

Summary for Input Data

Plot Reference	A 117	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	6.11	TER	18.14
Environmental	96 A	% DER < TER			66.32
CO ₂ Emissions (t/year)	0.28	DFEE	40.54	TFEE	47.02
Compliance Check	See BREL	% DFEE < TFEE			13.78
% DPER < TPER	33.89	DPER	64.59	TPER	97.70

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

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

Orientation	Southwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	253.56	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:	20.72 m	50.72 m ²	2.80 m

8.0 Living Area	25.44	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	17.92	9.58	0.00	None	8.34	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	40.10	37.68	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	22.19	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	99.82

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	50.72

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
Heatloss Floor 1	Exposed Floor - Solid	Lowest occupied	Other	0.10	None	0.00	110.00	50.72

Summary for Input Data

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door	Manufacturer	Door to Corridor				0.00			1.00
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.35		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South West	2.42	
Window	Window	External Wall 1	North East	8.34	

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	5.08	0.05	0.05	No
E4 Jamb	Independently assessed	12.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	3.04	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	14.32	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	2.80	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
E20 Exposed floor (normal)	Independently assessed	3.04	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	14.32	0.10	0.10	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	7.93	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	7.93	0.08	0.08	No
E3 Sill	Independently assessed	1.59	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.36	0.10	0.10	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	1
Manufacturer SFP	0.63
Duct Type	Rigid
MVHR Efficiency	90.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

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

Summary for Input Data

21.0 Fixed Cooling System		No	
22.0 Pressure Testing		Yes	
Designed AP ₅₀	3.00	m ² /(h.m ²) @ 50 Pa	
Test Method	Blower Door		
22.0 Lighting		No	
No Fixed Lighting	No		
	Name	Efficacy	Power
	Lighting 1	75.00	15.00
			Capacity
			1125.00
			Count
			5
24.0 Main Heating 1		None	
25.0 Main Heating 2		None	
26.0 Heat Networks		Space and Water Combined	
Space Community Heating			
Distribution Loss	Calculated		
Distribution Loss Value	1.50		
SAP Code	2306		
	Heat Source	Fuel Type	Heating Use
	Heat source 1	Heat pump	Electricity
	Heat source 2	None	Space and Water
	Heat source 3	None	
	Heat source 4	None	
	Heat source 5	None	
			Efficiency
			232.00
			Percentage Of Heat
			100.00
			Heat
			Heat Power Ratio
			Electrical
			Fuel Factor
			Efficiency type
27.0 Secondary Heating		None	
28.0 Water Heating		Community Heating	
Water Heating	Community Heating		
SAP Code	901		
Flue Gas Heat Recovery System	No		
Waste Water Heat Recovery Instantaneous System 1	No		
Waste Water Heat Recovery Instantaneous System 2	No		
Waste Water Heat Recovery Storage System	No		
Solar Panel	No		
Water use <= 125 litres/person/day	Yes		
Cold Water Source	From header tank		
Bath Count	1		
28.1 Showers			
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]
Shower	Combi boiler or unvented hot water system	8.00	
			Connected
			No
			Connected To
28.3 Waste Water Heat Recovery System			
29.0 Hot Water Cylinder		Internal Store	
Insulation Type	Measured Loss		
Cylinder Volume	180.00		
Loss	1.20		
			L
			kWh/day
32.0 Photovoltaic Unit		Multiple Dwellings – Not Connected	
Export Capable Meter?	No		
Connected To Dwelling	Yes		
Diverter	No		
Battery Capacity [kWh]	0.00		
PV Cells kWp	Orientation	Elevation	Overshading FGHRs
			MCS Certificate
			Overshading Factor
			MCS Certificate Reference
			Panel Manufacturer

Summary for Input Data



0.24

North East

Horizontal

Modest

No

0.80

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

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CO ₂ Emissions (t/year)	0.28	DFEE	40.54	TFEE	47.02		
Compliance Check	See BREL	% DFEE < TFEE				13.78	
% DPER < TPER	33.89	DPER	64.59	TPER	97.70		
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	50.7200 (1b)	2.8000 (2b)	142.0160 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7200		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	142.0160 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.1500 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1162 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												81.0000 (23c)
Effective ac	0.2432	0.2403	0.2374	0.2229	0.2200	0.2054	0.2054	0.2025	0.2112	0.2200	0.2258	0.2316 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			2.4200	1.0000	2.4200		(26)
Window			8.3400	1.1450	9.5496		(27)
Heatloss Floor 1			50.7200	0.1000	5.0720	110.0000	5579.2000 (28b)
External Wall 1	17.9200	8.3400	9.5800	0.1500	1.4370	70.0000	670.6000 (29a)
Corridor wall	40.1000	2.4200	37.6800	0.1900	7.1592	70.0000	2637.5999 (29a)
Total net area of external elements Aum(A, m ²)			108.7400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	25.6378		(33)
Main dwelling							
Party Wall 1			22.1900	0.0000	0.0000	70.0000	1553.3000 (32)
Party Ceiling 1			50.7200			30.0000	1521.6000 (32b)
Internal Wall 1			99.8200			9.0000	898.3800 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		12860.6799 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							253.5623 (35)
List of Thermal Bridges							

