

Full SAP Calculation Printout



Plot Reference	34 KINGSLEY PLACE			Issued on Date	29/03/2026
Assessment Reference	BE GREEN	Plot Type Ref			
Plot Address	34 KINGSLEY PLACE, LONDON, N6			SAP Version	10.2
SAP Rating	97 A	DER	-0.04	TER	11.82
Environmental	100 A	% DER < TER			100.34
CO ₂ Emissions (t/year)	-0.03	DFEE	37.11	TFEE	43.61
Compliance Check	See BREL	% DFEE < TFEE			14.91
% DPER < TPER	85.02	DPER	9.27	TPER	61.87
Assessor Details	Mr. Ian Folkard			Assessor ID	P733-0001
Client	DAVID HURST,				

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						
Basement floor	33.4400 (1a)	x	2.3000 (2a)	=	76.9120 (1a) - (3a)	
Ground floor	49.9200 (1b)	x	2.7000 (2b)	=	134.7840 (1b) - (3b)	
First floor	24.8300 (1c)	x	2.7000 (2c)	=	67.0410 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	108.1900					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	278.7370	(5)

2. Ventilation rate

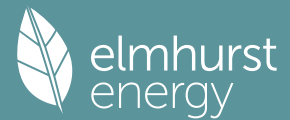
	m ³ per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	0 * 10 =	0.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		3.0000 (17)
Infiltration rate		0.1500 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498	(22b)
Balanced mechanical ventilation with heat recovery													
If mechanical ventilation												0.5000	(23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												81.9000	(23c)
Effective ac	0.2531	0.2499	0.2467	0.2307	0.2276	0.2116	0.2116	0.2084	0.2180	0.2276	0.2339	0.2403	(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			2.3600	1.0000	2.3600			(26)
WINDOW-VELFRIC 200 ENERGY			14.8800	0.7752	11.5349			(27)
ROOF WINDOW			2.7500	0.7752	2.1318			(27a)
LGF			33.4400	0.1000	3.3440	110.0000	3678.4000	(28)
GF			16.4800	0.1000	1.6480	110.0000	1812.8000	(28a)
BASEMENT WALL	46.9270		46.9270	0.1500	7.0391	9.0000	422.3430	(29a)
CAVITY WALL (LGF & GF)	102.3800	13.4900	88.8900	0.1500	13.3335	60.0000	5333.4000	(29a)
F1 WALL- CLT	57.2900	3.7500	53.5400	0.1500	8.0310	9.0000	481.8600	(29a)
FLAT RF	49.9200	2.7500	47.1700	0.1300	6.1321	9.0000	424.5300	(30)
Total net area of external elements Aum(A, m ²)			306.4370					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	55.5543			(33)
Main dwelling								
Internal Wall 1			120.0000			9.0000	1080.0000	(32c)

Full SAP Calculation Printout



Internal Floor 1	33.4400	18.0000	601.9200 (32d)
Internal Floor 2	24.8300	18.0000	446.9400 (32d)
Internal Ceiling 1	33.4400	9.0000	300.9600 (32e)
Internal Ceiling 2	24.8300	9.0000	223.4700 (32e)

Heat capacity $C_m = \text{Sum}(A \times k)$ (28)...(30) + (32) + (32a)...(32e) = 14806.6230 (34)
Thermal mass parameter (TMP = C_m / TFA) in $\text{kJ/m}^2\text{K}$ 136.8576 (35)

