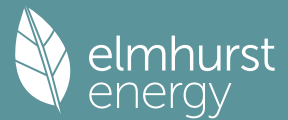


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Property Reference	Wroxham House				Issued on Date	10/01/2024
Assessment Reference	03 Be Green	Prop Type Ref	New build			
Property	New build, Wroxham House, Wroxham Gardens, London, N11					
SAP Rating	92 A	DER	1.40	TER	10.47	
Environmental	99 A	% DER < TER				86.63
CO ₂ Emissions (t/year)	0.16	DFEE	44.92	TFEE	46.88	
Compliance Check	See BREL	% DFEE < TFEE				4.18
% DPER < TPER	66.10	DPER	18.65	TPER	55.02	
Assessor Details	Mr. Thomas McMahon				Assessor ID	R863-0001
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)	
Basement floor	81.8400 (1a)	x	2.6400 (2a)	=	216.0576 (1a) - (3a)	
Ground floor	65.2700 (1b)	x	3.5300 (2b)	=	230.4031 (1b) - (3b)	
First floor	36.9600 (1c)	x	1.9100 (2c)	=	70.5936 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	184.0700				(4)	
Dwelling volume					(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	517.0543 (5)

2. Ventilation rate

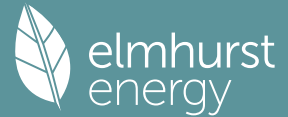
		m ³ per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)	
Number of open flues	0 * 20 =	0.0000 (6b)	
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)	
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)	
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)	
Number of blocked chimneys	0 * 20 =	0.0000 (6f)	
Number of intermittent extract fans	5 * 10 =	50.0000 (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) =	50.0000 / (5) =	0.0967 (8)	
Pressure test	Yes		
Pressure Test Method	Blower Door		
Measured/design AP50	5.0000	(17)	
Infiltration rate	0.3467	(18)	
Number of sides sheltered	1	(19)	
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)	
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3207 (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	0.4089	0.4009	0.3929	0.3528	0.3448	0.3047	0.3047	0.2966	0.3207	0.3448	0.3608	0.3768	(22b)
Effective ac	0.5836	0.5803	0.5772	0.5622	0.5594	0.5464	0.5464	0.5440	0.5514	0.5594	0.5651	0.5710	(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	
DG Windows (Uw = 1.20)			52.0000	1.1450	59.5420			(27)
DG Door			2.2000	1.2000	2.6400			(26a)
NW RW			2.6400	1.5918	4.2022			(27a)
Walk On Glass			3.7500	1.2357	4.6340			(27a)
Basement Floor			81.8400	0.1200	9.8208	110.0000	9002.4000	(28)
Exposed First Floor			3.0500	0.1200	0.3660	20.0000	61.0000	(28b)
Basement Wall	80.8500		80.8500	0.1600	12.9360	9.0000	727.6500	(29a)
External Walls	190.7700	54.2000	136.5700	0.1600	21.8512	150.0000	20485.5000	(29a)
Rafter Roof	78.8900	2.6400	76.2500	0.1200	9.1500	9.0000	686.2500	(30)
Flat Roof	16.5800	3.7500	12.8300	0.1200	1.5396	9.0000	115.4700	(30)
Total net area of external elements A _{um} (A, m ²)			451.9800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	126.6819			(33)
Internal Wall 1			146.7400			75.0000	11005.5000	(32c)
Internal Floor 1			65.2700			18.0000	1174.8600	(32d)
Internal Floor 2			33.9100			18.0000	610.3800	(32d)
Internal Ceiling 1			65.2700			9.0000	587.4300	(32e)
Internal Ceiling 2			33.9100			9.0000	305.1900	(32e)

