

Summary for Input Data

Plot Reference	A 614		Issued on Date	15/05/2026
Assessment Reference	Be Green 260515	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	82 B	DER	5.39	TER	14.24
Environmental	96 A	% DER < TER			62.15
CO ₂ Emissions (t/year)	0.36	DFEE	38.14	TFEE	38.13
Compliance Check	See BREL	% DFEE < TFEE			-0.01
% DPER < TPER	25.55	DPER	56.75	TPER	76.23

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

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

Orientation	Northeast
Property Tenture	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Flat, Mid-Terrace
Position of Flat	Top-floor flat
Which Floor	6
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	146.84 kJ/m ² K
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:	32.85 m	74.17 m ²	2.80 m

8.0 Living Area	35.70 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	49.94	34.47	0.00	None	15.47	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	42.04	39.62	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	7.90	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	168.67

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	74.17	74.17	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete planks floor, screed, carpeted	40.00	74.17

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
Windows	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 East	2.42	
SW Windows	Windows	External Wall 1	South West	10.72	
SE windows	Windows	External Wall 1	South East	4.75	

14.0 Conservatory

None

15.0 Draught Proofing

100

 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	9.84	0.05	0.05	No
E4 Jamb	Independently assessed	21.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	14.48	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	15.02	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.36	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	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	2.82	0.00	0.00	No
E3 Sill	Independently assessed	6.34	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
E14 Flat roof	Independently assessed	32.85	0.05	0.05	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	2.82	0.05	0.05	No

Y-value

0.03

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

Summary for Input Data

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m³/(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	7

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 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

Insulation Type

Cylinder Volume L

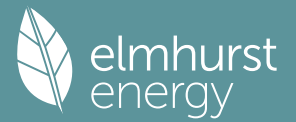
Loss kWh/day

32.0 Photovoltaic Unit

Export Capable Meter?

Connected To Dwelling

Summary for Input Data



Diverter	No										
Battery Capacity [kWh]	0.00										
PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer			
0.36	South West	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	96 A		% DER < TER				62.15
CO ₂ Emissions (t/year)	0.36		DFEE	38.14		TFEE	38.13
Compliance Check	See BREL		% DFEE < TFEE				-0.01
% DPER < TPER	25.55		DPER	56.75		TPER	76.23
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	74.1700 (1b)	2.8000 (2b)	207.6760 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.1700		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	207.6760 (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							
Door			2.4200	1.0000	2.4200		(26)
Windows			15.4800	1.1450	17.7252		(27)
External Wall 1	49.9400	15.4800	34.4600	0.1500	5.1690	70.0000	2412.2000 (29a)
Corridor wall	42.0400	2.4200	39.6200	0.1900	7.5278	70.0000	2773.4001 (29a)
External Roof 1	74.1700		74.1700	0.1000	7.4170	9.0000	667.5300 (30)
Total net area of external elements Aum(A, m ²)			166.1500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	40.2590		(33)
Main dwelling							
Party Wall 1			7.9000	0.0000	0.0000	70.0000	553.0000 (32)
Party Floor 1			74.1700			40.0000	2966.8000 (32d)
Internal Wall 1			168.6700			9.0000	1518.0300 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		10890.9601 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							146.8378 (35)
List of Thermal Bridges							