List of Thermal Bridges	Length	Psi-value	Total
K1 Element	12.4800	0.0500	0.6240
E2 Other lintels (including other steel lintels)	8.7500	0.0400	0.3500
E3 Sill	37.0800	0.0500	1.8540
E4 Jamb	46.2000	0.0500	2.3100
E16 Corner (normal)	15.4000	-0.0700	-1.0780
E17 Corner (inverted - internal area greater than external area)	15.8100	0.1000	1.5810
E5 Ground floor (normal)	33.9500	0.1000	3.3950
E14 Flat roof	35.7200	0.0400	1.4288
E6 Intermediate floor within a dwelling	3.5000	0.1000	0.3500
E19 Ground floor (inverted)	20.4000	0.1000	2.0400
E22 Basement floor	8.3000	0.1000	0.8300
E24 Eaves (insulation at ceiling level - inverted)			
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			13.6848 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 69.2391 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)\text{m} \times (5)$	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	23.2775	22.9843	22.6911	21.2251	20.9319	19.4659	19.4659	19.1728	20.0523	20.9319	21.5183	22.1047 (38)
Heat transfer coeff	92.5166	92.2234	91.9302	90.4642	90.1710	88.7051	88.7051	88.4119	89.2915	90.1710	90.7574	91.3438 (39)
Average = $\text{Sum}(39)\text{m} / 12 =$												90.3909
HLP	0.8551	0.8524	0.8497	0.8362	0.8335	0.8199	0.8199	0.8172	0.8253	0.8335	0.8389	0.8443 (40)
HLP (average)												0.8355
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

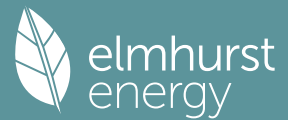
Assumed occupancy													2.8035 (42)
Hot water usage for mixer showers	80.1287	78.9245	77.1698	73.8125	71.3348	68.5718	67.0013	68.7427	70.6517	73.6183	77.0478	79.8217	(42a)
Hot water usage for baths	30.7525	30.2958	29.6527	28.4668	27.5788	26.5942	26.0624	26.7010	27.3964	28.4500	29.6603	30.6486	(42b)
Hot water usage for other uses	43.3408	41.7648	40.1887	38.6127	37.0367	35.4606	35.4606	37.0367	38.6127	40.1887	41.7648	43.3408	(42c)
Average daily hot water use (litres/day)												141.7891	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	154.2220	150.9851	147.0112	140.8919	135.9503	130.6266	128.5243	132.4804	136.6608	142.2570	148.4728	153.8110	(44)
Energy content (annual)	244.2500	215.0008	225.9507	192.8740	183.0153	160.6207	155.4390	164.0384	168.5164	193.0414	211.5267	240.8309	(45)
Distribution loss (46)m = 0.15 x (45)m	36.6375	32.2501	33.8926	28.9311	27.4523	24.0931	23.3158	24.6058	25.2775	28.9562	31.7290	36.1246	(46)
Water storage loss (or HIU loss):													
Store volume												300.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.1800	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.6372	(55)
Total storage loss	19.7532	17.8416	19.7532	19.1160	19.7532	19.1160	19.7532	19.7532	19.1160	19.7532	19.1160	19.7532	(56)
If cylinder contains dedicated solar storage	19.7532	17.8416	19.7532	19.1160	19.7532	19.1160	19.7532	19.7532	19.1160	19.7532	19.1160	19.7532	(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	287.2656	253.8536	268.9663	234.5020	226.0309	202.2487	198.4546	207.0540	210.1444	236.0570	253.1547	283.8465	(62)
WWHRS	-67.8904	-60.0428	-62.8734	-52.0616	-48.5196	-41.5185	-38.9170	-41.3843	-42.9567	-50.6412	-57.3703	-66.6331	(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	219.3752	193.8107	206.0929	182.4404	177.5113	160.7302	159.5376	165.6697	167.1877	185.4159	195.7844	217.2134	(64)
12Total per year (kWh/year)												2230.7693	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	115.6256	102.5700	109.5411	97.4330	95.2651	86.7088	86.0959	88.9553	89.3341	98.5988	103.6350	114.4888	(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	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	143.9722	159.3978	143.9722	148.7713	143.9722	148.7713	143.9722	143.9722	148.7713	143.9722	148.7713	143.9722 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	268.9294	271.7201	264.6877	249.7167	230.8185	213.0568	201.1910	198.4003	205.4327	220.4037	239.3019	257.0635 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176 (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)	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405 (71)
Water heating gains (Table 5)	155.4107	152.6339	147.2326	135.3236	128.0444	120.4289	115.7204	119.5635	124.0751	132.5252	143.9376	153.8827 (72)
Total internal gains	633.3651	648.8045	620.9453	598.8644	567.8879	547.3097	525.9363	526.9888	543.3318	561.9538	597.0635	619.9712 (73)