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	m2				Table 6a W/m2	Specific data or Table 6b		Specific data or Table 6c		factor Table 6d		W
Northeast	8.3400				11.2829	0.3500		0.7000		0.7700		15.9767 (75)
Solar gains	15.9767	32.5211	58.5926	96.2260	129.3466	137.8971	128.9999	102.8402	71.3961	39.7433	20.1029	13.0474 (83)
Total gains	421.0387	445.6474	455.9915	482.1328	497.5425	492.6207	469.7296	446.9679	424.3226	404.6056	405.5281	411.3177 (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	85.1766	85.4541	85.7335	87.1579	87.4485	88.9310	88.9310	89.2336	88.3320	87.4485	86.8693	86.2976
alpha	6.6784	6.6969	6.7156	6.8105	6.8299	6.9287	6.9287	6.9489	6.8888	6.8299	6.7913	6.7532
util living area	0.9864	0.9777	0.9582	0.8839	0.7310	0.5191	0.3760	0.4115	0.6446	0.8925	0.9697	0.9880 (86)
MIT	20.3673	20.4730	20.6284	20.8446	20.9639	20.9969	20.9997	20.9995	20.9877	20.8580	20.6029	20.3572 (87)
Th 2	20.2301	20.2324	20.2347	20.2463	20.2486	20.2603	20.2603	20.2626	20.2556	20.2486	20.2440	20.2393 (88)
util rest of house	0.9826	0.9715	0.9465	0.8557	0.6820	0.4604	0.3130	0.3458	0.5805	0.8606	0.9603	0.9846 (89)
MIT 2	19.5056	19.6398	19.8337	20.0963	20.2203	20.2586	20.2602	20.2624	20.2480	20.1172	19.8124	19.5004 (90)
Living area fraction	19.9378	20.0577	20.2323	20.4716	20.5933	20.6289	20.6311	20.6321	20.6190	20.4888	20.2089	19.9301 (91)
MIT	19.9378	20.0577	20.2323	20.4716	20.5933	20.6289	20.6311	20.6321	20.6190	20.4888	20.2089	19.9301 (92)
Temperature adjustment	19.9378	20.0577	20.2323	20.4716	20.5933	20.6289	20.6311	20.6321	20.6190	20.4888	20.2089	0.0000
adjusted MIT	19.9378	20.0577	20.2323	20.4716	20.5933	20.6289	20.6311	20.6321	20.6190	20.4888	20.2089	19.9301 (93)
8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9808	0.9699	0.9465	0.8647	0.7051	0.4898	0.3446	0.3788	0.6123	0.8716	0.9598	0.9830 (94)
Useful gains	412.9592	432.2355	431.5974	416.9051	350.7929	241.2839	161.8659	169.3057	259.7946	352.6543	389.2202	404.3103 (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	655.8687	633.6688	572.2082	474.2956	363.3052	242.1862	161.9321	169.4301	263.6480	403.9723	539.0897	651.1716 (97)
Space heating kWh	180.7247	135.3632	104.6144	41.3212	9.3091	0.0000	0.0000	0.0000	0.0000	38.1806	107.9061	183.6648 (98a)
Space heating requirement - total per year (kWh/year)												801.0840
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	180.7247	135.3632	104.6144	41.3212	9.3091	0.0000	0.0000	0.0000	0.0000	38.1806	107.9061	183.6648 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												801.0840
Space heating per m2										(98c) / (4) =		15.7942 (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												
	180.7247	135.3632	104.6144	41.3212	9.3091	0.0000	0.0000	0.0000	0.0000	38.1806	107.9061	183.6648 (98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												
307a	271.0870	203.0448	156.9216	61.9817	13.9637	0.0000	0.0000	0.0000	0.0000	57.2709	161.8591	275.4972
Space heating requirement	271.0870	203.0448	156.9216	61.9817	13.9637	0.0000	0.0000	0.0000	0.0000	57.2709	161.8591	275.4972 (307)
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)												0.0000 (308)
Space heating fuel for secondary/supplementary system	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (309)
Water heating												
Annual water heating requirement												
	211.4725	187.2787	199.5878	180.6050	176.2617	157.0934	151.5592	162.6246	162.3556	181.7228	192.0660	210.9962 (64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50												
310a	317.2087	280.9181	299.3817	270.9074	264.3926	235.6400	227.3389	243.9369	243.5333	272.5841	288.0990	316.4944
Water heating fuel	317.2087	280.9181	299.3817	270.9074	264.3926	235.6400	227.3389	243.9369	243.5333	272.5841	288.0990	316.4944 (310)
Cooling System Energy Efficiency Ratio												0.0000 (314)
Space coolin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (315)
Pumps and Fa	11.5882	10.4668	11.5882	11.2144	11.5882	11.2144	11.5882	11.5882	11.2144	11.5882	11.2144	11.5882 (331)
Lighting	16.5920	13.3107	11.9849	8.7806	6.7824	5.5413	6.1871	8.0423	10.4461	13.7059	15.4807	17.0532 (332)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333a)m	-2.6439	-4.7042	-8.7023	-12.2854	-15.3972	-15.2030	-14.8855	-12.7905	-9.5906	-6.1448	-3.1780	-2.1575 (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												1201.6259 (307)
Space heating fuel - secondary												0.0000 (309)
Water heating fuel - community heating												3260.4351 (310)
Efficiency of water heater												0.0000 (311)
Electricity used for heat distribution												12.0163 (313)
Space cooling fuel												0.0000 (321)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)												
mechanical ventilation fans (SFP = 0.7875)												136.4419 (330a)