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.8400	0.0500	0.4920
E4 Jamb	21.6000	0.0400	0.8640
E7 Party floor between dwellings (in blocks of flats)	14.4800	0.0500	0.7240
E7 Party floor between dwellings (in blocks of flats)	15.0200	0.0360	0.5407
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0500	0.1680
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	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	2.8200	0.0000	0.0000
E3 Sill	6.3400	0.0400	0.2536
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E14 Flat roof	32.8500	0.0500	1.6425
P4 Party wall - Roof (insulation at ceiling level)	2.8200	0.0500	0.1410
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			5.4642 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	45.7232 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	17.9599	17.7415	17.5231	16.4308	16.2124	15.1201	15.1201	14.9017	15.5570	16.2124	16.6493	17.0862	(38)
Heat transfer coeff	63.6832	63.4647	63.2463	62.1540	61.9356	60.8433	60.8433	60.6249	61.2802	61.9356	62.3725	62.8094	(39)
Average = Sum(39)m / 12 =												62.0994	
HLP	0.8586	0.8557	0.8527	0.8380	0.8350	0.8203	0.8203	0.8174	0.8262	0.8350	0.8409	0.8468	(40)
HLP (average)												0.8373	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3430 (42)
Hot water usage for mixer showers	61.8991	60.9514	59.5548	57.4063	55.4814	52.7884	50.6584	53.1485	54.4009	57.0682	59.8460	61.8433	(42a)
Hot water usage for baths	26.8203	26.4154	25.8395	24.9769	24.1995	23.1294	22.3176	23.3103	23.8314	24.8917	25.9941	26.7990	(42b)
Hot water usage for other uses	38.6243	37.2198	35.8153	34.4107	33.0062	31.6017	31.6017	33.0062	34.4107	35.8153	37.2198	38.6243	(42c)
Average daily hot water use (litres/day)												117.0479	(43)
Daily hot water use	127.3437	124.5866	121.2095	116.7940	112.6872	107.5195	104.5777	109.4650	112.6430	117.7751	123.0598	127.2666	(44)
Energy conte	187.4719	164.8533	173.2059	152.5622	145.2088	124.3427	115.5614	128.8424	130.6602	151.7652	166.3195	186.9003	(45)
Energy content (annual)										Total = Sum(45)m =		1827.6939	
Distribution loss (46)m = 0.15 x (45)m	28.1208	24.7280	25.9809	22.8843	21.7813	18.6514	17.3342	19.3264	19.5990	22.7648	24.9479	28.0351	(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	(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	(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	242.7487	214.7807	228.4827	206.0558	200.4856	177.8364	170.8382	184.1192	184.1539	207.0420	219.8131	242.1771	(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	242.7487	214.7807	228.4827	206.0558	200.4856	177.8364	170.8382	184.1192	184.1539	207.0420	219.8131	242.1771	(64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				2478.5336	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
												0.0000	(64a)
Heat gains from water heating, kWh/month	106.5559	94.7557	101.8124	93.5219	92.5034	84.1389	82.6456	87.0615	86.2395	94.6834	98.0962	106.3658	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	104.6537	115.8666	104.6537	108.1422	104.6537	108.1422	104.6537	104.6537	108.1422	104.6537	108.1422	104.6537	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.8277	208.9739	203.5655	192.0516	177.5174	163.8573	154.7315	152.5853	157.9937	169.5076	184.0418	197.7019	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	(71)
Water heating gains (Table 5)	143.2202	141.0055	136.8446	129.8915	124.3325	116.8596	111.0828	117.0182	119.7770	127.2626	136.2447	142.9648	(72)
Total internal gains	512.8461	523.9905	503.2083	488.2298	464.6481	447.0036	428.6125	432.4017	444.0574	459.5684	486.5731	503.4649	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
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elmhurst
energy

SAP 10 Online 3.1.62 Page 3 of 7

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Total electricity for the above, kWh/year	193.1906 (331)
Electricity for lighting (calculated in Appendix L)	182.2143 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-159.0604 (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	5916.2734 (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	2456.8659	0.1562	133.4417 (367)
Electrical energy for heat distribution (space & water)	19.8213	0.0000	8.3314 (372)
Overall CO2 factor for heat network			0.0645 (386)
Total CO2 associated with community systems			367.4435 (373)
Space and water heating			367.4435 (376)
Pumps, fans and electric keep-hot	193.1906	0.1387	26.7979 (378)
Energy for lighting	182.2143	0.1443	26.2992 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-159.0604	0.1305	-20.7638
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-20.7638 (380)
Total CO2, kg/year			399.7767 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.3900 (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	2456.8659	1.5782	1348.3776 (467)
Electrical energy for heat distribution (space & water)	19.8213	0.0000	87.8194 (472)
Overall CO2 factor for heat network			0.6795 (486)
Total CO2 associated with community systems			3873.1367 (473)
Space and water heating			3873.1367 (476)
Pumps, fans and electric keep-hot	193.1906	1.5128	292.2587 (478)
Energy for lighting	182.2143	1.5338	279.4864 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-159.0604	1.4822	-235.7624
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-235.7624 (480)
Total Primary energy kWh/year			4209.1194 (483)
Dwelling Primary energy Rate (DPER)			56.7500 (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	74.1700 (1b)	2.8000 (2b)	207.6760 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.1700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	207.6760 (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	30.0000 / (5) = 0.1445 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3945 (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) = 0.3353 (21)

