

Summary for Input Data



Plot Reference	B 1103	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	83 B	DER	5.09	TER	14.42
Environmental	96 A	% DER < TER			64.70
CO ₂ Emissions (t/year)	0.32	DFEE	34.35	TFEE	35.60
Compliance Check	See BREL	% DFEE < TFEE			3.52
% DPER < TPER	31.31	DPER	53.75	TPER	78.25

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

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

Orientation	Northwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Top-floor flat	
Which Floor	11	
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	148.13	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:	22.31 m	70.76 m ²	2.80 m

8.0 Living Area	24.48	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	48.02	34.57	0.00	None	13.45	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	14.45	12.03	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	33.57	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	155.80

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	70.76	70.76	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	70.76

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	North West	2.42	
NE windows	Windows	External Wall 1	North East	7.33	
SE windows	Windows	External Wall 1	South East	6.12	

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	8.49	0.05	0.05	No
E3 Sill	Independently assessed	4.99	0.04	0.04	No
E4 Jamb	Independently assessed	21.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	13.75	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	5.16	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.40	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	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	5.60	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	11.99	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	11.99	0.05	0.05	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	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	8

24.0 Main Heating 1

25.0 Main Heating 2

26.0 Heat Networks

Space Community Heating

Distribution Loss

Distribution Loss Value

SAP Code

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

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

28.1 Showers

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

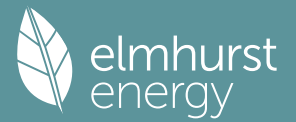
Loss kWh/day

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**

0.34

North 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				64.70	
CO ₂ Emissions (t/year)	0.32	DFEE	34.35	TFEE	35.60		
Compliance Check	See BREL	% DFEE < TFEE				3.52	
% DPER < TPER	31.31	DPER	53.75	TPER	78.25		
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	70.7600 (1b)	2.8000 (2b)	198.1280 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.7600		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	198.1280 (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			13.4500	1.1450	15.4008		(27)
Door			2.4200	1.0000	2.4200		(26)
External Wall 1	48.0200	13.4500	34.5700	0.1500	5.1855	70.0000	2419.9000 (29a)
Corridor wall	14.4500	2.4200	12.0300	0.1900	2.2857	70.0000	842.1000 (29a)
External Roof 1	70.7600		70.7600	0.1000	7.0760	9.0000	636.8400 (30)
Total net area of external elements Aum(A, m ²)			133.2300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.3680		(33)
Main dwelling							
Party Wall 1			33.5700	0.0000	0.0000	70.0000	2349.9000 (32)
Party Floor 1			70.7600			40.0000	2830.4000 (32d)
Internal Wall 1			155.8000			9.0000	1402.2000 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		10481.3400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							148.1252 (35)
List of Thermal Bridges							