6. Solar gains

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[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					
North			1.3800	10.6334	0.5000	0.7000	0.7700	3.5592	(74)				
East			1.6000	19.6403	0.5000	0.7000	0.7700	7.6220	(76)				
South			7.8500	46.7521	0.5000	0.7000	0.7700	89.0168	(78)				
West			4.0500	19.6403	0.5000	0.7000	0.7700	19.2932	(80)				
West			2.7500	26.0000	0.5000	0.7000	1.0000	22.5225	(82)				
Solar gains	142.0136	252.0176	367.1340	484.8521	565.0284	569.1603	545.4174	485.2976	408.3544	284.9893	172.0522	120.2108	(83)
Total gains	775.3787	900.8221	988.0794	1083.7164	1132.9163	1116.4700	1071.3537	1012.2864	951.6862	846.9432	769.1157	740.1820	(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	44.4563	44.5977	44.7399	45.4649	45.6128	46.3666	46.3666	46.5203	46.0621	45.6128	45.3181	45.0271	
alpha	3.9638	3.9732	3.9827	4.0310	4.0409	4.0911	4.0911	4.1014	4.0708	4.0409	4.0212	4.0018	
util living area	0.9665	0.9411	0.8987	0.8052	0.6671	0.4923	0.3606	0.3960	0.6037	0.8402	0.9418	0.9713	(86)
Living	19.9175	20.1172	20.3596	20.6414	20.8184	20.9014	20.9194	20.9172	20.8711	20.6361	20.2415	19.8895	
Non living	18.9290	19.1805	19.4820	19.8286	20.0284	20.1221	20.1365	20.1376	20.0915	19.8315	19.3486	18.9010	
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	20.4462	20.1172	20.3596	20.6414	20.8184	20.9014	20.9194	20.9172	20.8711	20.6361	20.2415	20.0448	(87)
Th 2	20.2058	20.2081	20.2105	20.2221	20.2244	20.2361	20.2361	20.2385	20.2314	20.2244	20.2198	20.2151	(88)
util rest of house	0.9611	0.9320	0.8834	0.7780	0.6255	0.4384	0.2995	0.3327	0.5479	0.8113	0.9313	0.9666	(89)
MIT 2	19.6968	19.1805	19.4820	19.8286	20.0284	20.1221	20.1365	20.1376	20.0915	19.8315	19.3486	19.1378	(90)
Living area fraction									fLA = Living area / (4) =			0.1202	(91)
MIT	19.7868	19.2931	19.5874	19.9263	20.1234	20.2157	20.2306	20.2313	20.1851	19.9282	19.4559	19.2468	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.7868	19.2931	19.5874	19.9263	20.1234	20.2157	20.2306	20.2313	20.1851	19.9282	19.4559	19.2468	(93)
8. Space heating requirement													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9578	0.9194	0.8695	0.7667	0.6198	0.4369	0.2991	0.3321	0.5444	0.7989	0.9188	0.9594	(94)
Useful gains	742.6238	828.2150	859.1216	830.8924	702.1400	487.8131	320.3995	336.1941	518.0698	676.5831	706.6775	710.1238	(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	1432.7890	1327.3793	1203.1313	997.4853	759.5423	498.1409	322.0516	338.7327	543.3514	841.1349	1121.3893	1374.4283	(97)
Space heating kWh	513.4829	335.4384	255.9432	119.9469	42.7073	0.0000	0.0000	0.0000	0.0000	122.4265	298.5925	494.2426	(98a)
Space heating requirement - total per year (kWh/year)												2182.7802	
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	513.4829	335.4384	255.9432	119.9469	42.7073	0.0000	0.0000	0.0000	0.0000	122.4265	298.5925	494.2426	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2182.7802	
Space heating per m2										(98c) / (4) =		20.1754	(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 %)										401.0448 (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	513.4829	335.4384	255.9432	119.9469	42.7073	0.0000	0.0000	0.0000	0.0000	122.4265	298.5925	494.2426	(98)
Space heating efficiency (main heating system 1)	401.0448	401.0448	401.0448	401.0448	401.0448	0.0000	0.0000	0.0000	0.0000	401.0448	401.0448	401.0448	(210)
Space heating fuel (main heating system)	128.0363	83.6411	63.8191	29.9086	10.6490	0.0000	0.0000	0.0000	0.0000	30.5269	74.4536	123.2387	(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	219.3752	193.8107	206.0929	182.4404	177.5113	160.7302	159.5376	165.6697	167.1877	185.4159	195.7844	217.2134	(64)
Efficiency of water heater	189.6040	189.6040	189.6040	189.6040	189.6040	189.6040	189.6040	189.6040	189.6040	189.6040	189.6040	189.6040	(216)
Fuel for water heating, kWh/month	115.7018	102.2187	108.6965	96.2218	93.6221	84.7715	84.1425	87.3767	88.1773	97.7911	103.2596	114.5616	(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	13.3434	12.0521	13.3434	12.9129	13.3434	12.9129	13.3434	13.3434	12.9129	13.3434	12.9129	13.3434	(231)
Lighting	30.6075	24.5545	22.1086	16.1977	12.5116	10.2221	11.4135	14.8357	19.2701	25.2834	28.5575	31.4582	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-49.8308	-72.1640	-106.2385	-120.6545	-130.8034	-121.5771	-120.0955	-112.5434	-98.6112	-82.1933	-55.0196	-42.7467	(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	-20.2904	-44.8480	-93.0462	-146.4264	-199.1525	-202.8221	-200.0167	-167.1401	-120.4372	-67.3910	-28.1541	-15.9327	(233b)