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Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate												
Effective ac	0.4275	0.4191	0.4107	0.3688	0.3604	0.3185	0.3185	0.3101	0.3353	0.3604	0.3772	0.3940 (22b)
	0.5914	0.5878	0.5843	0.5680	0.5650	0.5507	0.5507	0.5481	0.5562	0.5650	0.5711	0.5776 (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			15.4800	1.1450	17.7252		(27)
External Wall 1	49.9400	15.4800	34.4600	0.1800	6.2028		(29a)
Corridor wall	42.0400	2.4200	39.6200	0.1800	7.1316		(29a)
External Roof 1	74.1700		74.1700	0.1100	8.1587		(30)
Total net area of external elements Aum(A, m2)			166.1500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.6383		(33)
Main dwelling							
Party Wall 1			7.9000	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							146.8378 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.8400	0.0500	0.4920
E4 Jamb	21.6000	0.0500	1.0800
E7 Party floor between dwellings (in blocks of flats)	14.4800	0.0700	1.0136
E7 Party floor between dwellings (in blocks of flats)	15.0200	0.0700	1.0514
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672
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
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	2.8200	0.0000	0.0000
E3 Sill	6.3400	0.0500	0.3170
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E14 Flat roof	32.8500	0.0800	2.6280
P4 Party wall - Roof (insulation at ceiling level)	2.8200	0.1200	0.3384
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.8276 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	49.4659 (37)

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

(38)m	Jan 40.5287	Feb 40.2855	Mar 40.0472	Apr 38.9277	May 38.7182	Jun 37.7431	Jul 37.7431	Aug 37.5625	Sep 38.1187	Oct 38.7182	Nov 39.1419	Dec 39.5849 (38)
Heat transfer coeff	89.9946	89.7514	89.5131	88.3935	88.1841	87.2090	87.2090	87.0284	87.5846	88.1841	88.6078	89.0508 (39)
Average = Sum(39)m / 12 =												88.3925
HLP	Jan 1.2134	Feb 1.2101	Mar 1.2069	Apr 1.1918	May 1.1889	Jun 1.1758	Jul 1.1758	Aug 1.1734	Sep 1.1809	Oct 1.1889	Nov 1.1947	Dec 1.2006 (40)
HLP (average)												1.1918
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3430 (42)
Hot water usage for mixer showers												
63.5035	62.5492	61.1585	58.4978	56.5342	54.3444	53.0998	54.4799	55.9928	58.3439	61.0618	63.2602 (42a)	
Hot water usage for baths												
27.4318	27.0244	26.4507	25.3929	24.6008	23.7225	23.2481	23.8178	24.4381	25.3779	26.4575	27.3391 (42b)	
Hot water usage for other uses												
38.6243	37.2198	35.8153	34.4107	33.0062	31.6017	31.6017	33.0062	34.4107	35.8153	37.2198	38.6243 (42c)	
Average daily hot water use (litres/day)												119.0947 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
129.5596	126.7934	123.4245	118.3014	114.1412	109.6687	107.9496	111.3039	114.8416	119.5371	124.7391	129.2236 (44)	
Energy content (annual)	205.1908	180.5521	189.6988	161.9487	153.6560	134.8504	130.5557	137.8175	141.6112	162.2107	177.7137	202.3329 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1978.1385
30.7786	27.0828	28.4548	24.2923	23.0484	20.2276	19.5834	20.6726	21.2417	24.3316	26.6571	30.3499 (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	25.9803	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	25.9803	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												
254.4334	225.0293	238.9415	209.6029	202.8987	182.5046	179.7983	187.0602	189.2654	211.4534	225.3679	251.5756 (62)	
WWHRS	-29.0311	-25.6754	-26.8858	-22.2625	-20.7478	-17.7541	-16.6416	-17.6967	-18.3691	-21.6551	-24.5326	-28.4935 (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												
225.4023	199.3539	212.0557	187.3404	182.1509	164.7505	163.1567	169.3635	170.8963	189.7983	200.8353	223.0820 (64)	
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				2288.1859 (64)
Electric shower(s)												2288 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
107.6201	95.6154	102.4690	91.9713	90.4848	82.9611	82.8039	85.2185	85.2091	93.3292	97.2132	106.6698 (65)	

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

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Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	104.6537	115.8666	104.6537	108.1422	104.6537	108.1422	104.6537	104.6537	108.1422	104.6537	108.1422	104.6537	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.8277	208.9739	203.5655	192.0516	177.5174	163.8573	154.7315	152.5853	157.9937	169.5076	184.0418	197.7019	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	(71)
Water heating gains (Table 5)	144.6506	142.2848	137.7272	127.7379	121.6193	115.2238	111.2956	114.5409	118.3459	125.4425	135.0183	143.3734	(72)
Total internal gains	517.2765	528.2698	507.0909	489.0762	464.9349	445.3677	428.8253	429.9244	442.6263	460.7483	488.3467	506.8735	(73)