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	8.4900	0.0500	0.4245
E3 Sill	4.9900	0.0400	0.1996
E4 Jamb	21.6000	0.0400	0.8640
E7 Party floor between dwellings (in blocks of flats)	13.7500	0.0500	0.6875
E7 Party floor between dwellings (in blocks of flats)	5.1600	0.0390	0.2012
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0500	0.1700
E16 Corner (normal)	2.8000	0.0500	0.1400
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	5.6000	0.0500	0.2800
E18 Party wall between dwellings	2.8000	0.0390	0.1092
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	11.9900	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	11.9900	0.0500	0.5995
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			3.8939 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	36.2619 (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	17.1342	16.9258	16.7174	15.6754	15.4670	14.4250	14.4250	14.2166	14.8418	15.4670	15.8838	16.3006	(38)
Heat transfer coeff	53.3961	53.1877	52.9793	51.9373	51.7289	50.6869	50.6869	50.4785	51.1037	51.7289	52.1457	52.5625	(39)
Average = Sum(39)m / 12 =												51.8852	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.7546	0.7517	0.7487	0.7340	0.7310	0.7163	0.7163	0.7134	0.7222	0.7310	0.7369	0.7428	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2644 (42)
Hot water usage for mixer showers	60.6156	59.6876	58.3200	56.2160	54.3310	51.6938	49.6080	52.0464	53.2729	55.8849	58.6051	60.5610	(42a)
Hot water usage for baths	26.2667	25.8702	25.3061	24.4613	23.7000	22.6520	21.8569	22.8292	23.3394	24.3779	25.4575	26.2458	(42b)
Hot water usage for other uses	37.8201	36.4448	35.0695	33.6942	32.3190	30.9437	30.9437	32.3190	33.6942	35.0695	36.4448	37.8201	(42c)
Average daily hot water use (litres/day)													114.6202 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	124.7024	122.0025	118.6955	114.3716	110.3500	105.2895	102.4086	107.1946	110.3066	115.3323	120.5074	124.6269	(44)
Energy content (annual)	183.5834	161.4340	169.6135	149.3979	142.1971	121.7638	113.1645	126.1700	127.9501	148.6173	162.8697	183.0237	(45)
Distribution loss (46)m = 0.15 x (45)m	27.5375	24.2151	25.4420	22.4097	21.3296	18.2646	16.9747	18.9255	19.1925	22.2926	24.4305	27.4536	(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	238.8602	211.3615	224.8903	202.8916	197.4739	175.2575	168.4413	181.4468	181.4438	203.8941	216.3634	238.3005	(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	238.8602	211.3615	224.8903	202.8916	197.4739	175.2575	168.4413	181.4468	181.4438	203.8941	216.3634	238.3005	(64)
12Total per year (kWh/year)													2440.6248 (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	105.2629	93.6188	100.6179	92.4697	91.5020	83.2814	81.8486	86.1730	85.3383	93.6367	96.9491	105.0768	(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	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.7296	112.6292	101.7296	105.1206	101.7296	105.1206	101.7296	101.7296	105.1206	101.7296	105.1206	101.7296	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.0643	201.1300	195.9246	184.8429	170.8542	157.7069	148.9236	146.8579	152.0634	163.1451	177.1337	190.2811	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	(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)	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	(71)
Water heating gains (Table 5)	141.4824	139.3136	135.2392	128.4302	122.9865	115.6686	110.0116	115.8239	118.5255	125.8558	134.6516	141.2323	(72)
Total internal gains	499.2429	510.0394	489.8599	475.3602	452.5369	435.4626	417.6313	421.3780	432.6760	447.6970	473.8724	490.2095	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
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												W/m2	or Table 6b		or Table 6c		Table 6d			
Northeast				7.3300		11.2829				0.3500		0.7000		0.7700		14.0419 (75)				
Southeast				6.1200		36.7938				0.3500		0.7000		0.7700		38.2319 (77)				
Solar gains	52.2738	93.7057	140.6011	194.9771	237.3444	243.9653	231.7390	198.8565	159.2308	106.9051	63.4613	44.1858 (83)								
Total gains	551.5167	603.7451	630.4610	670.3373	689.8813	679.4279	649.3703	620.2344	591.9067	554.6021	537.3337	534.3953 (84)								
7. Mean internal temperature (heating season)																				
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)								
Utilisation factor for gains for living area, nil,m (see Table 9a)																				
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec								
tau	54.5261	54.7398	54.9551	56.0577	56.2835	57.4406	57.4406	57.6777	56.9721	56.2835	55.8336	55.3909								
alpha	4.6351	4.6493	4.6637	4.7372	4.7522	4.8294	4.8294	4.8452	4.7981	4.7522	4.7222	4.6927								
util living area	0.9559	0.9325	0.8941	0.7980	0.6538	0.4703	0.3421	0.3724	0.5746	0.8134	0.9232	0.9603 (86)								
MIT	20.0885	20.2659	20.4876	20.7648	20.9244	20.9878	20.9979	20.9968	20.9684	20.7812	20.4249	20.0719 (87)								
Th 2	20.2928	20.2954	20.2980	20.3109	20.3135	20.3264	20.3264	20.3290	20.3213	20.3135	20.3083	20.3032 (88)								
util rest of house	0.9490	0.9224	0.8784	0.7713	0.6147	0.4232	0.2903	0.3189	0.5242	0.7830	0.9102	0.9541 (89)								
MIT 2	19.2321	19.4542	19.7284	20.0667	20.2440	20.3175	20.3253	20.3273	20.2964	20.0931	19.6643	19.2193 (90)								
Living area fraction	fLA = Living area / (4) =																			
MIT	19.5284	19.7350	19.9911	20.3082	20.4794	20.5494	20.5580	20.5589	20.5289	20.3311	19.9274	19.5143 (92)								
Temperature adjustment	0.0000																			
adjusted MIT	19.5284	19.7350	19.9911	20.3082	20.4794	20.5494	20.5580	20.5589	20.5289	20.3311	19.9274	19.5143 (93)								
8. Space heating requirement																				
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec								
Utilisation	0.9401	0.9132	0.8709	0.7712	0.6244	0.4389	0.3082	0.3373	0.5399	0.7839	0.9021	0.9456 (94)								
Useful gains	518.4614	551.3484	549.0526	516.9518	430.7578	298.2081	200.1411	209.2050	319.5721	434.7338	484.7427	505.2994 (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	813.1376	789.0422	714.7492	592.5120	454.1480	301.5555	200.6183	209.9359	328.5408	503.3815	668.8957	804.9569 (97)								
Space heating kWh	219.2392	159.7303	123.2783	54.4034	17.4023	0.0000	0.0000	0.0000	0.0000	51.0738	132.5902	222.9452 (98a)								
Space heating requirement - total per year (kWh/year)													980.6626							
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)								
Solar heating contribution - total per year (kWh/year)													0.0000							
Space heating kWh	219.2392	159.7303	123.2783	54.4034	17.4023	0.0000	0.0000	0.0000	0.0000	51.0738	132.5902	222.9452 (98c)								
Space heating requirement after solar contribution - total per year (kWh/year)													980.6626							
Space heating per m2													(98c) / (4) =	13.8590 (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																				
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												222.9452 (98)								
307a												328.8587 239.5954 184.9174 81.6051 26.1034 0.0000 0.0000 0.0000 0.0000 76.6108 198.8853 334.4178								
Space heating requirement																				
328.8587 239.5954 184.9174 81.6051 26.1034 0.0000 0.0000 0.0000 0.0000 76.6108 198.8853 334.4178 (307)												0.0000 (308)								
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)																				
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																				
238.8602 211.3615 224.8903 202.8916 197.4739 175.2575 168.4413 181.4468 181.4438 203.8941 216.3634 238.3005 (64)																				
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50																				
310a 358.2903 317.0422 337.3355 304.3374 296.2109 262.8862 252.6619 272.1702 272.1657 305.8411 324.5451 357.4507																				
Water heating fuel																				
358.2903 317.0422 337.3355 304.3374 296.2109 262.8862 252.6619 272.1702 272.1657 305.8411 324.5451 357.4507 (310)																				
Cooling System Energy Efficiency Ratio												4.0000 (314)								
Space coolin												0.0000 (315)								
Pumps and Fa												15.6536 14.1387 15.6536 15.1486 15.6536 15.1486 15.6536 15.6536 15.6536 15.1486 15.6536 (331)								
Lighting												21.6270 17.3500 15.6218 11.4452 8.8406 7.2228 8.0647 10.4828 13.6161 17.8650 20.1785 22.2281 (332)								
Electricity generated by PVs (Appendix M) (negative quantity)																				
(333a)m -3.7285 -6.6205 -12.2174 -17.1999 -21.5069 -21.2134 -20.7690 -17.8698 -13.4310 -8.6334 -4.4775 -3.0437 (333a)																				
Electricity generated by wind turbines (Appendix M) (negative quantity)																				
(334a)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 (334a)																				
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)																				
(335a)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 (335a)																				
Electricity generated by PVs (Appendix M) (negative quantity)																				
(333b)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 (333b)																				
Electricity generated by wind turbines (Appendix M) (negative quantity)																				
(334b)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 (334b)																				
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)																				
(335b)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 (335b)																				
Annual totals kWh/year																				
Space heating fuel - community heating												1470.9939 (307)								
Space heating fuel - secondary												0.0000 (309)								
Water heating fuel - community heating												3660.9372 (310)								
Efficiency of water heater												0.0000 (311)								
Electricity used for heat distribution												14.7099 (313)								
Space cooling fuel												0.0000 (321)								
Electricity for pumps and fans:																				
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)																				
mechanical ventilation fans (SFP = 0.7625)																				
184.3086 (330a)																				