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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													544.2734	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													189.6040	
Water heating fuel used													1176.5414	(219)
Space cooling fuel													0.0000	(221)
Electricity for pumps and fans:														
(BalancedWithHeatRecovery, Database: in-use factor = 1.1000, SFP = 0.4620)														
mechanical ventilation fans (SFP = 0.4620)													157.1073	(230a)
Total electricity for the above, kWh/year													157.1073	(231)
Electricity for lighting (calculated in Appendix L)													247.0205	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-2418.1352	(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													-293.1926	(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	544.2734	0.1565	85.1815 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1176.5414	0.1407	165.5844 (264)
Space and water heating			250.7658 (265)
Pumps, fans and electric keep-hot	157.1073	0.1387	21.7927 (267)
Energy for lighting	247.0205	0.1443	35.6527 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1112.4778	0.1343	-149.4520
PV Unit electricity exported	-1305.6573	0.1247	-162.7646
Total			-312.2166 (269)
Total CO2, kg/year			-4.0053 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			-0.0400 (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	544.2734	1.5794	859.6041 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1176.5414	1.5204	1788.8024 (278)
Space and water heating			2648.4066 (279)
Pumps, fans and electric keep-hot	157.1073	1.5128	237.6720 (281)
Energy for lighting	247.0205	1.5338	378.8882 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1112.4778	1.4965	-1664.8176
PV Unit electricity exported	-1305.6573	0.4575	-597.3908
Total			-2262.2084 (283)
Total Primary energy kWh/year			1002.7583 (286)
Dwelling Primary energy Rate (DPER)			9.2700 (287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)

CALCULATION OF TARGET EMISSIONS

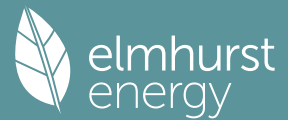
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Basement floor	33.4400 (1a)	x 2.3000 (2a)	= 76.9120 (1a) - (3a)
Ground floor	49.9200 (1b)	x 2.7000 (2b)	= 134.7840 (1b) - (3b)
First floor	24.8300 (1c)	x 2.7000 (2c)	= 67.0410 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	108.1900		(4)
Dwelling volume		(3a) + (3b) + (3c) + (3d) + (3e) ... (3n) =	278.7370 (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)