6. Solar gains

[Jan]													
					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c				Access factor Table 6d	Gains W
Southeast					4.7600	36.7938	0.6300	0.7000				0.7700	53.5246 (77)
Southwest					10.7200	36.7938	0.6300	0.7000				0.7700	120.5429 (79)
Solar gains	174.0675	296.5014	405.6862	502.6649	563.0265	558.9550	538.8923	493.8598	439.2723	327.6972	208.4928	148.9655 (83)	
Total gains	691.3441	824.7712	912.7770	991.7410	1027.9615	1004.3228	967.7176	923.7842	881.8987	788.4455	696.8396	655.8391 (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	33.6161	33.7072	33.7969	34.2250	34.3063	34.6898	34.6898	34.7618	34.5411	34.3063	34.1422	33.9724	
alpha	3.2411	3.2471	3.2531	3.2817	3.2871	3.3127	3.3127	3.3175	3.3027	3.2871	3.2761	3.2648	
util living area	0.9547	0.9234	0.8784	0.7945	0.6740	0.5174	0.3851	0.4176	0.6082	0.8210	0.9264	0.9608 (86)	
MIT	19.2225	19.5576	19.9518	20.4027	20.7300	20.9180	20.9765	20.9690	20.8554	20.4274	19.7577	19.1677 (87)	
Th 2	19.9093	19.9119	19.9145	19.9266	19.9289	19.9394	19.9394	19.9414	19.9353	19.9289	19.9243	19.9195 (88)	
util rest of house	0.9463	0.9100	0.8572	0.7598	0.6207	0.4434	0.2970	0.3277	0.5351	0.7828	0.9111	0.9535 (89)	
MIT 2	17.8783	18.2955	18.7806	19.3245	19.6902	19.8839	19.9289	19.9265	19.8283	19.3691	18.5605	17.8164 (90)	
Living area fraction									fLA = Living area / (4) =			0.4813 (91)	
MIT	18.5253	18.9030	19.3443	19.8435	20.1907	20.3817	20.4332	20.4283	20.3227	19.8785	19.1368	18.4668 (92)	
Temperature adjustment												0.0000	
adjusted MIT	18.5253	18.9030	19.3443	19.8435	20.1907	20.3817	20.4332	20.4283	20.3227	19.8785	19.1368	18.4668 (93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9326	0.8949	0.8444	0.7568	0.6344	0.4752	0.3387	0.3699	0.5629	0.7807	0.8974	0.9406 (94)	
Ext temp.	644.7605	738.0742	770.7777	750.5572	652.1694	477.2169	327.7511	341.6985	496.4064	615.5735	625.3594	616.8820 (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	1280.2002	1256.7876	1149.7348	967.3334	748.7418	504.2126	334.2871	350.5752	545.0125	818.2138	1066.5520	1270.4709 (97)	
Space heating requirement - total per year (kWh/year)	472.7671	348.5754	281.9441	156.0788	71.8499	0.0000	0.0000	0.0000	0.0000	150.7644	317.6587	486.2701 (98a)	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)	
Solar heating contribution - total per year (kWh/year)	472.7671	348.5754	281.9441	156.0788	71.8499	0.0000	0.0000	0.0000	0.0000	150.7644	317.6587	486.2701 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												2285.9086	
Space heating per m2										(98c) / (4) =		30.8199 (99)	

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													92.3000 (206)
Efficiency of main space heating system 2 (in %)													0.0000 (207)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating efficiency (main heating system 1)	472.7671	348.5754	281.9441	156.0788	71.8499	0.0000	0.0000	0.0000	0.0000	150.7644	317.6587	486.2701 (98)	
Space heating fuel (main heating system)	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 efficiency (main heating system 2)	512.2071	377.6548	305.4649	169.0995	77.8438	0.0000	0.0000	0.0000	0.0000	163.3418	344.1590	526.8366 (211)	
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 (212)	
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 (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	225.4023	199.3539	212.0557	187.3404	182.1509	164.7505	163.1567	169.3635	170.8963	189.7983	200.8353	223.0820 (64)	
Efficiency of water heater (217)m	85.6803	85.2998	84.6994	83.6533	82.1554	79.8000	79.8000	79.8000	79.8000	83.5486	85.0831	85.7583 (216)	
Fuel for water heating, kWh/month	263.0738	233.7096	250.3626	223.9486	221.7151	206.4543	204.4571	212.2350	214.1558	227.1711	236.0461	260.1288 (219)	

