

Full SAP Calculation Printout



Plot Reference	Nice Place			Issued on Date	20/03/2026
Assessment Reference	Nice Place	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	76 C	DER	3.83	TER	10.71
Environmental	95 A	% DER < TER			64.24
CO ₂ Emissions (t/year)	5.18	DFEE	49.83	TFEE	51.15
Compliance Check	See BREL	% DFEE < TFEE			2.59
% DPER < TPER	29.36	DPER	40.31	TPER	57.07
Assessor Details	Mr. George Farr			Assessor ID	T355-0001
Client	0 - Private Client, Private 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					
Basement floor	230.5100 (1a)	x	2.8500 (2a)	=	656.9535 (1a) - (3a)
Ground floor	223.8700 (1b)	x	4.0000 (2b)	=	895.4800 (1b) - (3b)
First floor	467.6700 (1c)	x	4.1000 (2c)	=	1917.4470 (1c) - (3c)
Second floor	399.2400 (1d)	x	4.1000 (2d)	=	1636.8840 (1d) - (3d)
Third floor	270.2900 (1e)	x	3.2600 (2e)	=	881.1454 (1e) - (3e)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	1591.5800				(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	5987.9099 (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)

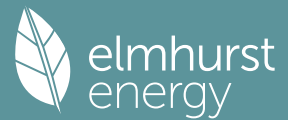
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	2.5000	(17)
Infiltration rate	0.1250	(18)
Number of sides sheltered	0	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	1.0000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1250 (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	0.1594	0.1562	0.1531	0.1375	0.1344	0.1187	0.1187	0.1156	0.1250	0.1344	0.1406	0.1469 (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) =												76.5000 (23c)
Effective ac	0.2769	0.2737	0.2706	0.2550	0.2519	0.2362	0.2362	0.2331	0.2425	0.2519	0.2581	0.2644 (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							
WINDOW			200.8100	0.9615	193.0865		(27)
Rooflight			18.9500	0.9615	18.2212		(27a)
BASEMENT			230.5100	0.1200	27.6612		(28)
GF			241.8900	0.1200	29.0268		(28a)
EW	782.1000	200.8100	581.2900	0.1400	81.3806		(29a)
BASEMENT	457.1200		457.1200	0.1400	63.9968		(29a)
DORMER	124.8300		124.8300	0.1400	17.4762		(29a)
SW	91.8600		91.8600	0.1300	11.9418		(29a)
SC	128.9600		128.9600	0.0952	12.2819		(30)
FR	28.7500	18.9500	9.8000	0.1100	1.0780		(30)
PR	96.2300		96.2300	0.1100	10.5853		(30)