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Total electricity for the above, kWh/year	184.3086 (331)
Electricity for lighting (calculated in Appendix L)	174.5427 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-150.7110 (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	5340.0713 (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	2212.0393	0.1566	99.2705 (367)
Electrical energy for heat distribution (space & water)	14.7099	0.0000	7.4581 (372)
Overall CO2 factor for heat network			0.0641 (386)
Total CO2 associated with community systems			328.9290 (373)
Space and water heating			328.9290 (376)
Pumps, fans and electric keep-hot	184.3086	0.1387	25.5659 (378)
Energy for lighting	174.5427	0.1443	25.1919 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-150.7110	0.1305	-19.6721
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-19.6721 (380)
Total CO2, kg/year			360.0146 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.0900 (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	2212.0393	1.5796	1001.5609 (467)
Electrical energy for heat distribution (space & water)	14.7099	0.0000	78.9069 (472)
Overall CO2 factor for heat network			0.6781 (486)
Total CO2 associated with community systems			3480.0657 (473)
Space and water heating			3480.0657 (476)
Pumps, fans and electric keep-hot	184.3086	1.5128	278.8220 (478)
Energy for lighting	174.5427	1.5338	267.7194 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-150.7110	1.4822	-223.3800
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-223.3800 (480)
Total Primary energy kWh/year			3803.2271 (483)
Dwelling Primary energy Rate (DPER)			53.7500 (484)

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

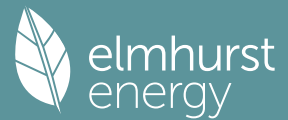
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	70.7600 (1b)	x 2.8000 (2b)	= 198.1280 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.7600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	198.1280 (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) = 0.1514 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4014 (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) = 0.3412 (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	0.4350	0.4265	0.4180	0.3753	0.3668	0.3241	0.3241	0.3156	0.3412	0.3668	0.3839	0.4009	(22b)
	0.5946	0.5910	0.5874	0.5704	0.5673	0.5525	0.5525	0.5498	0.5582	0.5673	0.5737	0.5804	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.4200	1.0000	2.4200			(26)
TER Opening Type			13.4500	1.1450	15.4008			(27)
External Wall 1	48.0200	13.4500	34.5700	0.1800	6.2226			(29a)
Corridor wall	14.4500	2.4200	12.0300	0.1800	2.1654			(29a)
External Roof 1	70.7600		70.7600	0.1100	7.7836			(30)
Total net area of external elements Aum(A, m2)			133.2300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.9924			(33)
Main dwelling								
Party Wall 1			33.5700	0.0000	0.0000			(32)

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

148.1252 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	8.4900	0.0500	0.4245	
E3 Sill	4.9900	0.0500	0.2495	
E4 Jamb	21.6000	0.0500	1.0800	
E7 Party floor between dwellings (in blocks of flats)	13.7500	0.0700	0.9625	
E7 Party floor between dwellings (in blocks of flats)	5.1600	0.0700	0.3612	
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680	
E16 Corner (normal)	2.8000	0.0900	0.2520	
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	5.6000	0.0600	0.3360	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	11.9900	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	11.9900	0.1200	1.4388	

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

5.5085 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 39.5009 (37)

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

(38)m	Jan 38.8781	Feb 38.6379	Mar 38.4024	Apr 37.2963	May 37.0893	Jun 36.1260	Jul 36.1260	Aug 35.9476	Sep 36.4970	Oct 37.0893	Nov 37.5080	Dec 37.9457	(38)
Heat transfer coeff	78.3790	78.1387	77.9032	76.7971	76.5902	75.6268	75.6268	75.4484	75.9979	76.5902	77.0089	77.4465	(39)
Average = Sum(39)m / 12 =												76.7962	