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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	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	21.7450	17.4446	15.7069	11.5076	8.8888	7.2622	8.1087	10.5399	13.6903	17.9625	20.2885	22.3493	22.3493	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-14.0221	-21.2098	-32.6820	-39.4778	-45.0118	-42.9154	-42.3922	-38.7935	-32.9054	-25.4137	-15.9181	-11.9608	-11.9608	(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	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	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	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233b)m	-4.0778	-8.8420	-18.0799	-27.9184	-37.6797	-38.1441	-37.6977	-31.5663	-22.6799	-12.8911	-5.5214	-3.2055	-3.2055	(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	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	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	0.0000	(235d)
Annual totals kWh/year														
Space heating fuel - main system 1													2476.6074	(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													2753.4578	(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)													175.4944	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-611.0063	(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													4880.5533	(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	2476.6074	0.2100	520.0876	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2753.4578	0.2100	578.2261	(264)
Space and water heating			1098.3137	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	175.4944	0.1443	25.3293	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-362.7025	0.1331	-48.2906	
PV Unit electricity exported	-248.3038	0.1251	-31.0609	
Total			-79.3515	(269)
Total CO2, kg/year			1056.2207	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.2400	(273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2476.6074	1.1300	2798.5664	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2753.4578	1.1300	3111.4073	(278)
Space and water heating			5909.9737	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	175.4944	1.5338	269.1791	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-362.7025	1.4920	-541.1464	
PV Unit electricity exported	-248.3038	0.4591	-114.0051	
Total			-655.1515	(283)
Total Primary energy kWh/year			5654.1021	(286)
Target Primary Energy Rate (TPER)			76.2300	(287)

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Plot Reference	A 614				Issued on Date	15/05/2026	
Assessment Reference	Be Green 260515			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	5.39	TER	14.24		
Environmental	96 A	% DER < TER				62.15	
CO ₂ Emissions (t/year)	0.36	DFEE	38.14	TFEE	38.13		
Compliance Check	See BREL	% DFEE < TFEE				-0.01	
% DPER < TPER	25.55	DPER	56.75	TPER	76.23		
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	74.1700 (1b)	2.8000 (2b)	207.6760 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.1700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	207.6760 (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) = 0.1445 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2945 (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) = 0.2503 (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 infiltr rate	0.3191	0.3129	0.3066	0.2753	0.2691	0.2378	0.2378	0.2315	0.2503	0.2691	0.2816	0.2941 (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	0.5509	0.5489	0.5470	0.5379	0.5362	0.5283	0.5283	0.5268	0.5313	0.5362	0.5396	0.5432 (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)
Windows			15.4800	1.1450	17.7252		(27)
External Wall 1	49.9400	15.4800	34.4600	0.1500	5.1690	70.0000	2412.2000 (29a)
Corridor wall	42.0400	2.4200	39.6200	0.1900	7.5278	70.0000	2773.4001 (29a)
External Roof 1	74.1700		74.1700	0.1000	7.4170	9.0000	667.5300 (30)
Total net area of external elements A _{um} (A, m ²)			166.1500				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 40.2590		(33)
Main dwelling							
Party Wall 1			7.9000	0.0000	0.0000	70.0000	553.0000 (32)
Party Floor 1			74.1700			40.0000	2966.8000 (32a)
Internal Wall 1			168.6700			9.0000	1518.0300 (32c)
Heat capacity C _m = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 10890.9601 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							146.8378 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					9.8400	0.0500	0.4920
E4 Jamb					21.6000	0.0400	0.8640

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
	37.7561	37.6206	37.4878	36.8639	36.7472	36.2038	36.2038	36.1032	36.4131	36.7472	36.9833	37.2302 (38)
Heat transfer coeff	83.4793	83.3438	83.2110	82.5871	82.4704	81.9270	81.9270	81.8264	82.1363	82.4704	82.7065	82.9534 (39)
Average = Sum(39)m / 12 =												82.5866
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.1255	1.1237	1.1219	1.1135	1.1119	1.1046	1.1046	1.1032	1.1074	1.1119	1.1151	1.1184 (40)
HLP (average)												1.1135
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy												2.3430 (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												
	26.8203	26.4154	25.8395	24.9769	24.1995	23.1294	22.3176	23.3103	23.8314	24.8917	25.9941	26.7990 (42b)
Hot water usage for other uses												
	38.6243	37.2198	35.8153	34.4107	33.0062	31.6017	31.6017	33.0062	34.4107	35.8153	37.2198	38.6243 (42c)
Average daily hot water use (litres/day)												59.9818 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
	65.4446	63.6352	61.6547	59.3876	57.2058	54.7311	53.9193	56.3166	58.2421	60.7069	63.2139	65.4233 (44)
Energy content (annual)												
	96.3458	84.2023	88.1033	77.5751	73.7154	63.2947	59.5824	66.2856	67.5579	78.2270	85.4356	96.0789 (45)
Distribution loss (46)m = 0.15 x (45)m												936.4042
	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												
	81.8939	71.5719	74.8878	65.9388	62.6581	53.8005	50.6450	56.3428	57.4242	66.4930	72.6203	81.6671 (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												
	81.8939	71.5719	74.8878	65.9388	62.6581	53.8005	50.6450	56.3428	57.4242	66.4930	72.6203	81.6671 (64)
12Total per year (kWh/year)												795.9436 (64a)
Electric shower(s)												796 (64)
	50.8557	45.3129	49.4799	47.2181	48.1041	45.8866	47.4162	48.1041	47.2181	49.4799	48.5495	50.8557 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												578.4809 (64a)
Heat gains from water heating, kWh/month												
	33.1874	29.2212	31.0919	28.2892	27.6906	24.9218	24.5153	26.1117	26.1606	28.9932	30.2925	33.1307 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	104.6537	115.8666	104.6537	108.1422	104.6537	108.1422	104.6537	104.6537	108.1422	104.6537	108.1422	104.6537 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.8277	208.9739	203.5655	192.0516	177.5174	163.8573	154.7315	152.5853	157.9937	169.5076	184.0418	197.7019 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186 (71)
Water heating gains (Table 5)	44.6067	43.4839	41.7902	39.2906	37.2185	34.6136	32.9507	35.0964	36.3341	38.9694	42.0728	44.5305 (72)
Total internal gains	414.2326	426.4689	408.1539	397.6289	377.5341	364.7576	350.4804	350.4799	360.6145	371.2752	392.4013	405.0306 (73)