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Heat capacity $C_m = \text{Sum}(A \times k)$ (28)...(30) + (32) + (32a)...(32e) = 44761.6300 (34)
Thermal mass parameter (TMP = C_m / TFA) in $\text{kJ/m}^2\text{K}$ 243.1772 (35)
Thermal bridges (User defined value 0.050 * total exposed area) 22.5990 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 149.2809 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	99.5778	99.0239	98.4810	95.9309	95.4538	93.2328	93.2328	92.8215	94.0883	95.4538	96.4190	97.4281 (38)
Average = $\text{Sum}(39)\text{m} / 12 =$	248.8586	248.3048	247.7618	245.2118	244.7347	242.5137	242.5137	242.1024	243.3692	244.7347	245.6999	246.7089 (39)
												245.2095
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.3520	1.3490	1.3460	1.3322	1.3296	1.3175	1.3175	1.3153	1.3222	1.3296	1.3348	1.3403 (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												2.9811 (42)
Hot water usage for mixer showers												
	74.2039	73.0888	71.4638	68.3547	66.0603	63.5015	62.0471	63.6598	65.4276	68.1749	71.3508	73.9196 (42a)
Hot water usage for baths												
	32.0333	31.5576	30.8877	29.6524	28.7275	27.7018	27.1479	27.8131	28.5375	29.6349	30.8956	31.9250 (42b)
Hot water usage for other uses												
	45.1599	43.5178	41.8756	40.2334	38.5912	36.9490	36.9490	38.5912	40.2334	41.8756	43.5178	45.1599 (42c)
Average daily hot water use (litres/day)												139.1680 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
	151.3972	148.1642	144.2270	138.2405	133.3790	128.1524	126.1440	130.0642	134.1985	139.6854	145.7642	151.0046 (44)
Energy content (annual)												
	239.7762	210.9838	221.6716	189.2444	179.5537	157.5784	152.5603	161.0466	165.4801	189.5518	207.6678	236.4367 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 2311.5513
	35.9664	31.6476	33.2507	28.3867	26.9331	23.6368	22.8840	24.1570	24.8220	28.4328	31.1502	35.4655 (46)
Water storage loss:												
Store volume												300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												
Temperature factor from Table 2b												2.5000 (48)
Enter (49) or (54) in (55)												0.5400 (49)
Total storage loss												1.3500 (55)
	41.8500	37.8000	41.8500	40.5000	41.8500	40.5000	41.8500	41.8500	40.5000	41.8500	40.5000	41.8500 (56)
If cylinder contains dedicated solar storage												
	41.8500	37.8000	41.8500	40.5000	41.8500	40.5000	41.8500	41.8500	40.5000	41.8500	40.5000	41.8500 (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												
	304.8886	269.7950	286.7840	252.2564	244.6661	220.5904	217.6727	226.1590	228.4921	254.6642	270.6798	301.5491 (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												
	304.8886	269.7950	286.7840	252.2564	244.6661	220.5904	217.6727	226.1590	228.4921	254.6642	270.6798	301.5491 (64)
Total per year (kWh/year)												3078.1973 (64)
Electric shower(s)												3078 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
	131.8155	117.2011	125.7957	113.3333	111.7915	102.8044	102.8162	105.6379	105.4317	115.1159	119.4591	130.7051 (65)

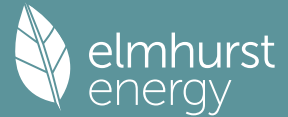
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	179.3805	198.5998	179.3805	185.3599	179.3805	185.3599	179.3805	179.3805	185.3599	179.3805	185.3599	179.3805 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	355.6419	359.3324	350.0326	330.2343	305.2427	281.7540	266.0621	262.3717	271.6715	291.4697	316.4614	339.9501 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057 (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)	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460 (71)
Water heating gains (Table 5)	177.1714	174.4063	169.0803	157.4074	150.2574	142.7839	138.1938	141.9864	146.4330	154.7257	165.9155	175.6789 (72)
Total internal gains	779.9110	800.0558	766.2106	740.7189	702.5978	677.6150	651.3537	651.4559	671.1816	693.2931	735.4540	762.7267 (73)