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Total net area of external elements Aum(A, m2) 2182.2500 (31)
 Fabric heat loss, W/K = Sum (A x U) (26)...(30) + (32) = 466.7363 (33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 200.0000 (35)
 Thermal bridges (User defined value 0.070 * total exposed area) 152.7575 (36)
 Point Thermal bridges (36a) = 0.0000
 Total fabric heat loss (33) + (36) + (36a) = 619.4938 (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	547.1078	540.9328	534.7578	503.8826	497.7076	466.8324	466.8324	460.6574	479.1825	497.7076	510.0577	522.4077 (38)
Heat transfer coeff	1166.6016	1160.4266	1154.2516	1123.3764	1117.2014	1086.3262	1086.3262	1080.1512	1098.6763	1117.2014	1129.5514	1141.9015 (39)
Average = Sum(39)m / 12 =												1121.8327
HLP	0.7330	0.7291	0.7252	0.7058	0.7019	0.6825	0.6825	0.6787	0.6903	0.7019	0.7097	Dec 0.7175 (40)
HLP (average)												0.7049
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												4.8110 (42)
Hot water usage for mixer showers	104.8848	103.3086	101.0117	96.6171	93.3740	89.7573	87.7016	89.9810	92.4797	96.3630	100.8520	104.4829 (42a)
Hot water usage for baths	45.2271	44.5554	43.6095	41.8655	40.5596	39.1116	38.3294	39.2687	40.2913	41.8408	43.6207	45.0742 (42b)
Hot water usage for other uses	63.8993	61.5757	59.2521	56.9285	54.6048	52.2812	52.2812	54.6048	56.9285	59.2521	61.5757	63.8993 (42c)
Average daily hot water use (litres/day)												196.7231 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	214.0111	209.4396	203.8733	195.4111	188.5384	181.1501	178.3122	183.8545	189.6995	197.4558	206.0484	213.4564 (44)
Energy content (annual)	338.9413	298.2392	313.3457	267.5080	253.8090	222.7452	215.6531	227.6503	233.9185	267.9457	293.5537	334.2211 (45)
Distribution loss (46)m = 0.15 x (45)m	50.8412	44.7359	47.0018	40.1262	38.0713	33.4118	32.3480	34.1475	35.0878	40.1919	44.0331	50.1332 (46)
Water storage loss (or HIU loss):												
Store volume												300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6900 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9126 (55)
Total storage loss	28.2906	25.5528	28.2906	27.3780	28.2906	27.3780	28.2906	28.2906	27.3780	28.2906	27.3780	28.2906 (56)
If cylinder contains dedicated solar storage	28.2906	25.5528	28.2906	27.3780	28.2906	27.3780	28.2906	28.2906	27.3780	28.2906	27.3780	28.2906 (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												
	390.4943	344.8032	364.8987	317.3980	305.3620	272.6352	267.2061	279.2033	283.8085	319.4987	343.4437	385.7741 (62)
WWHRS	-85.4487	-75.5716	-79.1342	-65.5262	-61.0681	-52.2564	-48.9820	-52.0875	-54.0665	-63.7384	-72.2079	-83.8663 (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	305.0456	269.2317	285.7645	251.8717	244.2939	220.3788	218.2241	227.1158	229.7420	255.7603	271.2358	301.9078 (64)
Total per year (kWh/year) = Sum(64)m =												3080.5720 (64)
Electric shower(s)												3081 (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												
	153.9404	136.4157	145.4298	128.8584	125.6339	113.9748	112.9471	116.9361	117.6899	130.3343	137.5186	152.3709 (65)

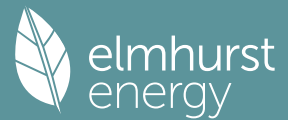
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
686.0498	759.5551	686.0498	708.9181	686.0498	708.9181	686.0498	686.0498	708.9181	686.0498	708.9181	686.0498 (67)	
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
1232.0334	1244.8180	1212.6011	1144.0152	1057.4377	976.0670	921.7065	908.9218	941.1387	1009.7247	1096.3022	1177.6728 (68)	
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549 (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 (70)	
Losses e.g. evaporation (negative values) (Table 5)												
-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394 (71)	
Water heating gains (Table 5)												
206.9091	202.9996	195.4702	178.9700	168.8627	158.2983	151.8106	157.1722	163.4582	175.1806	190.9981	204.7996 (72)	
Total internal gains	2220.1570	2302.5375	2189.2859	2127.0680	2007.5149	1938.4482	1854.7316	1847.3085	1908.6798	1966.1198	2091.3831	2163.6870 (73)