[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			

Southeast											4.7600		36.7938		0.3500		0.7000		0.7700		29.7359 (77)	
Southwest											10.7200		36.7938		0.3500		0.7000		0.7700		66.9683 (79)	

Solar gains	96.7042	164.7230	225.3812	279.2583	312.7925	310.5306	299.3846	274.3665	244.0402	182.0540	115.8293	82.7586	(83)									
Total gains	510.9368	591.1920	633.5351	676.8871	690.3266	675.2881	649.8650	624.8464	604.6547	553.3292	508.2306	487.7893	(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
tau	36.2397	36.2986	36.3566	36.6312	36.6831	36.9264	36.9264	36.9718	36.8323	36.6831	36.5783
alpha	3.4160	3.4199	3.4238	3.4421	3.4455	3.4618	3.4618	3.4648	3.4555	3.4455	3.4386
util living area	0.9792	0.9652	0.9445	0.8974	0.8140	0.6696	0.5201	0.5562	0.7498	0.9086	0.9654
MIT	19.0700	19.3338	19.6854	20.1511	20.5556	20.8433	20.9512	20.9373	20.7540	20.2307	19.5730
Th 2	19.9801	19.9815	19.9830	19.9898	19.9911	19.9971	19.9971	19.9982	19.9948	19.9911	19.9885
util rest of house	0.9751	0.9584	0.9331	0.8753	0.7713	0.5933	0.4150	0.4522	0.6829	0.8844	0.9574
MIT 2	18.2294	18.4901	18.8358	19.2892	19.6632	19.9069	19.9783	19.9724	19.8402	19.3732	18.7339
Living area fraction	fLA = Living area / (4) =										
MIT	18.6340	18.8962	19.2447	19.7041	20.0927	20.3576	20.4466	20.4368	20.2800	19.7859	19.1378
Temperature adjustment	0.0000										
adjusted MIT	18.6340	18.8962	19.2447	19.7041	20.0927	20.3576	20.4466	20.4368	20.2800	19.7859	19.1378
											18.5878 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9679	0.9492	0.9231	0.8681	0.7761	0.6223	0.4637	0.4996	0.7035	0.8786	0.9489	0.9720
Useful gains	494.5572	561.1704	584.8355	587.5779	535.7469	420.2575	301.3404	312.1602	425.3874	486.1782	482.2755	474.1444
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	1196.5926	1166.4946	1060.5007	892.2754	692.1517	471.7058	315.1380	330.3186	507.6062	757.5685	995.6036	1193.5156
Space heating kWh	522.3144	406.7778	353.8949	219.3822	116.3652	0.0000	0.0000	0.0000	0.0000	201.9144	369.5962	535.2122
Space heating requirement - total per year (kWh/year)												2725.4572
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	522.3144	406.7778	353.8949	219.3822	116.3652	0.0000	0.0000	0.0000	0.0000	201.9144	369.5962	535.2122
Space heating requirement after solar contribution - total per year (kWh/year)												2725.4572
Space heating per m2	(98c) / (4) =											36.7461
												(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	770.1142	606.2601	621.8808	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7653	0.8383	0.8169	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	589.3373	508.2084	507.9951	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	749.5515	721.9777	694.6448	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	115.3542	159.0443	138.8674	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	28.8385	39.7611	34.7169	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												103.3165 (107)
Energy for space heating												36.7461 (99)
Energy for space cooling												1.3930 (108)
Total												38.1391 (109)
Fabric Energy Efficiency (DFEE)												38.1 (109)