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Total electricity for the above, kWh/year	136.4419 (331)
Electricity for lighting (calculated in Appendix L)	133.9073 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-107.6829 (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	4624.7273 (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	1923.3022	0.1569	81.2610 (367)
Electrical energy for heat distribution (space & water)	12.0163	0.0000	6.4733 (372)
Overall CO2 factor for heat network			0.0640 (386)
Total CO2 associated with community systems			285.4943 (373)
Space and water heating			285.4943 (376)
Pumps, fans and electric keep-hot	136.4419	0.1387	18.9262 (378)
Energy for lighting	133.9073	0.1443	19.3270 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.6829	0.1305	-14.0508
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-14.0508 (380)
Total CO2, kg/year			309.6967 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.1100 (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	1923.3022	1.5808	818.7889 (467)
Electrical energy for heat distribution (space & water)	12.0163	0.0000	68.5648 (472)
Overall CO2 factor for heat network			0.6777 (486)
Total CO2 associated with community systems			3023.9446 (473)
Space and water heating			3023.9446 (476)
Pumps, fans and electric keep-hot	136.4419	1.5128	206.4093 (478)
Energy for lighting	133.9073	1.5338	205.3914 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.6829	1.4820	-159.5864
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-159.5864 (480)
Total Primary energy kWh/year			3276.1589 (483)
Dwelling Primary energy Rate (DPER)			64.5900 (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	50.7200 (1b)	2.8000 (2b)	142.0160 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	142.0160 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans	(6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 20.0000 / (5) = 0.1408 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3908 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3029 (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	0.3862	0.3786	0.3710	0.3332	0.3256	0.2877	0.2877	0.2802	0.3029	0.3256	0.3408	0.3559 (22b)
	0.5746	0.5717	0.5688	0.5555	0.5530	0.5414	0.5414	0.5392	0.5459	0.5530	0.5581	0.5633 (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			8.3400	1.1450	9.5496		(27)
Heatloss Floor 1			50.7200	0.1300	6.5936		(28b)
External Wall 1	17.9200	8.3400	9.5800	0.1800	1.7244		(29a)
Corridor wall	40.1000	2.4200	37.6800	0.1800	6.7824		(29a)
Total net area of external elements Aum(A, m2)			108.7400				(31)
Fabric heat loss, W/K = Sum (A x U)					27.0700		(33)
Main dwelling							
Party Wall 1			22.1900	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							253.5623 (35)

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

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.0800	0.0500	0.2540
E4 Jamb	12.6000	0.0500	0.6300
E7 Party floor between dwellings (in blocks of flats)	3.0400	0.0700	0.2128
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0700	1.0024
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672
E16 Corner (normal)	2.8000	0.0900	0.2520
E16 Corner (normal)	2.8000	0.0900	0.2520
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	3.0400	0.3200	0.9728
E21 Exposed floor (inverted)	14.3200	0.3200	4.5824
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.9300	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	7.9300	0.1600	1.2688
E3 Sill	1.5900	0.0500	0.0795
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			9.9771 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 37.0471 (37)

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

Point Thermal bridges

Total fabric heat loss

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

(38)m	Jan 26.9274	Feb 26.7917	Mar 26.6587	Apr 26.0339	May 25.9170	Jun 25.3728	Jul 25.3728	Aug 25.2721	Sep 25.5824	Oct 25.9170	Nov 26.1535	Dec 26.4007 (38)
Heat transfer coeff	63.9745	63.8388	63.7058	63.0810	62.9641	62.4200	62.4200	62.3192	62.6296	62.9641	63.2006	63.4478 (39)
Average = Sum(39)m / 12 =												63.0805