HLP	Jan 1.1077	Feb 1.1043	Mar 1.1010	Apr 1.0853	May 1.0824	Jun 1.0688	Jul 1.0688	Aug 1.0663	Sep 1.0740	Oct 1.0824	Nov 1.0883	Dec 1.0945	(40)
HLP (average)												1.0853	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2644	(42)
Hot water usage for mixer showers													
62.1868	61.2522	59.8904	57.2848	55.3619	53.2176	51.9987	53.3502	54.8318	57.1341	59.7957	61.9485	(42a)	
Hot water usage for baths													
26.8656	26.4666	25.9047	24.8687	24.0930	23.2329	22.7682	23.3262	23.9337	24.8541	25.9114	26.7747	(42b)	
Hot water usage for other uses													
37.8201	36.4448	35.0695	33.6942	32.3190	30.9437	30.9437	32.3190	33.6942	35.0695	36.4448	37.8201	(42c)	
Average daily hot water use (litres/day)												116.6246	(43)

Daily hot water use	Jan 126.8724	Feb 124.1636	Mar 120.8646	Apr 115.8478	May 111.7739	Jun 107.3941	Jul 105.7107	Aug 108.9954	Sep 112.4597	Oct 117.0577	Nov 122.1519	Dec 126.5433	(44)
Energy conte	200.9349	176.8073	185.7644	158.5898	150.4692	132.0536	127.8479	134.9591	138.6740	158.8462	174.0277	198.1362	(45)
Energy content (annual)										Total = Sum(45)m =		1937.1103	
Distribution loss (46)m = 0.15 x (45)m													
30.1402	26.5211	27.8647	23.7885	22.5704	19.8080	19.1772	20.2439	20.8011	23.8269	26.1042	29.7204	29.7204	(46)

Water storage loss (or HIU storage):

Store volume 180.0000 (47)

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

1.5520 (48)

Temperature factor from Table 2b

0.5400 (49)

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

0.8381 (55)

Total storage loss

25.9803 23.4661 25.9803 25.1422 25.9803 25.1422 25.9803 25.9803 25.1422 25.9803 25.1422 25.9803 25.9803 (56)

If cylinder contains dedicated solar storage

25.9803 23.4661 25.9803 25.1422 25.9803 25.1422 25.9803 25.9803 25.1422 25.9803 25.1422 25.9803 25.9803 (57)

Primary loss 23.2624 21.0112 23.2624 22.5120 23.2624 22.5120 23.2624 23.2624 22.5120 23.2624 22.5120 23.2624 23.2624 (59)

Combi loss 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (61)

Total heat required for water heating calculated for each month

250.1775 221.2845 235.0071 206.2440 199.7119 179.7078 177.0906 184.2017 186.3282 208.0889 221.6819 247.3789 (62)

WWHRS -28.4292 -25.1430 -26.3283 -21.8009 -20.3176 -17.3859 -16.2966 -17.3298 -17.9882 -21.2061 -24.0239 -27.9027 (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 -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 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 0.0000 (63d)

Output from w/h

221.7483 196.1415 208.6788 184.4431 179.3942 162.3219 160.7940 166.8720 168.3400 186.8828 197.6580 219.4762 (64)

12Total per year (kWh/year)

Total per year (kWh/year) = Sum(64)m = 2252.7509 (64)

Electric shower(s)

0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (64a)

Total Energy used by instantaneous electric shower (s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