6. Solar gains

[Jan]												Gains
					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		W
Northeast					12.8600	11.2829	0.4500	0.0000		0.7700		50.2767 (75)
Southeast					12.3000	36.7938	0.4500	0.0000		0.7700		156.8135 (77)
Southwest					26.8400	36.7938	0.4500	0.0000		0.7700		342.1849 (79)
Northwest					2.6400	18.0708	0.4000	0.0000		1.0000		19.0828 (82)
North					3.7500	26.0000	0.6300	1.0000		1.0000		55.2825 (82)
Solar gains	623.6403	1107.2247	1626.4792	2189.4333	2602.0448	2646.6032	2525.4163	2209.5356	1821.0262	1254.5457	755.3501	528.1856 (83)
Total gains	1403.5513	1907.2805	2392.6898	2930.1521	3304.6426	3324.2182	3176.7700	2860.9915	2492.2078	1947.8388	1490.8041	1290.9124 (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	49.9632	50.0747	50.1844	50.7063	50.8052	51.2705	51.2705	51.3576	51.0902	50.8052	50.6056	50.3986
alpha	4.3309	4.3383	4.3456	4.3804	4.3870	4.4180	4.4180	4.4238	4.4060	4.3870	4.3737	4.3599
util living area	0.9940	0.9785	0.9356	0.8192	0.6405	0.4582	0.3341	0.3856	0.6300	0.9049	0.9848	0.9957 (86)
Living	19.7408	20.0112	20.3457	20.6847	20.8607	20.9174	20.9275	20.9255	20.8826	20.5914	20.0890	19.6963
Non living	18.3478	18.6911	19.1043	19.5012	19.6769	19.7311	19.7367	19.7378	19.7060	19.4149	18.8014	18.2981
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10
MIT	20.3558	20.0112	20.3457	20.6847	20.8607	20.9174	20.9275	20.9255	20.8826	20.5914	20.0890	19.8787 (87)
Th 2	19.8003	19.8027	19.8050	19.8157	19.8177	19.8271	19.8271	19.8289	19.8235	19.8177	19.8137	19.8094 (88)
util rest of house	0.9920	0.9719	0.9169	0.7756	0.5737	0.3780	0.2460	0.2893	0.5391	0.8688	0.9790	0.9943 (89)
MIT 2	19.2213	18.6911	19.1043	19.5012	19.6769	19.7311	19.7367	19.7378	19.7060	19.4149	18.8014	18.5704 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.5723	19.0996	19.4884	19.8674	20.0432	20.0982	20.1051	20.1053	20.0700	19.7789	19.1998	18.9752 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.5723	19.0996	19.4884	19.8674	20.0432	20.0982	20.1051	20.1053	20.0700	19.7789	19.1998	18.9752 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9915	0.9668	0.9110	0.7776	0.5870	0.3968	0.2670	0.3123	0.5591	0.8674	0.9750	0.9930 (94)
Useful gains	1391.6515	1843.9991	2179.7147	2278.6194	1939.8527	1319.1712	848.1955	893.4123	1393.4915	1689.5574	1453.5800	1281.8516 (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	3800.6462	3525.8164	3218.0243	2689.3341	2041.8660	1333.3815	850.0363	897.0596	1452.9255	2246.3990	2972.9098	3645.1678 (97)
Space heating kWh	1792.2920	1130.1812	772.5024	295.7146	75.8978	0.0000	0.0000	0.0000	0.0000	414.2902	1093.9174	1758.3072 (98a)
Space heating requirement - total per year (kWh/year)	7333.1030											
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	1792.2920	1130.1812	772.5024	295.7146	75.8978	0.0000	0.0000	0.0000	0.0000	414.2902	1093.9174	1758.3072 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	7333.1030											
Space heating per m2	(98c) / (4) = 39.8387 (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 %)	291.6937 (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	1792.2920	1130.1812	772.5024	295.7146	75.8978	0.0000	0.0000	0.0000	0.0000	414.2902	1093.9174	1758.3072 (98)
Space heating efficiency (main heating system 1)	291.6937	291.6937	291.6937	291.6937	291.6937	0.0000	0.0000	0.0000	0.0000	291.6937	291.6937	291.6937 (210)
Space heating fuel (main heating system)	614.4432	387.4548	264.8334	101.3785	26.0197	0.0000	0.0000	0.0000	0.0000	142.0292	375.0227	602.7923 (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	304.8886	269.7950	286.7840	252.2564	244.6661	220.5904	217.6727	226.1590	228.4921	254.6642	270.6798	301.5491 (64)
Efficiency of water heater	167.7854	167.7854	167.7854	167.7854	167.7854	167.7854	167.7854	167.7854	167.7854	167.7854	167.7854	167.7854 (216)
Fuel for water heating, kWh/month	181.7134	160.7977	170.9231	150.3447	145.8209	131.4717	129.7328	134.7907	136.1812	151.7797	161.3250	179.7231 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)
Lighting	40.6732	32.6295	29.3793	21.5245	16.6262	13.5837	15.1669	19.7146	25.6073	33.5981	37.9490	41.8036 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-84.9389	-135.2231	-214.2892	-250.8057	-269.9191	-248.7205	-244.9943	-228.2044	-195.6343	-158.9210	-97.7900	-71.2305 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	-7.6322	-23.4717	-65.3698	-134.6338	-213.2988	-228.6974	-225.1669	-178.3083	-115.6302	-46.6782	-12.8885	-5.6208 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)
Annual totals kWh/year												
Space heating fuel - main system 1	2513.9738 (211)											
Space heating fuel - main system 2	0.0000 (213)											
Space heating fuel - secondary	0.0000 (215)											
Efficiency of water heater	167.7854											
Water heating fuel used	1834.6041 (219)											
Space cooling fuel	0.0000 (221)											
Electricity for pumps and fans:												
Total electricity for the above, kWh/year	0.0000 (231)											
Electricity for lighting (calculated in Appendix L)	328.2559 (232)											