HLP	Jan 1.2613	Feb 1.2587	Mar 1.2560	Apr 1.2437	May 1.2414	Jun 1.2307	Jul 1.2307	Aug 1.2287	Sep 1.2348	Oct 1.2414	Nov 1.2461	Dec 1.2509 (40)
HLP (average)												1.2437
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7113 (42)
Hot water usage for mixer showers	52.9126	52.1174	50.9587	48.7417	47.1056	45.2810	44.2440	45.3939	46.6545	48.6135	50.8781	52.7099 (42a)
Hot water usage for baths	22.8774	22.5376	22.0592	21.1770	20.5164	19.7839	19.3883	19.8634	20.3807	21.1645	22.0648	22.8000 (42b)
Hot water usage for other uses	32.1556	30.9863	29.8170	28.6477	27.4784	26.3091	26.3091	27.4784	28.6477	29.8170	30.9863	32.1556 (42c)
Average daily hot water use (litres/day)												99.2269 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	107.9456	105.6413	102.8349	98.5664	95.1004	91.3741	89.9414	92.7357	95.6829	99.5950	103.9293	107.6655 (44)
Energy content (annual)	170.9594	150.4319	158.0534	134.9324	128.0234	112.3551	108.7763	114.8262	117.9866	135.1494	148.0663	168.5782 (45)
Distribution loss (46)m = 0.15 x (45)m	25.6439	22.5648	23.7080	20.2399	19.2035	16.8533	16.3164	17.2239	17.6980	20.2724	22.2099	25.2867 (46)
Water storage loss (or HIU loss):												
Store volume												180.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.5520 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8381 (55)
Total storage loss	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (56)
If cylinder contains dedicated solar storage	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	220.2021	194.9091	207.2960	182.5866	177.2661	160.0093	158.0190	164.0689	165.6408	184.3921	195.7205	217.8208 (62)
WWHRS	-24.1894	-21.3933	-22.4019	-18.5496	-17.2876	-14.7931	-13.8662	-14.7453	-15.3055	-18.0435	-20.4411	-23.7415 (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	196.0126	173.5158	184.8942	164.0370	159.9785	145.2162	144.1528	149.3236	150.3352	166.3486	175.2793	194.0793 (64)
12Total per year (kWh/year)												2003.1732 (64)
Electric shower(s)												2003 (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)
												0.0000 (64a)
Heat gains from water heating, kWh/month	96.2381	85.6004	91.9469	82.9884	81.9619	75.4814	75.5623	77.5739	77.3539	84.3313	87.3554	95.4464 (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	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	78.0459	86.4079	78.0459	80.6474	78.0459	80.6474	78.0459	78.0459	80.6474	78.0459	80.6474	78.0459 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.1038	150.6510	146.7520	138.4516	127.9738	118.1261	111.5472	110.0000	113.8990	122.1994	132.6773	142.5249 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566 (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)	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526 (71)
Water heating gains (Table 5)	129.3523	127.3815	123.5845	115.2617	110.1639	104.8353	101.5622	104.2659	107.4360	113.3486	121.3269	128.2881 (72)
Total internal gains	408.1717	416.1102	400.0521	386.0304	367.8532	352.2785	339.8250	340.9815	350.6521	365.2636	386.3213	400.5287 (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				8.3400				11.2829		0.6300		0.7000		0.7700		28.7581 (75)	

Solar gains				28.7581	58.5379	105.4668	173.2067	232.8238	248.2148	232.1999	185.1124	128.5129	71.5380	36.1851	23.4853	(83)	
Total gains				436.9298	474.6481	505.5189	559.2371	600.6771	600.4934	572.0249	526.0940	479.1650	436.8016	422.5064	424.0140	(84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	55.8411	55.9599	56.0767	56.6321	56.7372	57.2319	57.2319	57.3244	57.0403	56.7372	56.5250	56.3047
alpha	4.7227	4.7307	4.7384	4.7755	4.7825	4.8155	4.8155	4.8216	4.8027	4.7825	4.7683	4.7536
util living area	0.9913	0.9859	0.9731	0.9274	0.8164	0.6308	0.4727	0.5312	0.7823	0.9469	0.9839	0.9924 (86)
MIT	19.6984	19.8524	20.1145	20.4972	20.8043	20.9573	20.9913	20.9852	20.8821	20.5040	20.0493	19.6758 (87)
Th 2	19.8713	19.8734	19.8754	19.8852	19.8870	19.8955	19.8955	19.8971	19.8923	19.8870	19.8833	19.8795 (88)
util rest of house	0.9884	0.9813	0.9639	0.9024	0.7584	0.5360	0.3579	0.4108	0.6968	0.9231	0.9778	0.9900 (89)
MIT 2	18.3877	18.5842	18.9154	19.3886	19.7289	19.8727	19.8930	19.8923	19.8159	19.4080	18.8426	18.3648 (90)
Living area fraction									fLA = Living area / (4) =			0.5016 (91)
MIT	19.0451	19.2203	19.5168	19.9446	20.2683	20.4167	20.4439	20.4404	20.3507	19.9577	19.4478	19.0224 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0451	19.2203	19.5168	19.9446	20.2683	20.4167	20.4439	20.4404	20.3507	19.9577	19.4478	19.0224 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9857	0.9778	0.9603	0.9039	0.7799	0.5822	0.4157	0.4714	0.7350	0.9249	0.9747	0.9874 (94)
Useful gains	430.6633	464.1297	485.4344	505.5111	468.4450	349.6282	237.7978	247.9847	352.1749	403.9867	411.8060	418.6809 (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	943.3132	914.1920	829.2484	696.7075	539.4943	363.0780	239.9345	251.7973	391.4772	589.2012	780.3904	940.4465 (97)
Space heating kWh	381.4116	302.4419	255.7976	137.6614	52.8606	0.0000	0.0000	0.0000	0.0000	137.7996	265.3807	388.1936 (98a)
Space heating requirement - total per year (kWh/year)												1921.5470
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	381.4116	302.4419	255.7976	137.6614	52.8606	0.0000	0.0000	0.0000	0.0000	137.7996	265.3807	388.1936 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1921.5470
Space heating per m ²										(98c) / (4) =		37.8854 (99)