106.2050 94.3702 101.1608 90.8545 89.4251 82.0312 81.9036 84.2680 84.2325 92.2105 95.9876 105.2744 (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	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.7296	112.6292	101.7296	105.1206	101.7296	105.1206	101.7296	101.7296	105.1206	101.7296	105.1206	101.7296	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.0643	201.1300	195.9246	184.8429	170.8542	157.7069	148.9236	146.8579	152.0634	163.1451	177.1337	190.2811	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	(71)
Water heating gains (Table 5)	142.7486	140.4319	135.9688	126.1868	120.1951	113.9322	110.0854	113.2635	116.9895	123.9388	133.3161	141.4979	(72)
Total internal gains	503.5091	514.1576	493.5895	476.1168	452.7454	433.7262	417.7052	418.8176	431.1400	448.7800	475.5369	493.4751	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d				Gains W
Northeast				7.3300	11.2829	0.6300	0.7000	0.7700				25.2754 (75)
Southeast				6.1200	36.7938	0.6300	0.7000	0.7700				68.8174 (77)
Solar gains	94.0928	168.6703	253.0820	350.9588	427.2200	439.1375	417.1302	357.9416	286.6154	192.4293	114.2304	79.5345 (83)
Total gains	597.6019	682.8279	746.6715	827.0756	879.9654	872.8636	834.8354	776.7592	717.7554	641.2093	589.7673	573.0096 (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	37.1462	37.2604	37.3731	37.9113	38.0138	38.4980	38.4980	38.5891	38.3100	38.0138	37.8071	37.5935	
alpha	3.4764	3.4840	3.4915	3.5274	3.5343	3.5665	3.5665	3.5726	3.5540	3.5343	3.5205	3.5062	
util living area	0.9633	0.9419	0.9054	0.8221	0.6909	0.5222	0.3894	0.4326	0.6458	0.8553	0.9409	0.9676	(86)
MIT	19.3424	19.6086	19.9728	20.4330	20.7626	20.9355	20.9825	20.9747	20.8611	20.4352	19.8285	19.3061	(87)
Th 2	19.9946	19.9973	20.0001	20.0128	20.0152	20.0264	20.0264	20.0285	20.0221	20.0152	20.0104	20.0053	(88)
util rest of house	0.9565	0.9314	0.8883	0.7912	0.6408	0.4527	0.3071	0.3469	0.5765	0.8228	0.9286	0.9616	(89)
MIT 2	18.0843	18.4187	18.8713	19.4319	19.8021	19.9818	20.0183	20.0158	19.9159	19.4499	18.7081	18.0459	(90)
Living area fraction									fLA = Living area / (4) =			0.3460	(91)
MIT	18.5196	18.8304	19.2523	19.7782	20.1344	20.3117	20.3519	20.3476	20.2429	19.7908	19.0957	18.4819	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5196	18.8304	19.2523	19.7782	20.1344	20.3117	20.3519	20.3476	20.2429	19.7908	19.0957	18.4819	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9434	0.9162	0.8732	0.7830	0.6473	0.4737	0.3351	0.3756	0.5930	0.8143	0.9142	0.9494	(94)
Ext temp.	563.7721	625.6326	651.9747	647.6130	569.5653	413.4629	279.7239	291.7823	425.6523	522.1399	539.1819	543.9884	(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	1114.5152	1088.5036	993.4491	835.4152	645.9942	431.9599	283.7433	297.8373	466.8467	703.9261	923.7763	1106.0809	(97)
Space heating requirement - total per year (kWh/year)	409.7529	311.0493	254.0569	135.2175	56.8631	0.0000	0.0000	0.0000	0.0000	135.2489	276.9079	418.1968	(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)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98c)
Space heating kWh	409.7529	311.0493	254.0569	135.2175	56.8631	0.0000	0.0000	0.0000	0.0000	135.2489	276.9079	418.1968	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1997.2935	
Space heating per m2										(98c) / (4) =		28.2263	(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)	409.7529	311.0493	254.0569	135.2175	56.8631	0.0000	0.0000	0.0000	0.0000	135.2489	276.9079	418.1968	(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)	443.9360	336.9982	275.2513	146.4979	61.6068	0.0000	0.0000	0.0000	0.0000	146.5319	300.0086	453.0843	(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	221.7483	196.1415	208.6788	184.4431	179.3942	162.3219	160.7940	166.8720	168.3400	186.8828	197.6580	219.4762	(64)
Efficiency of water heater	85.4172	85.0888	84.5021	83.3744	81.7953	79.8000	79.8000	79.8000	79.8000	83.3466	84.8159	85.4818	(216)
Fuel for water heating, kWh/month	259.6061	230.5138	246.9509	221.2227	219.3210	203.4109	201.4962	209.1127	210.9524	224.2236	233.0437	256.7519	(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	21.1374	16.9572	15.2681	11.1861	8.6404	7.0593	7.8821	10.2454	13.3078	17.4606	19.7217	21.7249	21.7249	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-7.8194	-12.1299	-19.1619	-23.7472	-27.6206	-26.5345	-26.2139	-23.7252	-19.7398	-14.7810	-8.9799	-6.6378	-6.6378	(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	-1.5994	-3.5083	-7.2534	-11.3242	-15.4101	-15.6471	-15.4630	-12.8885	-9.1855	-5.1519	-2.1768	-1.2544	-1.2544	(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													2163.9149	(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													2716.6059	(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)													170.5910	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-317.9537	(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													4819.1582	(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	2163.9149	0.2100	454.4221	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2716.6059	0.2100	570.4872	(264)
Space and water heating			1024.9094	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	170.5910	0.1443	24.6216	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-217.0911	0.1326	-28.7964	
PV Unit electricity exported	-100.8626	0.1248	-12.5861	
Total			-41.3825	(269)
Total CO2, kg/year			1020.0777	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.4200	(273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2163.9149	1.1300	2445.2239	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2716.6059	1.1300	3069.7647	(278)
Space and water heating			5514.9886	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	170.5910	1.5338	261.6581	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-217.0911	1.4901	-323.4933	
PV Unit electricity exported	-100.8626	0.4580	-46.1940	
Total			-369.6874	(283)
Total Primary energy kWh/year			5537.0601	(286)
Target Primary Energy Rate (TPER)			78.2500	(287)

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Plot Reference	B 1103	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2
SAP Rating	83 B	DER	5.09
Environmental	96 A	TER	14.42
CO ₂ Emissions (t/year)	0.32	% DER < TER	64.70
Compliance Check	See BREL	DFEE	34.35
% DPER < TPER	31.31	TFEE	35.60
		% DFEE < TFEE	3.52
		TPER	78.25
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.7600		
Dwelling volume			

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	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) = 0.1514 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.3014 (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) = 0.2562 (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	0.3267	0.3203	0.3139	0.2818	0.2754	0.2434	0.2434	0.2370	0.2562	0.2754	0.2882	0.3010 (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	0.5534	0.5513	0.5493	0.5397	0.5379	0.5296	0.5296	0.5281	0.5328	0.5379	0.5415	0.5453 (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			13.4500	1.1450	15.4008		(27)
Door			2.4200	1.0000	2.4200		(26)
External Wall 1	48.0200	13.4500	34.5700	0.1500	5.1855	70.0000	2419.9000 (29a)
Corridor wall	14.4500	2.4200	12.0300	0.1900	2.2857	70.0000	842.1000 (29a)
External Roof 1	70.7600		70.7600	0.1000	7.0760	9.0000	636.8400 (30)
Total net area of external elements A _{um} (A, m ²)			133.2300				(31)
Fabric heat loss, W/K = Sum (A x U)							(32)
Main dwelling							
Party Wall 1			33.5700	0.0000	0.0000	70.0000	2349.9000 (32)
Party Floor 1			70.7600			40.0000	2830.4000 (32a)
Internal Wall 1			155.8000			9.0000	1402.2000 (32c)
Heat capacity C _m = Sum (A x k)							(28)...(30) + (32) + (32a)...(32e) = 10481.3400 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							148.1252 (35)
List of Thermal Bridges							
K1 Element							
E1 Steel lintel with perforated steel base plate					Length	Psi-value	Total
E3 Sill					8.4900	0.0500	0.4245
					4.9900	0.0400	0.1996