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Number of passive vents
Number of flueless gas fires

0 * 10 = 0.0000 (7b)
0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =
Pressure test
Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Air changes per hour
40.0000 / (5) = 0.1435 (8)
Yes
Blower Door
5.0000 (17)
0.3935 (18)
2 (19)

Shelter factor
Infiltration rate adjusted to include shelter factor

(20) = 1 - [0.075 x (19)] = 0.8500 (20)
(21) = (18) x (20) = 0.3345 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	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												
	0.4265	0.4181	0.4097	0.3679	0.3596	0.3178	0.3178	0.3094	0.3345	0.3596	0.3763	0.3930 (22b)
Effective ac	0.5909	0.5874	0.5839	0.5677	0.5646	0.5505	0.5505	0.5479	0.5559	0.5646	0.5708	0.5772 (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			2.3600	1.0000	2.3600		(26)
TER Opening Type			14.8800	1.1450	17.0382		(27)
TER Roof Window			2.7500	1.1450	4.3773		(27a)
LGF			33.4400	0.1300	4.3472		(28)
GF			16.4800	0.1300	2.1424		(28a)
BASEMENT WALL	46.9270		46.9270	0.1800	8.4469		(29a)
CAVITY WALL (LGF & GF)	102.3800	13.4900	88.8900	0.1800	16.0002		(29a)
F1 WALL- CLT	57.2900	3.7500	53.5400	0.1800	9.6372		(29a)
FLAT RF	49.9200	2.7500	47.1700	0.1100	5.1887		(30)
Total net area of external elements Aum(A, m2)			306.4370				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	69.5381		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							136.8576 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				12.4800	0.0500	0.6240	
E3 Sill				8.7500	0.0500	0.4375	
E4 Jamb				37.0800	0.0500	1.8540	
E16 Corner (normal)				46.2000	0.0900	4.1580	
E17 Corner (inverted - internal area greater than external area)				15.4000	-0.0900	-1.3860	
E5 Ground floor (normal)				15.8100	0.1600	2.5296	
E14 Flat roof				33.9500	0.0800	2.7160	
E6 Intermediate floor within a dwelling				35.7200	0.0000	0.0000	
E19 Ground floor (inverted)				3.5000	0.0700	0.2450	
E22 Basement floor				20.4000	0.0700	1.4280	
E24 Eaves (insulation at ceiling level - inverted)				8.3000	0.2400	1.9920	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)						14.5981	(36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	84.1362 (37)

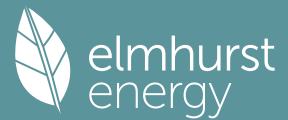
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	54.3560	54.0312	53.7129	52.2175	51.9377	50.6353	50.6353	50.3941	51.1370	51.9377	52.5037	53.0954 (38)
Heat transfer coeff	138.4922	138.1674	137.8490	136.3537	136.0739	134.7715	134.7715	134.5303	135.2731	136.0739	136.6399	137.2316 (39)
Average = Sum(39)m / 12 =												136.3523
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2801	1.2771	1.2741	1.2603	1.2577	1.2457	1.2457	1.2435	1.2503	1.2577	1.2630	1.2684 (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													2.8035 (42)
Hot water usage for mixer showers													
	71.2255	70.1551	68.5954	65.6111	63.4087	60.9527	59.5567	61.1046	62.8015	65.4385	68.4869	70.9526 (42a)	
Hot water usage for baths													
	30.7525	30.2958	29.6527	28.4668	27.5788	26.5942	26.0624	26.7010	27.3964	28.4500	29.6603	30.6486 (42b)	
Hot water usage for other uses													
	43.3408	41.7648	40.1887	38.6127	37.0367	35.4606	35.4606	37.0367	38.6127	40.1887	41.7648	43.3408 (42c)	
Average daily hot water use (litres/day)													133.5807 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	145.3188	142.2157	138.4368	132.6906	128.0242	123.0076	121.0797	124.8423	128.8106	134.0772	139.9119	144.9420 (44)	
Energy content (annual)	230.1495	202.5133	212.7721	181.6467	172.3452	151.2521	146.4354	154.5809	158.8363	181.9415	199.3302	226.9441 (45)	
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =			2218.7474
	34.5224	30.3770	31.9158	27.2470	25.8518	22.6878	21.9653	23.1871	23.8255	27.2912	29.8995	34.0416 (46)	
Water storage loss (or HIU 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 (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 (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													
	288.7783	255.4683	271.4010	238.3843	230.9740	207.9897	205.0642	213.2097	215.5739	240.5703	256.0678	285.5729 (62)	
WWHRS	-32.5613	-28.7975	-30.1551	-24.9696	-23.2708	-19.9130	-18.6652	-19.8486	-20.6027	-24.2883	-27.5157	-31.9583 (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													