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (201)
Fraction of space heat from main system(s)												1.0000 (202)
Efficiency of main space heating system 1 (in %)												92.3000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	381.4116	302.4419	255.7976	137.6614	52.8606	0.0000	0.0000	0.0000	0.0000	137.7996	265.3807	388.1936 (98)
Space heating efficiency (main heating system 1)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
Space heating fuel (main heating system)	413.2303	327.6727	277.1371	149.1457	57.2705	0.0000	0.0000	0.0000	0.0000	149.2954	287.5198	420.5781 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	196.0126	173.5158	184.8942	164.0370	159.9785	145.2162	144.1528	149.3236	150.3352	166.3486	175.2793	194.0793 (64)
Efficiency of water heater	85.5257	85.2931	84.7880	83.6693	81.8606	79.8000	79.8000	79.8000	79.8000	83.6407	84.9874	79.8000 (216)
Fuel for water heating, kWh/month	229.1858	203.4347	218.0665	196.0539	195.4281	181.9752	180.6426	187.1223	188.3900	198.8847	206.2416	85.5828 (217)
												226.7738 (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	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	(231)
Lighting	16.2164	13.0094	11.7135	8.5818	6.6288	5.4158	6.0471	7.8602	10.2096	13.3956	15.1303	16.6671	16.6671	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-9.6898	-14.7122	-22.7581	-27.6079	-31.5945	-30.1804	-29.8287	-27.2496	-23.0333	-17.6920	-11.0239	-8.2604	-8.2604	(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	-2.6876	-5.8382	-11.9546	-18.4799	-24.9528	-25.2509	-24.9395	-20.8649	-14.9778	-8.5022	-3.6372	-2.1109	-2.1109	(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													2081.8495	(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													2412.1992	(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)													130.8756	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-417.8272	(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													4293.0970	(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	2081.8495	0.2100	437.1884	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2412.1992	0.2100	506.5618	(264)
Space and water heating			943.7502	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	130.8756	0.1443	18.8894	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-253.6308	0.1331	-33.7456	
PV Unit electricity exported	-164.1964	0.1251	-20.5373	
Total			-54.2829	(269)
Total CO2, kg/year			920.2860	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			18.1400	(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	2081.8495	1.1300	2352.4899	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2412.1992	1.1300	2725.7851	(278)
Space and water heating			5078.2750	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	130.8756	1.5338	200.7413	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-253.6308	1.4916	-378.3264	
PV Unit electricity exported	-164.1964	0.4591	-75.3795	
Total			-453.7060	(283)
Total Primary energy kWh/year			4955.4111	(286)
Target Primary Energy Rate (TPER)			97.7000	(287)

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Plot Reference	A 117				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	81 B	DER	6.11	TER	18.14		
Environmental	96 A	% DER < TER				66.32	
CO ₂ Emissions (t/year)	0.28	DFEE	40.54	TFEE	47.02		
Compliance Check	See BREL	% DFEE < TFEE				13.78	
% DPER < TPER	33.89	DPER	64.59	TPER	97.70		
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	50.7200 (1b)	2.8000 (2b)	142.0160 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7200		142.0160 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	142.0160 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1408 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2908 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2254 (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	0.2874	0.2817	0.2761	0.2479	0.2423	0.2141	0.2141	0.2085	0.2254	0.2423	0.2536	0.2648 (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	0.5413	0.5397	0.5381	0.5307	0.5294	0.5229	0.5229	0.5217	0.5254	0.5294	0.5321	0.5351 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			2.4200	1.0000	2.4200		(26)
Window			8.3400	1.1450	9.5496		(27)
Heatloss Floor 1			50.7200	0.1000	5.0720	110.0000	5579.2000 (28b)
External Wall 1	17.9200	8.3400	9.5800	0.1500	1.4370	70.0000	670.6000 (29a)
Corridor wall	40.1000	2.4200	37.6800	0.1900	7.1592	70.0000	2637.5999 (29a)
Total net area of external elements Aum(A, m ²)			108.7400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	25.6378		(33)
Main dwelling							
Party Wall 1			22.1900	0.0000	0.0000	70.0000	1553.3000 (32)
Party Ceiling 1			50.7200			30.0000	1521.6000 (32b)
Internal Wall 1			99.8200			9.0000	898.3800 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12860.6799 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							253.5623 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					5.0800	0.0500	0.2540
E4 Jamb					12.6000	0.0400	0.5040