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
	36.1795	36.0440	35.9113	35.2876	35.1709	34.6278	34.6278	34.5272	34.8370	35.1709	35.4070	35.6538 (38)
Heat transfer coeff	72.4414	72.3059	72.1732	71.5495	71.4328	70.8897	70.8897	70.7891	71.0989	71.4328	71.6689	71.9157 (39)
Average = Sum(39)m / 12 =												71.5490
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.0238	1.0218	1.0200	1.0112	1.0095	1.0018	1.0018	1.0004	1.0048	1.0095	1.0128	1.0163 (40)
HLP (average)												1.0111
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy											2.2644	(42)	
Hot water usage for mixer showers											0.0000	(42a)	
Hot water usage for baths											26.2667	(42b)	
Hot water usage for other uses											37.8201	(42c)	
Average daily hot water use (litres/day)											58.7373	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	64.0867	62.3150	60.3756	58.1556	56.0190	53.5957	52.8006	55.1481	57.0337	59.4474	61.9023	64.0659	(44)
Energy content (annual)	94.3467	82.4553	86.2755	75.9657	72.1861	61.9816	58.3462	64.9104	66.1562	76.6040	83.6630	94.0855	(45)
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):	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)
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	(57)
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	(59)
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	(61)
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	(62)
Total heat required for water heating calculated for each month	80.1947	70.0870	73.3342	64.5709	61.3582	52.6844	49.5943	55.1738	56.2328	65.1134	71.1136	79.9726	(63a)
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	(63b)
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	(63c)
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	(63d)
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	(64)
Output from w/h	80.1947	70.0870	73.3342	64.5709	61.3582	52.6844	49.5943	55.1738	56.2328	65.1134	71.1136	79.9726	(64a)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											779	(64)
Electric shower(s)	49.8012	44.3733	48.4540	46.2390	47.1067	44.9352	46.4330	47.1067	46.2390	48.4540	47.5428	49.8012	(64a)
Heat gains from water heating, kWh/month	32.4990	28.6151	30.4470	27.7025	27.1162	24.4049	24.0068	25.5701	25.6179	28.3918	29.6641	32.4435	(65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.7296	112.6292	101.7296	105.1206	101.7296	105.1206	101.7296	101.7296	105.1206	101.7296	105.1206	101.7296 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.0643	201.1300	195.9246	184.8429	170.8542	157.7069	148.9236	146.8579	152.0634	163.1451	177.1337	190.2811 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222 (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)	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773 (71)
Water heating gains (Table 5)	43.6814	42.5820	40.9234	38.4756	36.4465	33.8957	32.2672	34.3684	35.5805	38.1611	41.2001	43.6068 (72)
Total internal gains	401.4419	413.3077	395.5441	385.4056	365.9969	353.6897	339.8870	339.9225	349.7310	360.0022	380.4210	392.5840 (73)

[Jan											Area		Solar flux		g		FF		Access		Gains		
											m2		Table 6a		Table 6b		Table 6c		factor		W		
											W/m2		or Table 6b		or Table 6c		Table 6d						
Northeast											7.3300	11.2829		0.3500		0.7000		0.7700		14.0419		(75)	
Southeast											6.1200	36.7938		0.3500		0.7000		0.7700		38.2319		(77)	
Solar gains	52.2738	93.7057	140.6011	194.9771	237.3444	243.9653	231.7390	198.8565	159.2308	106.9051	63.4613	44.1858	88										
Total gains	453.7157	507.0134	536.1452	580.3828	603.3413	597.6549	571.6260	538.7790	508.9617	466.9074	443.8823	436.7699	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	40.1909	40.2662	40.3402	40.6919	40.7583	41.0706	41.0706	41.1290	40.9498	40.7583	40.6241
alpha	3.6794	3.6844	3.6893	3.7128	3.7172	3.7380	3.7380	3.7419	3.7300	3.7172	3.7083
util living area	0.9829	0.9730	0.9568	0.9120	0.8242	0.6696	0.5184	0.5644	0.7738	0.9256	0.9717
MIT	19.2330	19.4474	19.7644	20.2189	20.6120	20.8755	20.9637	20.9498	20.7751	20.2783	19.6893
Th 2	20.0636	20.0652	20.0667	20.0740	20.0754	20.0818	20.0818	20.0830	20.0793	20.0754	20.0726
util rest of house	0.9795	0.9678	0.9479	0.8929	0.7847	0.5979	0.4210	0.4668	0.7126	0.9056	0.9652
MIT 2	18.4500	18.6629	18.9761	19.4210	19.7854	20.0090	20.0674	20.0616	19.9341	19.4854	18.9095
Living area fraction	fLA = Living area / (4) =										
MIT	18.7209	18.9343	19.2488	19.6971	20.0714	20.3088	20.3775	20.3689	20.2251	19.7597	19.1792
Temperature adjustment	0.0000										
adjusted MIT	18.7209	18.9343	19.2488	19.6971	20.0714	20.3088	20.3775	20.3689	20.2251	19.7597	19.1792
											18.6877 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9732	0.9596	0.9382	0.8838	0.7845	0.6167	0.4534	0.4986	0.7233	0.8974	0.9572	0.9763
Useful gains	441.5381	486.5398	503.0087	512.9347	473.3143	368.5760	259.1856	268.6308	368.1140	419.0109	424.8992	426.4180
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	1044.6692	1014.7624	920.1217	772.5246	597.9928	404.6939	267.7836	280.9531	435.4853	654.3055	865.7058	1041.8910
Space heating kWh	448.7295	354.9656	310.3321	186.9048	92.7608	0.0000	0.0000	0.0000	0.0000	175.0592	317.3808	457.9119
Space heating requirement - total per year (kWh/year)												2344.0446
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	448.7295	354.9656	310.3321	186.9048	92.7608	0.0000	0.0000	0.0000	0.0000	175.0592	317.3808	457.9119
Space heating requirement after solar contribution - total per year (kWh/year)												2344.0446
Space heating per m2												(98c) / (4) = 33.1267 (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
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	666.3629	524.5836	537.9971	0.0000	0.0000	0.0000
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7848	0.8551	0.8267	0.0000	0.0000	0.0000
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	522.9774	448.5696	444.7550	0.0000	0.0000	0.0000
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	659.4739	631.1625	594.6303	0.0000	0.0000	0.0000
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	98.2775	135.8492	111.5072	0.0000	0.0000	0.0000
Cooled fraction	fc = cooled area / (4) =										
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	24.5694	33.9623	27.8768	0.0000	0.0000	0.0000
Space cooling requirement											
Energy for space heating											
Energy for space cooling											
Total											
Fabric Energy Efficiency (DFEE)											