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256.2170	226.6708	241.2459	213.4147	207.7032	188.0767	186.3990	193.3611	194.9712	216.2820	228.5520	253.6146 (64)
Total per year (kWh/year)											2606.5082 (64)
Electric shower(s)											2607 (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											
123.4278	109.6997	117.6498	105.7876	104.2078	95.6814	95.5928	98.3012	98.2031	107.3986	111.6673	122.3620 (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	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757	140.1757 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	140.1766	155.1955	140.1766	144.8492	140.1766	144.8492	140.1766	140.1766	144.8492	140.1766	144.8492	140.1766 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	268.9294	271.7201	264.6877	249.7167	230.8185	213.0568	201.1910	198.4003	205.4327	220.4037	239.3019	257.0635 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176	37.0176 (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)	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405	-112.1405 (71)
Water heating gains (Table 5)	165.8975	163.2436	158.1314	146.9272	140.0643	132.8908	128.4850	132.1253	136.3932	144.3530	155.0935	164.4650 (72)
Total internal gains	643.0563	658.2119	631.0485	609.5458	579.1121	555.8495	534.9053	535.7549	551.7278	572.9859	607.2973	629.7579 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
	m2	Table 6a	Specific data	Specific data	factor	W
		W/m2	or Table 6b	or Table 6c	Table 6d	
North	1.3800	10.6334	0.6300	0.7000	0.7700	4.4846 (74)
East	1.6000	19.6403	0.6300	0.7000	0.7700	9.6037 (76)
South	7.8500	46.7521	0.6300	0.7000	0.7700	112.1611 (78)
West	4.0500	19.6403	0.6300	0.7000	0.7700	24.3094 (80)
West	2.7500	26.0000	0.6300	0.7000	1.0000	28.3784 (82)
Solar gains						
178.9372	317.5422	462.5889	610.9136	711.9358	717.1420	687.2259
Total gains						
821.9934	975.7541	1093.6374	1220.4594	1291.0479	1272.9915	1222.1312
						1147.2299
						1066.2543
						932.0725
						824.0831
						151.4656 (83)
						781.2234 (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	29.6981	29.7679	29.8366	30.1638	30.2259	30.5180	30.5180	30.5727	30.4048	30.2259	30.1007	29.9709
alpha	2.9799	2.9845	2.9891	3.0109	3.0151	3.0345	3.0345	3.0382	3.0270	3.0151	3.0067	2.9981
util living area	0.9700	0.9501	0.9179	0.8503	0.7434	0.5929	0.4558	0.4979	0.6996	0.8808	0.9523	0.9739 (86)
MIT	18.7451	19.0680	19.5172	20.0843	20.5423	20.8381	20.9460	20.9284	20.7189	20.1104	19.3339	18.6943 (87)
Th 2	19.8565	19.8588	19.8611	19.8720	19.8741	19.8836	19.8836	19.8854	19.8799	19.8741	19.8700	19.8656 (88)
util rest of house	0.9642	0.9408	0.9023	0.8212	0.6925	0.5126	0.3513	0.3923	0.6261	0.8510	0.9418	0.9688 (89)
MIT 2	17.2563	17.6637	18.2259	18.9241	19.4549	19.7689	19.8583	19.8491	19.6599	18.9736	18.0117	17.1977 (90)
Living area fraction									fLA = Living area / (4) =			0.1202 (91)
MIT	17.4352	17.8324	18.3811	19.0635	19.5856	19.8973	19.9890	19.9788	19.7871	19.1102	18.1705	17.3775 (92)
Temperature adjustment												0.0000
adjusted MIT	17.4352	17.8324	18.3811	19.0635	19.5856	19.8973	19.9890	19.9788	19.7871	19.1102	18.1705	17.3775 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9463	0.9180	0.8758	0.7962	0.6778	0.5137	0.3617	0.4017	0.6192	0.8257	0.9196	0.9525	(94)
Useful gains	777.8851	895.7713	957.8580	971.6877	875.0982	653.8955	442.0260	460.8623	660.2541	769.5762	757.8665	744.0944	(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	1819.1205	1786.8384	1637.7954	1385.8268	1073.0188	713.9309	456.7348	481.4588	769.3182	1158.0196	1512.6768	1808.3708	(97)
Space heating kWh	774.6792	598.7971	505.8734	298.1802	147.2530	0.0000	0.0000	0.0000	0.0000	289.0019	543.4635	791.8217	(98a)
Space heating requirement - total per year (kWh/year)												3949.0699	
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	774.6792	598.7971	505.8734	298.1802	147.2530	0.0000	0.0000	0.0000	0.0000	289.0019	543.4635	791.8217	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3949.0699	
Space heating per m2											(98c) / (4) =	36.5012	(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	774.6792	598.7971	505.8734	298.1802	147.2530	0.0000	0.0000	0.0000	0.0000	289.0019	543.4635	791.8217 (98)
Space heating efficiency (main heating system 1)												