6. Solar gains

[Jan]	Area m2		Solar flux Table 6a W/m2		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
North	41.1100		10.6334		0.5700		0.7000		0.7700		120.8719 (74)	
East	42.8800		19.6403		0.5700		0.7000		0.7700		232.8671 (76)	
South	24.6000		46.7521		0.5700		0.7000		0.7700		318.0109 (78)	
West	92.2200		19.6403		0.5700		0.7000		0.7700		500.8164 (80)	
East	18.9500		26.0000		0.5700		0.7000		1.0000		176.9286 (82)	
Solar gains	1349.4950	2554.5201	4072.8566	5848.2637	7161.9216	7346.8875	6987.0267	5992.0616	4696.5370	2988.8799	1665.4428	1121.8050 (83)
Total gains	3569.6520	4857.0576	6262.1424	7975.3317	9169.4365	9285.3356	8841.7582	7839.3702	6605.2167	4954.9997	3756.8259	3285.4920 (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	75.7937	76.1971	76.6047	78.7101	79.1452	81.3946	81.3946	81.8599	80.4797	79.1452	78.2798	77.4332
alpha	6.0529	6.0798	6.1070	6.2473	6.2763	6.4263	6.4263	6.4573	6.3653	6.2763	6.2187	6.1622
util living area	1.0000	0.9998	0.9985	0.9849	0.9102	0.7156	0.5358	0.6212	0.9160	0.9973	0.9999	1.0000 (86)
Living	19.8992	20.0362	20.2564	20.5694	20.8147	20.9311	20.9488	20.9453	20.8492	20.5069	20.1579	19.8972
Non living	18.9673	19.1457	19.4309	19.8434	20.1435	20.2797	20.2929	20.2946	20.1969	19.7688	19.3159	18.9758
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	31	28	31	30	31	30	31	31	30	31	30	31
16 / 9	0	0	0	0	0	0	0	0	0	0	0	0
MIT	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000 (87)
Th 2	20.3118	20.3152	20.3186	20.3357	20.3391	20.3563	20.3563	20.3597	20.3494	20.3391	20.3323	20.3254 (88)
util rest of house	1.0000	0.9997	0.9980	0.9801	0.8836	0.6551	0.4598	0.5406	0.8804	0.9961	0.9999	1.0000 (89)
MIT 2	20.3118	20.3152	20.3186	20.3357	20.3391	20.3563	20.3563	20.3597	20.3494	20.3391	20.3323	20.3254 (90)
Living area fraction									fLA = Living area / (4) =			0.0471 (91)
MIT	20.3442	20.3474	20.3507	20.3670	20.3702	20.3866	20.3866	20.3899	20.3800	20.3702	20.3637	20.3572 (92)
Temperature adjustment												0.0000
adjusted MIT	20.3442	20.3474	20.3507	20.3670	20.3702	20.3866	20.3866	20.3899	20.3800	20.3702	20.3637	20.3572 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	1.0000	0.9997	0.9980	0.9803	0.8850	0.6581	0.4634	0.5445	0.8823	0.9961	0.9999	1.0000	(94)
Useful gains	3569.5247	4855.7949	6249.6813	7818.5327	8115.4039	6110.9270	4097.3259	4268.4474	5827.9559	4935.9046	3756.3088	3285.4269	(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	18717.1923	17925.6304	15987.1895	12881.7333	9686.4063	6286.1295	4113.4770	4309.6653	6899.7380	10915.3278	14982.0514	18449.9343	(97)
Space heating kWh	11269.8647	8782.9294	7244.7061	3645.5044	1168.8258	0.0000	0.0000	0.0000	0.0000	4448.6909	8082.5347	11282.3935	(98a)
Space heating requirement - total per year (kWh/year)												55925.4496	
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	11269.8647	8782.9294	7244.7061	3645.5044	1168.8258	0.0000	0.0000	0.0000	0.0000	4448.6909	8082.5347	11282.3935	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												55925.4496	
Space heating per m2										(98c) / (4) =		35.1383	(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 %)													198.4957 (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	11269.8647	8782.9294	7244.7061	3645.5044	1168.8258	0.0000	0.0000	0.0000	0.0000	4448.6909	8082.5347	11282.3935	(98)
Space heating efficiency (main heating system 1)	198.4957	198.4957	198.4957	198.4957	198.4957	0.0000	0.0000	0.0000	0.0000	198.4957	198.4957	198.4957	(210)
Space heating fuel (main heating system)	5677.6377	4424.7462	3649.8057	1836.5662	588.8420	0.0000	0.0000	0.0000	0.0000	2241.2030	4071.8948	5683.9495	(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	305.0456	269.2317	285.7645	251.8717	244.2939	220.3788	218.2241	227.1158	229.7420	255.7603	271.2358	301.9078	(64)
Efficiency of water heater	105.0600	105.0600	105.0600	105.0600	105.0600	105.0600	105.0600	105.0600	105.0600	105.0600	105.0600	105.0600	(216)
Fuel for water heater, kWh/month	290.3537	256.2647	272.0012	239.7408	232.5279	209.7647	207.7138	216.1773	218.6770	243.4421	258.1723	287.3670	(219)
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)
Pumps and Fa	1042.3491	941.4766	1042.3491	1008.7249	1042.3491	1008.7249	1042.3491	1042.3491	1008.7249	1042.3491	1008.7249	1042.3491	(231)
Lighting	166.4581	133.5389	120.2370	88.0908	68.0438	55.5924	62.0719	80.6834	104.7997	137.5029	155.3092	171.0845	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	-117.0555	-185.1829	-295.5429	-359.0648	-396.7454	-364.8158	-361.7970	-327.5118	-271.1223	-221.6352	-134.8786	-98.9651	(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)	-15.1729	-35.4683	-80.2512	-144.5734	-225.4571	-246.9084	-241.8430	-199.8916	-141.9403	-60.4379	-21.9633	-11.6874	(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												28174.6451	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												105.0600	
Water heating fuel used												2932.2025	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:
(BalancedWithHeatRecovery, DataSheet: in-use factor = 1.4000, SFP = 1.6800)