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	70.7600 (1b)	x 2.8000 (2b)	= 198.1280 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.7600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 198.1280 (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) =											Air changes per hour	
Pressure test												30.0000 / (5) =	0.1514 (8)
Pressure Test Method												Yes	
Measured/design AP50												Blower Door	
Infiltration rate												5.0000	(17)
Number of sides sheltered												0.4014	(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) =	0.3412 (21)
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
	0.4350	0.4265	0.4180	0.3753	0.3668	0.3241	0.3241	0.3156	0.3412	0.3668	0.3839	0.4009	(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	0.5946	0.5910	0.5874	0.5704	0.5673	0.5525	0.5525	0.5498	0.5582	0.5673	0.5737	0.5804	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K						
Main dwelling													
TER Opaque door			2.4200	1.0000	2.4200			(26)					
TER Opening Type			13.4500	1.1450	15.4008			(27)					
External Wall 1	48.0200	13.4500	34.5700	0.1800	6.2226			(29a)					
Corridor wall	14.4500	2.4200	12.0300	0.1800	2.1654			(29a)					
External Roof 1	70.7600		70.7600	0.1100	7.7836			(30)					
Total net area of external elements Aum(A, m2)			133.2300					(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)... (30) + (32) =	33.9924			(33)					
Main dwelling													
Party Wall 1			33.5700	0.0000	0.0000			(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								148.1252 (35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value	Total							
E1 Steel lintel with perforated steel base plate				8.4900	0.0500	0.4245							
E3 Sill				4.9900	0.0500	0.2495							
E4 Jamb				21.6000	0.0500	1.0800							
E7 Party floor between dwellings (in blocks of flats)				13.7500	0.0700	0.9625							
E7 Party floor between dwellings (in blocks of flats)				5.1600	0.0700	0.3612							
E9 Balcony between dwellings, wall insulation continuous				3.4000	0.0200	0.0680							
E16 Corner (normal)				2.8000	0.0900	0.2520							
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				5.6000	0.0600	0.3360							
E18 Party wall between dwellings				2.8000	0.0600	0.1680							
E25 Staggered party wall between dwellings				2.8000	0.0600	0.1680							
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				11.9900	0.0000	0.0000							
P4 Party wall - Roof (insulation at ceiling level)				11.9900	0.1200	1.4388							
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.5085	(36)					
Point Thermal bridges						(36a) =	0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	39.5009	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	38.8781	38.6379	38.4024	37.2963	37.0893	36.1260	36.1260	35.9476	36.4970	37.0893	37.5080	37.9457	(38)
Average = Sum(39)m / 12 =	78.3790	78.1387	77.9032	76.7971	76.5902	75.6268	75.6268	75.4484	75.9979	76.5902	77.0089	77.4465	(39)
												76.7962	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.1077	1.1043	1.1010	1.0853	1.0824	1.0688	1.0688	1.0663	1.0740	1.0824	1.0883	1.0945	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2644	(42)
Hot water usage for mixer showers												0.0000	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	26.8656	26.4666	25.9047	24.8687	24.0930	23.2329	22.7682	23.3262	23.9337	24.8541	25.9114	26.7747	(42c)
Average daily hot water use (litres/day)	37.8201	36.4448	35.0695	33.6942	32.3190	30.9437	30.9437	32.3190	33.6942	35.0695	36.4448	37.8201	(43)
												59.2905	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	64.6856	62.9114	60.9742	58.5630	56.4120	54.1765	53.7119	55.6451	57.6279	59.9236	62.3562	64.5948	(44)
Energy content (annual)	102.4462	89.5849	93.7151	80.1698	75.9414	66.6164	64.9599	68.9003	71.0610	81.3157	88.8378	101.1399	(45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m =	984.6884
Water storage loss (or HIU 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	(46)
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	87.0793	76.1472	79.6579	68.1443	64.5502	56.6239	55.2159	58.5653	60.4018	69.1184	75.5121	85.9689	(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	87.0793	76.1472	79.6579	68.1443	64.5502	56.6239	55.2159	58.5653	60.4018	69.1184	75.5121	85.9689	(64)
Total per year (kWh/year) = Sum(64)m =												836.9851	(64)
												837	(64)