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Energy saving/generation technologies (Appendices M ,N and Q)

PV generation	-3458.0674	(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	1218.7664	(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	2513.9738	0.1570	394.7978 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1834.6041	0.1409	258.4304 (264)
Space and water heating			653.2282 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	328.2559	0.1443	47.3775 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-2200.6709	0.1337	-294.2187
PV Unit electricity exported	-1257.3965	0.1189	-149.4961
Total			-443.7148 (269)
Total CO2, kg/year			256.8909 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			1.4000 (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	2513.9738	1.5813	3975.3888 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1834.6041	1.5209	2790.1828 (278)
Space and water heating			6765.5716 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	328.2559	1.5338	503.4899 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-2200.6709	1.4941	-3287.9931
PV Unit electricity exported	-1257.3965	0.4361	-548.2958
Total			-3836.2889 (283)
Total Primary energy kWh/year			3432.7727 (286)
Dwelling Primary energy Rate (DPER)			18.6500 (287)

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)
Basement floor	81.8400 (1a)	x 2.6400 (2a)	= 216.0576 (1a) - (3a)
Ground floor	65.2700 (1b)	x 3.5300 (2b)	= 230.4031 (1b) - (3b)
First floor	36.9600 (1c)	x 1.9100 (2c)	= 70.5936 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	184.0700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	517.0543 (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	4 * 10 = 40.0000 (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) =	40.0000 / (5) = 0.0774 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3274 (18)
Number of sides sheltered	1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3028 (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	0.3861	0.3785	0.3709	0.3331	0.3255	0.2877	0.2877	0.2801	0.3028	0.3255	0.3407	0.3558 (22b)