elmhurst
energy

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
	25.3678	25.2927	25.2190	24.8730	24.8083	24.5070	24.5070	24.4512	24.6231	24.8083	24.9393	25.0762 (38)
Heat transfer coeff	55.9105	55.8354	55.7617	55.4157	55.3510	55.0497	55.0497	54.9939	55.1658	55.3510	55.4820	55.6189 (39)
Average = Sum(39)m / 12 =												55.4154
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.1023	1.1009	1.0994	1.0926	1.0913	1.0854	1.0854	1.0843	1.0877	1.0913	1.0939	1.0966 (40)
HLP (average)												1.0926
Days in mont.	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy												1.7113 (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 (42a)
Hot water usage for baths	22.3674	22.0297	21.5494	20.8301	20.1818	19.2893	18.6123	19.4402	19.8747	20.7590	21.6784	22.3496 (42b)
Hot water usage for other uses	32.1556	30.9863	29.8170	28.6477	27.4784	26.3091	26.3091	27.4784	28.6477	29.8170	30.9863	32.1556 (42c)
Average daily hot water use (litres/day)												49.9722 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	54.5230	53.0160	51.3664	49.4777	47.6602	45.5984	44.9214	46.9186	48.5224	50.5760	52.6646	54.5052 (44)
Energy content (annual)	80.2672	70.1509	73.4015	64.6303	61.4149	52.7331	49.6394	55.2240	56.2836	65.1722	71.1780	80.0449 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		780.1402
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												
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 (56)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Total heat required for water heating calculated for each month	68.2271	59.6283	62.3913	54.9358	52.2027	44.8231	42.1935	46.9404	47.8410	55.3964	60.5013	68.0382 (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	68.2271	59.6283	62.3913	54.9358	52.2027	44.8231	42.1935	46.9404	47.8410	55.3964	60.5013	68.0382 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		663.1191 (64)
Electric shower(s)	42.3742	37.7557	41.2278	39.3432	40.0815	38.2338	39.5083	40.0815	39.3432	41.2278	40.4526	42.3742 (64a)
												482.0039 (64a)
Heat gains from water heating, kWh/month	27.6503	24.3460	25.9048	23.5697	23.0710	20.7642	20.4255	21.7555	21.7961	24.1561	25.2385	27.6031 (65)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	78.0459	86.4079	78.0459	80.6474	78.0459	80.6474	78.0459	78.0459	80.6474	78.0459	80.6474	78.0459 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.1038	150.6510	146.7520	138.4516	127.9738	118.1261	111.5472	110.0000	113.8990	122.1994	132.6773	142.5249 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566 (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)	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526 (71)
Water heating gains (Table 5)	37.1644	36.2292	34.8183	32.7358	31.0095	28.8392	27.4536	29.2412	30.2723	32.4678	35.0534	37.1009 (72)
Total internal gains	312.9838	321.9578	308.2859	300.5045	285.6988	276.2824	265.7164	265.9568	273.4884	281.3828	297.0478	306.3414 (73)

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d		Gains W	
Northeast					8.3400	11.2829	0.3500	0.7000	0.7700		15.9767 (75)	
Solar gains	15.9767	32.5211	58.5926	96.2260	129.3466	137.8971	128.9999	102.8402	71.3961	39.7433	20.1029	13.0474 (83)
Total gains	328.9605	354.4789	366.8785	396.7304	415.0454	414.1795	394.7163	368.7971	344.8845	321.1262	317.1507	319.3888 (84)

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7. Mean internal temperature (heating season)												
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	63.8952	63.9811	64.0657	64.4656	64.5410	64.8943	64.8943	64.9601	64.7578	64.5410	64.3887	64.2302
alpha	5.2597	5.2654	5.2710	5.2977	5.3027	5.3263	5.3263	5.3307	5.3172	5.3027	5.2926	5.2820
util living area	0.9973	0.9955	0.9915	0.9737	0.9167	0.7669	0.5952	0.6541	0.8801	0.9795	0.9946	0.9977 (86)
MIT	19.7233	19.8485	20.0618	20.3998	20.7164	20.9266	20.9846	20.9752	20.8370	20.4484	20.0378	19.7006 (87)
Th 2	19.9989	20.0001	20.0013	20.0069	20.0079	20.0128	20.0128	20.0137	20.0109	20.0079	20.0058	20.0036 (88)
util rest of house	0.9964	0.9939	0.9883	0.9630	0.8811	0.6795	0.4711	0.5295	0.8172	0.9690	0.9925	0.9970 (89)
MIT 2	18.8396	18.9652	19.1781	19.5139	19.8091	19.9779	20.0088	20.0064	19.9174	19.5653	19.1586	18.8207 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.2828	19.4083	19.6214	19.9582	20.2641	20.4537	20.4982	20.4923	20.3787	20.0082	19.5996	19.2621 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.2828	19.4083	19.6214	19.9582	20.2641	20.4537	20.4982	20.4923	20.3787	20.0082	19.5996	19.2621 (93)

8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9955	0.9927	0.9867	0.9623	0.8916	0.7210	0.5338	0.5924	0.8435	0.9690	0.9913	0.9962 (94)
Useful gains	327.4927	351.8957	362.0056	381.7857	370.0422	298.6307	210.7015	218.4588	290.9107	311.1710	314.3922	318.1732 (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	837.6981	810.0748	731.6709	612.7994	474.0342	322.2460	214.5966	225.0523	346.3675	520.7560	693.5013	837.7342 (97)
Space heating kWh	379.5928	307.8964	275.0310	166.3299	77.3701	0.0000	0.0000	0.0000	0.0000	155.9312	272.9585	386.5534 (98a)
Space heating requirement - total per year (kWh/year)	2021.6633											
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	379.5928	307.8964	275.0310	166.3299	77.3701	0.0000	0.0000	0.0000	0.0000	155.9312	272.9585	386.5534 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2021.6633											
Space heating per m2	(98c) / (4) = 39.8593 (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	517.4671	407.3677	417.9536	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7825	0.8667	0.8279	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	404.9338	353.0728	346.0062	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	454.3595	433.3053	404.4198	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	35.5865	59.6929	43.4597	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (105)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	8.8966	14.9232	10.8649	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	34.6848 (107)											
Energy for space heating	39.8593 (99)											
Energy for space cooling	0.6838 (108)											
Total	40.5431 (109)											
Fabric Energy Efficiency (DFEE)	40.5 (109)											