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Electric shower(s)	49.8012	44.3733	48.4540	46.2390	47.1067	44.9352	46.4330	47.1067	46.2390	48.4540	47.5428	49.8012 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												566.4861 (64a)
Heat gains from water heating, kWh/month	34.2201	30.1301	32.0280	28.5958	27.9142	25.3898	25.4122	26.4180	26.6602	29.3931	30.7637	33.9425 (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	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.7296	112.6292	101.7296	105.1206	101.7296	105.1206	101.7296	101.7296	105.1206	101.7296	105.1206	101.7296	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.0643	201.1300	195.9246	184.8429	170.8542	157.7069	148.9236	146.8579	152.0634	163.1451	177.1337	190.2811	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	(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)	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	(71)
Water heating gains (Table 5)	45.9948	44.8365	43.0483	39.7164	37.5191	35.2636	34.1562	35.5080	37.0281	39.5068	42.7274	45.6217	(72)
Total internal gains	403.7552	415.5622	397.6690	386.6464	367.0694	355.0576	341.7760	341.0621	351.1785	361.3480	381.9482	394.5989	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d					Gains W	
Northeast					7.3300	11.2829	0.6300	0.7000	0.7700					25.2754 (75)	
Southeast					6.1200	36.7938	0.6300	0.7000	0.7700					68.8174 (77)	
Solar gains	94.0928	168.6703	253.0820	350.9588	427.2200	439.1375	417.1302	357.9416	286.6154	192.4293	114.2304			79.5345 (83)	
Total gains	497.8481	584.2325	650.7510	737.6052	794.2895	794.1950	758.9062	699.0038	637.7939	553.7773	496.1786	474.1334			(84)

7. Mean internal temperature (heating season)

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

Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	21.0000 (85)
tau	37.1462	37.2604	37.3731	37.9113	38.0138	38.4980	38.4980	38.5891	38.3100	38.0138	37.8071	37.5935	
alpha	3.4764	3.4840	3.4915	3.5274	3.5343	3.5665	3.5665	3.5726	3.5540	3.5343	3.5205	3.5062	
util living area	0.9782	0.9618	0.9325	0.8592	0.7352	0.5640	0.4252	0.4751	0.6986	0.8956	0.9630	0.9814	(86)
MIT	19.1419	19.4249	19.8161	20.3279	20.7079	20.9176	20.9769	20.9659	20.8202	20.3158	19.6533	19.1038	(87)
Th 2	19.9946	19.9973	20.0001	20.0128	20.0152	20.0264	20.0264	20.0285	20.0221	20.0152	20.0104	20.0053	(88)
util rest of house	0.9739	0.9544	0.9193	0.8321	0.6867	0.4918	0.3365	0.3832	0.6300	0.8692	0.9547	0.9777	(89)
MIT 2	18.3098	18.5897	18.9731	19.4678	19.8072	19.9812	20.0179	20.0149	19.9121	19.4695	18.8275	18.2799	(90)
Living area fraction	18.5977	18.8787	19.2648	19.7654	20.1188	20.3051	20.3497	20.3439	20.2262	19.7623	19.1132	18.5649	(91)
MIT	18.5977	18.8787	19.2648	19.7654	20.1188	20.3051	20.3497	20.3439	20.2262	19.7623	19.1132	18.5649	(92)
Temperature adjustment	18.5977	18.8787	19.2648	19.7654	20.1188	20.3051	20.3497	20.3439	20.2262	19.7623	19.1132	18.5649	(93)
adjusted MIT	18.5977	18.8787	19.2648	19.7654	20.1188	20.3051	20.3497	20.3439	20.2262	19.7623	19.1132	18.5649	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9660	0.9440	0.9076	0.8245	0.6922	0.5133	0.3666	0.4139	0.6454	0.8613	0.9450	0.9705	(94)
Useful gains	480.9187	551.5385	590.6310	608.1419	549.8194	407.6292	278.2110	289.3114	411.6369	476.9626	468.8806	460.1583	(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	1120.6382	1092.2747	994.4157	834.4287	644.7981	431.4611	283.5763	297.5617	465.5814	701.7410	925.1209	1112.5136	(97)
Space heating kWh	475.9513	363.3747	300.4158	162.9264	70.6642	0.0000	0.0000	0.0000	0.0000	167.2351	328.4931	485.3523	(98a)
Space heating requirement - total per year (kWh/year)												2354.4129	
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	475.9513	363.3747	300.4158	162.9264	70.6642	0.0000	0.0000	0.0000	0.0000	167.2351	328.4931	485.3523	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2354.4129	
Space heating per m ²										(98c) / (4) =		33.2732	(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	710.8922	559.6385	573.4080	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8589	0.9096	0.8837	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	610.5913	509.0454	506.7452	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	888.9652	849.7426	781.7136	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	200.4292	253.4787	204.5765	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	50.1073	63.3697	51.1441	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												164.6211	(107)

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

33.2732 (99)
2.3265 (108)
35.5997 (109)
35.6 (109)