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

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	74.1700 (1b)	x 2.8000 (2b)	= 207.6760 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.1700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 207.6760 (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)

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Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 30.0000 / (5) = 0.1445 (8)
 Pressure test Yes
 Pressure Test Method Blower Door
 Measured/design AP50 5.0000 (17)
 Infiltration rate 0.3945 (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) = 0.3353 (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	0.4275	0.4191	0.4107	0.3688	0.3604	0.3185	0.3185	0.3101	0.3353	0.3604	0.3772	0.3940	(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	0.5914	0.5878	0.5843	0.5680	0.5650	0.5507	0.5507	0.5481	0.5562	0.5650	0.5711	0.5776	(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			15.4800	1.1450	17.7252			(27)
External Wall 1	49.9400	15.4800	34.4600	0.1800	6.2028			(29a)
Corridor wall	42.0400	2.4200	39.6200	0.1800	7.1316			(29a)
External Roof 1	74.1700		74.1700	0.1100	8.1587			(30)
Total net area of external elements Aum(A, m2)			166.1500					(31)
Fabric heat loss, W/K = Sum (A x U)					41.6383			(33)
Main dwelling								
Party Wall 1			7.9000	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							146.8378	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	9.8400	0.0500	0.4920	
E4 Jamb	21.6000	0.0500	1.0800	
E7 Party floor between dwellings (in blocks of flats)	14.4800	0.0700	1.0136	
E7 Party floor between dwellings (in blocks of flats)	15.0200	0.0700	1.0514	
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672	
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	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	2.8200	0.0000	0.0000	
E3 Sill	6.3400	0.0500	0.3170	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E14 Flat roof	32.8500	0.0800	2.6280	
P4 Party wall - Roof (insulation at ceiling level)	2.8200	0.1200	0.3384	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				7.8276 (36)
Point Thermal bridges				0.0000 (36a)
Total fabric heat loss				49.4659 (37)

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

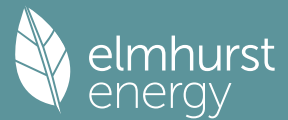
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	40.5287	40.2855	40.0472	38.9277	38.7182	37.7431	37.7431	37.5625	38.1187	38.7182	39.1419	39.5849	(38)
Heat transfer coeff	89.9946	89.7514	89.5131	88.3935	88.1841	87.2090	87.2090	87.0284	87.5846	88.1841	88.6078	89.0508	(39)
Average = Sum(39)m / 12 =												88.3925	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2134	1.2101	1.2069	1.1918	1.1889	1.1758	1.1758	1.1734	1.1809	1.1889	1.1947	1.2006	(40)
HLP (average)												1.1918	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3430 (42)
Hot water usage for mixer showers													0.0000 (42a)
Hot water usage for baths	27.4318	27.0244	26.4507	25.3929	24.6008	23.7225	23.2481	23.8178	24.4381	25.3779	26.4575	27.3391	(42b)
Hot water usage for other uses	38.6243	37.2198	35.8153	34.4107	33.0062	31.6017	31.6017	33.0062	34.4107	35.8153	37.2198	38.6243	(42c)
Average daily hot water use (litres/day)													60.5466 (43)
Daily hot water use	66.0561	64.2442	62.2660	59.8036	57.6070	55.3242	54.8498	56.8240	58.8489	61.1932	63.6773	65.9634	(44)
Energy conte	104.6167	91.4829	95.7005	81.8682	77.5502	68.0276	66.3361	70.3600	72.5665	83.0386	90.7200	103.2827	(45)
Energy content (annual)													Total = Sum(45)m = 1005.5500
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	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	88.9242	77.7604	81.3454	69.5880	65.9176	57.8235	56.3857	59.8060	61.6815	70.5828	77.1120	87.7903	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	88.9242	77.7604	81.3454	69.5880	65.9176	57.8235	56.3857	59.8060	61.6815	70.5828	77.1120	87.7903	(64)
Total per year (kWh/year) = Sum(64)m =												854.7175	(64)
12Total per year (kWh/year)												855	(64)