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Effective ac 0.5745 0.5716 0.5688 0.5555 0.5530 0.5414 0.5414 0.5392 0.5458 0.5530 0.5580 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	
TER Semi-glazed door			2.2000	1.0000	2.2000			(26a)
TER Opening Type (Uw = 1.20)			39.0200	1.1450	44.6794			(27)
NW RW			1.9800	1.5918	3.1517			(27a)
Walk On Glass			2.8100	2.0221	5.6820			(27a)
Basement Floor			81.8400	0.1300	10.6392			(28)
Exposed First Floor			3.0500	0.1300	0.3965			(28b)
Basement Wall	80.8500		80.8500	0.1800	14.5530			(29a)
External Walls	190.7700	41.2200	149.5500	0.1800	26.9190			(29a)
Rafter Roof	78.8900	1.9800	76.9100	0.1100	8.4601			(30)
Flat Roof	16.5800	2.8100	13.7700	0.1100	1.5147			(30)
Total net area of external elements Aum(A, m2)			451.9800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	118.1956			(33)

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

243.1772 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	18.3600	0.0500	0.9180
E4 Jamb	49.4900	0.0500	2.4745
E22 Basement floor	32.1000	0.0700	2.2470
E6 Intermediate floor within a dwelling	38.5000	0.0000	0.0000
E24 Eaves (insulation at ceiling level - inverted)	17.0100	0.2400	4.0824
E11 Eaves (insulation at rafter level)	22.8500	0.0400	0.9140
E13 Gable (insulation at rafter level)	18.6700	0.0800	1.4936
E14 Flat roof	19.8100	0.0800	1.5848
E16 Corner (normal)	41.9400	0.0900	3.7746
E17 Corner (inverted - internal area greater than external area)	16.3600	-0.0900	-1.4724
R1 Head of roof window	1.8800	0.0800	0.1504
R2 Sill of roof window	1.8800	0.0600	0.1128
R3 Jamb of roof window	5.6000	0.0800	0.4480
R4 Ridge (vaulted ceiling)	17.4100	0.0800	1.3928
R5 Ridge (inverted)	17.4100	0.0400	0.6964

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

18.8169 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 137.0125 (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	98.0308	97.5370	97.0529	94.7795	94.3541	92.3740	92.3740	92.0073	93.1367	94.3541	95.2146	96.1142	(38)
Heat transfer coeff	235.0432	234.5494	234.0654	231.7919	231.3666	229.3864	229.3864	229.0197	230.1491	231.3666	232.2271	233.1267	(39)
Average = Sum(39)m / 12 =												231.7899	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2769	1.2742	1.2716	1.2593	1.2569	1.2462	1.2462	1.2442	1.2503	1.2569	1.2616	1.2665	(40)
HLP (average)												1.2592	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9811 (42)
Hot water usage for mixer showers													
74.2039	73.0888	71.4638	68.3547	66.0603	63.5015	62.0471	63.6598	65.4276	68.1749	71.3508	73.9196	73.9196	(42a)
Hot water usage for baths													
32.0333	31.5576	30.8877	29.6524	28.7275	27.7018	27.1479	27.8131	28.5375	29.6349	30.8956	31.9250	31.9250	(42b)
Hot water usage for other uses													
45.1599	43.5178	41.8756	40.2334	38.5912	36.9490	36.9490	38.5912	40.2334	41.8756	43.5178	45.1599	45.1599	(42c)
Average daily hot water use (litres/day)													139.1680 (43)
Daily hot water use													
151.3972	148.1642	144.2270	138.2405	133.3790	128.1524	126.1440	130.0642	134.1985	139.6854	145.7642	151.0046	151.0046	(44)
Energy conte	239.7762	210.9838	221.6716	189.2444	179.5537	157.5784	152.5603	161.0466	165.4801	189.5518	207.6678	236.4367	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m													
35.9664	31.6476	33.2507	28.3867	26.9331	23.6368	22.8840	24.1570	24.8220	28.4328	31.1502	35.4655	35.4655	(46)
Water storage loss:													
Store volume													300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													2.1127 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													1.1409 (55)
Total storage loss													
35.3664	31.9439	35.3664	34.2256	35.3664	34.2256	35.3664	35.3664	34.2256	35.3664	34.2256	35.3664	35.3664	(56)
If cylinder contains dedicated solar storage													
35.3664	31.9439	35.3664	34.2256	35.3664	34.2256	35.3664	35.3664	34.2256	35.3664	34.2256	35.3664	35.3664	(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													
298.4050	263.9388	280.3004	245.9819	238.1825	214.3159	211.1891	219.6754	222.2177	248.1806	264.4053	295.0655	295.0655	(62)
WWHRS	-33.9229	-30.0017	-31.4161	-26.0138	-24.2439	-20.7457	-19.4458	-20.6786	-21.4643	-25.3040	-28.6664	-33.2947	(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													
264.4821	233.9371	248.8843	219.9682	213.9386	193.5703	191.7434	198.9968	200.7534	222.8766	235.7390	261.7708	261.7708	(64)
12Total per year (kWh/year)													
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													
126.6286	112.5162	120.6089	108.3138	106.6047	97.7849	97.6293	100.4510	100.4122	109.9290	114.4396	125.5183	125.5183	(65)