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

1. Overall dwelling characteristics												
Main dwelling					Area (m2)	Storey height (m)				Volume (m3)		
Ground floor					50.7200 (1b)	x	2.8000 (2b)	=		142.0160 (1b) - (3b)		
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)					50.7200					(4)		
Dwelling volume						(3a) + (3b) + (3c) + (3d) + (3e) ... (3n)	=			142.0160 (5)		

2. Ventilation rate												
												m3 per hour
Number of open chimneys												0 * 80 = 0.0000 (6a)
Number of open flues												0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire												0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler												0 * 20 = 0.0000 (6d)
Number of flues attached to other heater												0 * 35 = 0.0000 (6e)
Number of blocked chimneys												0 * 20 = 0.0000 (6f)
Number of intermittent extract fans												2 * 10 = 20.0000 (7a)
Number of passive vents												0 * 10 = 0.0000 (7b)
Number of flueless gas fires												0 * 40 = 0.0000 (7c)

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Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 20.0000 / (5) = 0.1408 (8)
Pressure test Yes
Pressure Test Method Blower Door
Measured/design AP50 5.0000 (17)
Infiltration rate 0.3908 (18)
Number of sides sheltered 3 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3029 (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	0.3862	0.3786	0.3710	0.3332	0.3256	0.2877	0.2877	0.2802	0.3029	0.3256	0.3408	0.3559 (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	0.5746	0.5717	0.5688	0.5555	0.5530	0.5414	0.5414	0.5392	0.5459	0.5530	0.5581	0.5633 (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			8.3400	1.1450	9.5496		(27)
Heatloss Floor 1			50.7200	0.1300	6.5936		(28b)
External Wall 1	17.9200	8.3400	9.5800	0.1800	1.7244		(29a)
Corridor wall	40.1000	2.4200	37.6800	0.1800	6.7824		(29a)
Total net area of external elements Aum(A, m2)			108.7400				(31)
Fabric heat loss, W/K = Sum (A x U)					27.0700		(33)
Main dwelling							
Party Wall 1			22.1900	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							253.5623 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.0800	0.0500	0.2540
E4 Jamb	12.6000	0.0500	0.6300
E7 Party floor between dwellings (in blocks of flats)	3.0400	0.0700	0.2128
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0700	1.0024
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672
E16 Corner (normal)	2.8000	0.0900	0.2520
E16 Corner (normal)	2.8000	0.0900	0.2520
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	3.0400	0.3200	0.9728
E21 Exposed floor (inverted)	14.3200	0.3200	4.5824
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.9300	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	7.9300	0.1600	1.2688
E3 Sill	1.5900	0.0500	0.0795
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 9.9771 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 37.0471 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	26.9274	26.7917	26.6587	26.0339	25.9170	25.3728	25.3728	25.2721	25.5824	25.9170	26.1535	26.4007 (38)
Heat transfer coeff	63.9745	63.8388	63.7058	63.0810	62.9641	62.4200	62.4200	62.3192	62.6296	62.9641	63.2006	63.4478 (39)
Average = Sum(39)m / 12 =												63.0805

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2613	1.2587	1.2560	1.2437	1.2414	1.2307	1.2307	1.2287	1.2348	1.2414	1.2461	1.2509 (40)
HLP (average)												1.2437
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												1.7113 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	22.8774	22.5376	22.0592	21.1770	20.5164	19.7839	19.3883	19.8634	20.3807	21.1645	22.0648	22.8000 (42b)
Hot water usage for other uses	32.1556	30.9863	29.8170	28.6477	27.4784	26.3091	26.3091	27.4784	28.6477	29.8170	30.9863	32.1556 (42c)
Average daily hot water use (litres/day)												50.4433 (43)
Daily hot water use	55.0330	53.5239	51.8762	49.8247	47.9948	46.0931	45.6974	47.3418	49.0284	50.9815	53.0511	54.9556 (44)
Energy conte	87.1588	76.2173	79.7317	68.2075	64.6102	56.6768	55.2671	58.6191	60.4569	69.1814	75.5810	86.0472 (45)
Energy content (annual)										Total = Sum(45)m =		837.7550
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (or HIU loss):												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	74.0849	64.7847	67.7720	57.9764	54.9187	48.1753	46.9770	49.8262	51.3884	58.8042	64.2439	73.1401 (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	74.0849	64.7847	67.7720	57.9764	54.9187	48.1753	46.9770	49.8262	51.3884	58.8042	64.2439	73.1401 (64)
Total per year (kWh/year) = Sum(64)m =												712.0917 (64)