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Electric shower(s)	50.8557	45.3129	49.4799	47.2181	48.1041	45.8866	47.4162	48.1041	47.2181	49.4799	48.5495	50.8557 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												578.4809 (64a)
Heat gains from water heating, kWh/month	34.9450	30.7683	32.7063	29.2015	28.5054	25.9275	25.9505	26.9775	27.2249	30.0157	31.4154	34.6615 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483	117.1483 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	104.6537	115.8666	104.6537	108.1422	104.6537	108.1422	104.6537	104.6537	108.1422	104.6537	108.1422	104.6537 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.8277	208.9739	203.5655	192.0516	177.5174	163.8573	154.7315	152.5853	157.9937	169.5076	184.0418	197.7019 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148	34.7148 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186	-93.7186 (71)
Water heating gains (Table 5)	46.9691	45.7862	43.9601	40.5577	38.3138	36.0105	34.8797	36.2601	37.8124	40.3436	43.6325	46.5880 (72)
Total internal gains	416.5950	428.7712	410.3238	398.8959	378.6294	366.1544	352.4094	351.6436	362.0927	372.6494	393.9609	407.0882 (73)

6. Solar gains

[Jan]													
					Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d	Gains W
Southeast					4.7600	36.7938		0.6300	0.7000			0.7700	53.5246 (77)
Southwest					10.7200	36.7938		0.6300	0.7000			0.7700	120.5429 (79)
Solar gains	174.0675	296.5014	405.6862	502.6649	563.0265	558.9550	538.8923	493.8598	439.2723	327.6972	208.4928		148.9655 (83)
Total gains	590.6625	725.2727	816.0100	901.5608	941.6559	925.1094	891.3017	845.5034	801.3651	700.3467	602.4537		556.0537 (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	33.6161	33.7072	33.7969	34.2250	34.3063	34.6898	34.6898	34.7618	34.5411	34.3063	34.1422	33.9724
alpha	3.2411	3.2471	3.2531	3.2817	3.2871	3.3127	3.3127	3.3175	3.3027	3.2871	3.2761	3.2648
util living area	0.9700	0.9439	0.9047	0.8272	0.7113	0.5527	0.4151	0.4517	0.6503	0.8578	0.9485	0.9748 (86)
MIT	19.0388	19.3949	19.8177	20.3132	20.6809	20.9003	20.9707	20.9608	20.8230	20.3285	19.6007	18.9813 (87)
Th 2	19.9093	19.9119	19.9145	19.9266	19.9289	19.9394	19.9394	19.9414	19.9353	19.9289	19.9243	19.9195 (88)
util rest of house	0.9641	0.9334	0.8869	0.7954	0.6590	0.4762	0.3213	0.3563	0.5766	0.8243	0.9371	0.9698 (89)
MIT 2	18.1478	18.4970	18.9068	19.3802	19.7058	19.8860	19.9291	19.9265	19.8311	19.4080	18.7124	18.0985 (90)
Living area fraction	18.5767	18.9292	19.3452	19.8293	20.1751	20.3742	20.4304	20.4244	20.3085	19.8511	19.1400	18.5234 (91)
MIT	18.5767	18.9292	19.3452	19.8293	20.1751	20.3742	20.4304	20.4244	20.3085	19.8511	19.1400	18.5234 (92)
Temperature adjustment	18.5767	18.9292	19.3452	19.8293	20.1751	20.3742	20.4304	20.4244	20.3085	19.8511	19.1400	18.5234 (93)
adjusted MIT	18.5767	18.9292	19.3452	19.8293	20.1751	20.3742	20.4304	20.4244	20.3085	19.8511	19.1400	18.5234 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	563.9649	668.5456	714.8448	714.2213	632.6136	470.5673	325.8385	338.9591	483.9282	575.3383	558.2859	534.5741 (94)
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 (95)
Heat loss rate W	1284.8222	1259.1390	1149.8138	966.0814	747.3730	503.5603	334.0472	350.2330	543.7716	815.7980	1066.8349	1275.5097 (97)
Space heating kWh	536.3178	396.8787	323.6170	181.3393	85.3810	0.0000	0.0000	0.0000	0.0000	178.9020	366.1553	551.2560 (98a)
Space heating requirement - total per year (kWh/year)												2619.8472
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	536.3178	396.8787	323.6170	181.3393	85.3810	0.0000	0.0000	0.0000	0.0000	178.9020	366.1553	551.2560 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2619.8472
Space heating per m ²										(98c) / (4) =		35.3222 (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	819.7647	645.3467	661.4161	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8503	0.9029	0.8850	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	697.0754	582.6925	585.3676	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1041.3145	1003.8507	952.3591	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	247.8522	313.3417	273.0417	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	61.9630	78.3354	68.2604	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												208.5589 (107)

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Energy for space heating
Energy for space cooling
Total
Fabric Energy Efficiency (TFEE)

35.3222 (99)
2.8119 (108)
38.1341 (109)
38.1 (109)