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

Metabolic gains (Table 5), Watts

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	149.0575	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	179.3805	198.5998	179.3805	185.3599	179.3805	185.3599	179.3805	179.3805	185.3599	179.3805	185.3599	179.3805	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	355.6419	359.3324	350.0326	330.2343	305.2427	281.7540	266.0621	262.3717	271.6715	291.4697	316.4614	339.9501	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	37.9057	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	-119.2460	(71)
Water heating gains (Table 5)	170.1998	167.4347	162.1087	150.4358	143.2858	135.8123	131.2222	135.0148	139.4614	147.7541	158.9439	168.7073	(72)
Total internal gains	775.9394	796.0842	762.2390	736.7473	698.6262	670.6434	644.3821	644.4843	664.2100	689.3215	731.4824	758.7551	(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					9.6500	11.2829	0.6300	0.7000			0.7700	33.2753 (75)	
Southeast					9.2300	36.7938	0.6300	0.7000			0.7700	103.7883 (77)	
Southwest					20.1400	36.7938	0.6300	0.7000			0.7700	226.4677 (79)	
Northwest					1.9800	18.0708	0.6300	0.7000			1.0000	14.2012 (82)	
North					2.8100	26.0000	0.6300	0.7000			1.0000	28.9975 (82)	
Solar gains	406.7300	720.3402	1054.6161	1415.6937	1680.3062	1708.4752	1630.4686	1427.7490	1179.2753	815.1343	492.2816	344.7140	(83)
Total gains	1182.6695	1516.4244	1816.8551	2152.4409	2378.9325	2379.1186	2274.8507	2072.2333	1843.4853	1504.4558	1223.7639	1103.4691	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)														
tau	52.9000	53.0114	53.1210	53.6420	53.7406	54.2045	54.2045	54.2913	54.0249	53.7406	53.5415	53.3349		
alpha	4.5267	4.5341	4.5414	4.5761	4.5827	4.6136	4.6136	4.6194	4.6017	4.5827	4.5694	4.5557		
util living area	0.9969	0.9904	0.9719	0.9102	0.7774	0.5898	0.4378	0.4972	0.7553	0.9530	0.9926	0.9978	(86)	
MIT	19.4032	19.6768	20.0524	20.5068	20.8235	20.9620	20.9922	20.9864	20.8857	20.4325	19.8261	19.3597	(87)	
Th 2	19.8590	19.8611	19.8631	19.8729	19.8747	19.8832	19.8832	19.8848	19.8799	19.8747	19.8710	19.8672	(88)	
util rest of house	0.9959	0.9872	0.9626	0.8818	0.7162	0.4980	0.3297	0.3822	0.6683	0.9319	0.9896	0.9970	(89)	
MIT 2	18.0091	18.3591	18.8333	19.3897	19.7342	19.8629	19.8809	19.8803	19.8062	19.3177	18.5581	17.9592	(90)	
Living area fraction									fLA = Living area / (4) =			0.3094	(91)	
MIT	18.4404	18.7668	19.2104	19.7353	20.0712	20.2030	20.2247	20.2225	20.1402	19.6626	18.9504	18.3925	(92)	
Temperature adjustment												0.0000		
adjusted MIT	18.4404	18.7668	19.2104	19.7353	20.0712	20.2030	20.2247	20.2225	20.1402	19.6626	18.9504	18.3925	(93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9940	0.9830	0.9557	0.8777	0.7278	0.5252	0.3633	0.4179	0.6904	0.9268	0.9862	0.9955	(94)
Useful gains	1175.5578	1490.6000	1736.2890	1889.1753	1731.3151	1249.6308	826.3704	865.9119	1272.7072	1394.3757	1206.8276	1098.5149	(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	3323.6138	3252.4439	2975.0755	2511.5415	1936.8203	1285.2453	831.4654	875.4307	1390.1502	2096.7803	2751.9873	3308.6542	(97)
Space heating kWh	1598.1536	1183.9591	921.6571	448.1036	152.8959	0.0000	0.0000	0.0000	0.0000	522.5890	1112.5150	1644.3437	(98a)
Space heating requirement - total per year (kWh/year)												7584.2170	
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	1598.1536	1183.9591	921.6571	448.1036	152.8959	0.0000	0.0000	0.0000	0.0000	522.5890	1112.5150	1644.3437	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												7584.2170	
Space heating per m ²										(98c) / (4) =		41.2029	(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	1598.1536	1183.9591	921.6571	448.1036	152.8959	0.0000	0.0000	0.0000	0.0000	522.5890	1112.5150	1644.3437	(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)	1731.4774	1282.7292	998.5451	485.4861	165.6510	0.0000	0.0000	0.0000	0.0000	566.1853	1205.3250	1781.5207	(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 requirement	264.4821	233.9371	248.8843	219.9682	213.9386	193.5703	191.7434	198.9968	200.7534	222.8766	235.7390	261.7708	(64)	
Efficiency of water heater	87.4003	87.1778	86.7204	85.6205	83.3197	79.8000	79.8000	79.8000	79.8000	85.9034	87.0828	79.8000	(216)	
(217)m												87.4456	(217)	