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12Total per year (kWh/year)	712 (64)										
Electric shower(s)	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =										
	42.3742	37.7557	41.2278	39.3432	40.0815	38.2338	39.5083	40.0815	39.3432	41.2278	40.4526
Heat gains from water heating, kWh/month	29.1148	25.6351	27.2499	24.3299	23.7500	21.6023	21.6213	22.4769	22.6829	25.0080	26.1741
	42.3742 (64a)										
	482.0039 (64a)										
	28.8786 (65)										

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

Metabolic gains (Table 5), Watts											
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657	85.5657
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	78.0459	86.4079	78.0459	80.6474	78.0459	80.6474	78.0459	78.0459	80.6474	78.0459	80.6474
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.1038	150.6510	146.7520	138.4516	127.9738	118.1261	111.5472	110.0000	113.8990	122.1994	132.6773
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566	31.5566
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Losses e.g. evaporation (negative values) (Table 5)	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526	-68.4526
Water heating gains (Table 5)	39.1328	38.1475	36.6263	33.7915	31.9221	30.0032	29.0609	30.2109	31.5040	33.6129	36.3529
Total internal gains	314.9521	323.8762	310.0939	301.5602	286.6115	277.4464	267.3237	266.9265	274.7201	282.5279	298.3473
	308.0558 (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	8.3400				11.2829		0.6300		0.7000		0.7700		28.7581 (75)	
Solar gains	28.7581	58.5379	105.4668	173.2067	232.8238	248.2148	232.1999	185.1124	128.5129	71.5380	36.1851	23.4853	(83)	
Total gains	343.7102	382.4141	415.5607	474.7669	519.4353	525.6612	499.5236	452.0389	403.2330	354.0659	334.5324	331.5411	(84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000 (85)										
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
tau	55.8411	55.9599	56.0767	56.6321	56.7372	57.2319	57.2319	57.3244	57.0403	56.7372	56.5250
alpha	4.7227	4.7307	4.7384	4.7755	4.7825	4.8155	4.8155	4.8216	4.8027	4.7825	4.7683
util living area	0.9968	0.9941	0.9874	0.9582	0.8726	0.6990	0.5355	0.6064	0.8550	0.9750	0.9938
	0.9973 (86)										
MIT	19.5130	19.6724	19.9471	20.3662	20.7280	20.9339	20.9853	20.9741	20.8201	20.3634	19.8782
Th 2	19.8713	19.8734	19.8754	19.8852	19.8870	19.8955	19.8955	19.8971	19.8923	19.8870	19.8833
util rest of house	0.9957	0.9921	0.9827	0.9417	0.8239	0.6020	0.4084	0.4746	0.7812	0.9621	0.9912
MIT 2	18.5314	18.6916	18.9654	19.3799	19.7070	19.8665	19.8920	19.8901	19.7939	19.3851	18.9047
Living area fraction	19.0238	19.1836	19.4578	19.8746	20.2191	20.4019	20.4404	20.4338	20.3087	19.8758	19.3930
MIT	19.0238	19.1836	19.4578	19.8746	20.2191	20.4019	20.4404	20.4338	20.3087	19.8758	19.3930
Temperature adjustment	19.0238	19.1836	19.4578	19.8746	20.2191	20.4019	20.4404	20.4338	20.3087	19.8758	19.3930
adjusted MIT	19.0238	19.1836	19.4578	19.8746	20.2191	20.4019	20.4404	20.4338	20.3087	19.8758	19.3930
	19.0047 (92)										
	0.0000										
	19.0047 (93)										

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
	0.9945	0.9904	0.9804	0.9415	0.8401	0.6487	0.4725	0.5410	0.8123	0.9619	0.9897
Useful gains	341.8369	378.7487	407.4182	446.9935	436.3669	341.0022	236.0306	244.5714	327.5430	340.5909	331.0785
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	941.9451	911.8477	825.4872	692.2875	536.3999	362.1547	239.7158	251.3852	388.8451	584.0434	776.9260
Space heating kWh	446.4805	358.2426	311.0433	176.6117	74.4246	0.0000	0.0000	0.0000	0.0000	181.1286	321.0102
Space heating requirement - total per year (kWh/year)	453.3236 (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
Solar heating contribution - total per year (kWh/year)	0.0000 (98b)										
Space heating kWh	446.4805	358.2426	311.0433	176.6117	74.4246	0.0000	0.0000	0.0000	0.0000	181.1286	321.0102
Space heating requirement after solar contribution - total per year (kWh/year)	453.3236 (98c)										
Space heating per m2	45.7860 (99)										

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b											
Ext. temp.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
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
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	586.7476	461.9077	473.6258	0.0000	0.0000	0.0000
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.8264	0.8947	0.8511	0.0000	0.0000	0.0000
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	484.9044	413.2736	403.0823	0.0000	0.0000	0.0000
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	584.4662	555.5359	501.5518	0.0000	0.0000	0.0000
Cooled fraction	0.0000	0.0000	0.0000	0.0000	0.0000	71.6845	105.8431	73.2613	0.0000	0.0000	0.0000
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	17.9211	26.4608	18.3153	0.0000	0.0000	0.0000
Space cooling requirement	62.6972 (107)										

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

45.7860 (99)
1.2361 (108)
47.0221 (109)
47.0 (109)