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

(36a) = 13.0732 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 54.0733 (37)

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

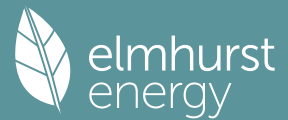
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	39.6424	39.4009	39.1641	38.0518	37.8437	36.8750	36.8750	36.6956	37.2481	37.8437	38.2647	38.7048 (38)
Heat transfer coeff	93.7157	93.4741	93.2374	92.1251	91.9170	90.9483	90.9483	90.7689	91.3214	91.9170	92.3380	92.7781 (39)
Average = Sum(39)m / 12 =												92.1241

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2955	1.2922	1.2889	1.2735	1.2706	1.2572	1.2572	1.2548	1.2624	1.2706	1.2764	1.2825 (40)
HLP (average)												1.2735
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3016 (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												
27.1333	26.7303	26.1629	25.1166	24.3331	23.4644	22.9952	23.5586	24.1722	25.1018	26.1696	27.0416	(42b)
Hot water usage for other uses												
38.2004	36.8113	35.4221	34.0330	32.6439	31.2548	31.2548	32.6439	34.0330	35.4221	36.8113	38.2004	(42c)
Average daily hot water use (litres/day)												59.8845 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	65.3337	63.5416	61.5850	59.1496	56.9771	54.7192	54.2500	56.2026	58.2052	60.5239	62.9809	65.2419 (44)
Energy conte	103.4726	90.4824	94.6539	80.9729	76.7021	67.2837	65.6107	69.5905	71.7729	82.1304	89.7278	102.1531 (45)
Energy content (annual)										Total = Sum(45)m =		994.5528
Distribution loss (46)m = 0.15 x (45)m												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (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												
87.9517	76.9100	80.4558	68.8270	65.1968	57.1911	55.7691	59.1520	61.0069	69.8108	76.2686	86.8301	(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	87.9517	76.9100	80.4558	68.8270	65.1968	57.1911	55.7691	59.1520	61.0069	69.8108	76.2686	86.8301 (64)

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12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =										845.3699 (64)
Electric shower(s)											845 (64)
50.2998	44.8176	48.9391	46.7020	47.5783	45.3851	46.8979	47.5783	46.7020	48.9391	48.0188	50.2998 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =										572.1578 (64a)	
Heat gains from water heating, kWh/month											
34.5629	30.4319	32.3487	28.8822	28.1938	25.6441	25.6667	26.6826	26.9272	29.6875	31.0719	34.2825 (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	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	115.0784	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.3361	113.3007	102.3361	105.7473	102.3361	105.7473	102.3361	102.3361	105.7473	102.3361	105.7473	102.3361	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	202.6957	204.7990	199.4987	188.2148	173.9710	160.5838	151.6403	149.5370	154.8373	166.1212	180.3650	193.7522	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	34.5078	(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)	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	-92.0627	(71)
Water heating gains (Table 5)	46.4555	45.2856	43.4795	40.1142	37.8949	35.6167	34.4983	35.8637	37.3989	39.9025	43.1554	46.0786	(72)
Total internal gains	409.0108	420.9088	402.8377	391.5998	371.7254	359.4713	345.9982	345.2602	355.5070	365.8833	386.7912	399.6904	(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	
Southwest				8.8000	36.7938	0.6300	0.7000		0.7700		98.9531	(79)
Northwest				6.8600	11.2829	0.6300	0.7000		0.7700		23.6547	(81)
Solar gains	122.6079	216.7037	317.3735	428.2224	511.5741	521.9193	497.3412	433.0099	355.4228	245.1309	148.2868	104.0009 (83)
Total gains	531.6186	637.6125	720.2112	819.8222	883.2995	881.3906	843.3394	778.2701	710.9298	611.0141	535.0780	503.6913 (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	50.3600	50.4901	50.6184	51.2295	51.3455	51.8924	51.8924	51.9949	51.6803	51.3455	51.1114	50.8689
alpha	4.3573	4.3660	4.3746	4.4153	4.4230	4.4595	4.4595	4.4663	4.4454	4.4230	4.4074	4.3913
util living area	0.9940	0.9863	0.9692	0.9160	0.8020	0.6211	0.4654	0.5206	0.7640	0.9453	0.9876	0.9952 (86)
MIT	19.4304	19.6727	20.0087	20.4469	20.7773	20.9471	20.9883	20.9811	20.8675	20.4245	19.8526	19.3951 (87)
Th 2	19.8444	19.8470	19.8496	19.8616	19.8639	19.8745	19.8745	19.8764	19.8704	19.8639	19.8593	19.8545 (88)
util rest of house	0.9921	0.9820	0.9594	0.8892	0.7437	0.5272	0.3509	0.4011	0.6782	0.9220	0.9829	0.9937 (89)
MIT 2	18.4372	18.6788	19.0101	19.4347	19.7217	19.8515	19.8716	19.8713	19.8022	19.4256	18.8682	18.4098 (90)
Living area fraction	18.9085	19.1505	19.4840	19.9150	20.2226	20.3715	20.4015	20.3980	20.3077	19.8996	19.3354	18.8774 (91)
MIT	18.9085	19.1505	19.4840	19.9150	20.2226	20.3715	20.4015	20.3980	20.3077	19.8996	19.3354	18.8774 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9085	19.1505	19.4840	19.9150	20.2226	20.3715	20.4015	20.3980	20.3077	19.8996	19.3354	18.8774 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9900	0.9787	0.9555	0.8907	0.7636	0.5702	0.4054	0.4579	0.7141	0.9229	0.9801	0.9920	(94)
Useful gains	526.3122	624.0256	688.1584	730.1805	674.4707	502.5379	341.8891	356.3768	507.6459	563.9195	524.4400	499.6464	(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	1369.0479	1332.0505	1210.5913	1014.7604	783.3727	524.9048	345.7444	362.8919	566.8986	854.7950	1129.7902	1361.7371	(97)
Space heating kWh	626.9954	475.7927	388.6900	204.8975	81.0231	0.0000	0.0000	0.0000	0.0000	216.4113	435.8521	641.3955	(98a)
Space heating requirement - total per year (kWh/year)												3071.0578	
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	626.9954	475.7927	388.6900	204.8975	81.0231	0.0000	0.0000	0.0000	0.0000	216.4113	435.8521	641.3955	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3071.0578	
Space heating per m2												42.4531	(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	854.9140	673.0174	689.8436	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8718	0.9258	0.8994	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	745.2820	623.0845	620.4218	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	991.4259	948.9524	874.8870	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	177.2236	242.4457	189.3221	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction									fc = cooled area / (4) =			1.0000	(105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													

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	0.0000	0.0000	0.0000	0.0000	0.0000	44.3059	60.6114	47.3305	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement													152.2479 (107)
Energy for space heating													42.4531 (99)
Energy for space cooling													2.1046 (108)
Total													44.5577 (109)
Fabric Energy Efficiency (TFEE)													44.6 (109)