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Fuel for water heating, kWh/month	302.6099	268.3448	286.9962	256.9105	256.7684	242.5692	240.2799	249.3694	251.5707	259.4502	270.7068	299.3528	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	37.2717	29.9008	26.9223	19.7244	15.2357	12.4477	13.8985	18.0659	23.4658	30.7883	34.7754	38.3076	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-71.4168	-98.1633	-137.5588	-150.5656	-158.8435	-146.8389	-144.8061	-138.2582	-126.4195	-110.0541	-77.5209	-62.0248	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-48.4131	-100.7934	-198.5082	-295.6285	-388.6124	-389.8132	-385.4261	-327.5571	-241.5810	-143.5415	-64.4189	-38.3830	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												8216.9199	(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												3184.9289	(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)												300.8042	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-4045.1470	(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												7743.5059	(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	8216.9199	0.2100	1725.5532	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3184.9289	0.2100	668.8351	(264)
Space and water heating			2394.3882	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	300.8042	0.1443	43.4153	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1422.4705	0.1352	-192.2771	
PV Unit electricity exported	-2622.6766	0.1261	-330.8139	
Total			-523.0910	(269)
Total CO2, kg/year			1926.6418	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.4700	(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	8216.9199	1.1300	9285.1194	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3184.9289	1.1300	3598.9697	(278)
Space and water heating			12884.0891	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	300.8042	1.5338	461.3835	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1422.4705	1.4996	-2133.1405	
PV Unit electricity exported	-2622.6766	0.4630	-1214.3405	
Total			-3347.4810	(283)
Total Primary energy kWh/year			10128.0924	(286)
Target Primary Energy Rate (TPER)			55.0200	(287)