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Space heating fuel (main heating system)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
839.3057	648.7510	548.0752	323.0554	159.5374	0.0000	0.0000	0.0000	0.0000	0.0000	313.1115	588.8011	857.8783 (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	256.2170	226.6708	241.2459	213.4147	207.7032	188.0767	186.3990	193.3611	194.9712	216.2820	228.5520	253.6146 (64)
Efficiency of water heater (217)m	86.3788	86.1325	85.6798	84.8099	83.3025	79.8000	79.8000	79.8000	79.8000	84.7106	85.9309	79.8000 (216)
Fuel for water heating, kWh/month	296.6204	263.1652	281.5669	251.6389	249.3362	235.6851	233.5827	242.3071	244.3248	255.3188	265.9719	86.4351 (217)
Space cooling fuel requirement	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)
(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	29.1259	23.3659	21.0384	15.4136	11.9059	9.7273	10.8610	14.1175	18.3373	24.0595	27.1751	29.9354 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-46.1845	-64.8441	-92.8128	-103.8704	-111.5540	-103.9070	-102.5647	-97.0140	-87.1994	-73.8625	-50.6566	-39.9558 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	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)	-26.9082	-56.5136	-112.1782	-168.2949	-222.3781	-223.4350	-220.8614	-187.1197	-137.2701	-80.8234	-35.9225	-21.2901 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	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												4278.5156 (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												3112.9341 (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)												235.0629 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-2467.4211 (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												5245.0915 (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	4278.5156	0.2100	898.4883 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3112.9341	0.2100	653.7162 (264)
Space and water heating			1552.2044 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	235.0629	0.1443	33.9268 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-974.4259	0.1347	-131.2468
PV Unit electricity exported	-1492.9952	0.1259	-188.0026
Total			-319.2493 (269)
Total CO2, kg/year			1278.8112 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.8200 (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	4278.5156	1.1300	4834.7226 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3112.9341	1.1300	3517.6155 (278)
Space and water heating			8352.3381 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	235.0629	1.5338	360.5474 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-974.4259	1.4978	-1459.4975
PV Unit electricity exported	-1492.9952	0.4622	-690.0997
Total			-2149.5973 (283)
Total Primary energy kWh/year			6693.3890 (286)
Target Primary Energy Rate (TPER)			61.8700 (287)