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mechanical ventilation fans (SFP = 1.6800)	12272.8201 (230a)
Total electricity for the above, kWh/year	12272.8201 (231)
Electricity for lighting (calculated in Appendix L)	1343.4126 (232)

Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-4559.9120 (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	40163.1684 (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	28174.6451	0.1554	4378.3342 (261)
Total CO2 associated with community systems			0.0000 (273)
Water heating (other fuel)	2932.2025	0.1408	412.9742 (264)
Space and water heating			4791.3084 (265)
Pumps, fans and electric keep-hot	12272.8201	0.1387	1702.3915 (267)
Energy for lighting	1343.4126	0.1443	193.8960 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-3134.3173	0.1334	-417.9800
PV Unit electricity exported	-1425.5947	0.1206	-171.9404
Total			-589.9204 (269)
Total CO2, kg/year			6097.6755 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.8300 (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	28174.6451	1.5753	44384.4824 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2932.2025	1.5208	4459.2215 (278)
Space and water heating			48843.7040 (279)
Pumps, fans and electric keep-hot	12272.8201	1.5128	18566.3223 (281)
Energy for lighting	1343.4126	1.5338	2060.5711 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-3134.3173	1.4928	-4678.9440
PV Unit electricity exported	-1425.5947	0.4424	-630.6579
Total			-5309.6019 (283)
Total Primary energy kWh/year			64160.9954 (286)
Dwelling Primary energy Rate (DPER)			40.3100 (287)

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

CALCULATION OF TARGET EMISSIONS

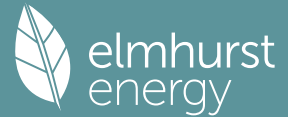
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Basement floor	230.5100 (1a)	x 2.8500 (2a)	= 656.9535 (1a) - (3a)
Ground floor	223.8700 (1b)	x 4.0000 (2b)	= 895.4800 (1b) - (3b)
First floor	467.6700 (1c)	x 4.1000 (2c)	= 1917.4470 (1c) - (3c)
Second floor	399.2400 (1d)	x 4.1000 (2d)	= 1636.8840 (1d) - (3d)
Third floor	270.2900 (1e)	x 3.2600 (2e)	= 881.1454 (1e) - (3e)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	1591.5800		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 5987.9099 (5)
Dwelling volume			

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) = 0.0067 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.2567 (18)
Number of sides sheltered	0 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 1.0000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2567 (21)

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Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Effective ac	0.3273	0.3209	0.3144	0.2823	0.2759	0.2438	0.2438	0.2374	0.2567	0.2759	0.2888	0.3016	(22b)
	0.5536	0.5515	0.5494	0.5399	0.5381	0.5297	0.5297	0.5282	0.5329	0.5381	0.5417	0.5455	(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 Opening Type			200.8100	1.1450	229.9351		(27)
TER Roof Light			18.9500	1.5918	38.3180		(27a)
BASEMENT			230.5100	0.1300	29.9663		(28)
GF			241.8900	0.1300	31.4457		(28a)
EW	782.1000	200.8100	581.2900	0.1800	104.6322		(29a)
BASEMENT	457.1200		457.1200	0.1800	82.2816		(29a)
DORMER	124.8300		124.8300	0.1800	22.4694		(29a)
SW	91.8600		91.8600	0.1800	16.5348		(29a)
SC	128.9600		128.9600	0.1100	14.1856		(30)
FR	28.7500	18.9500	9.8000	0.1100	1.0780		(30)
PR	96.2300		96.2300	0.1100	10.5853		(30)
Total net area of external elements Aum(A, m2)			2182.2500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	581.4320		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							200.0000 (35)

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

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element	30.8100	0.0500	1.5405
E2 Other lintels (including other steel lintels)	30.8100	0.0500	1.5405
E3 Sill	53.9500	0.0500	2.6975
E4 Jamb	66.4400	0.1600	10.6304
E5 Ground floor (normal)	81.4100	0.0000	0.0000
E6 Intermediate floor within a dwelling	80.7500	0.0600	4.8450
E10 Eaves (insulation at ceiling level)	0.0000	0.2400	0.0000
E24 Eaves (insulation at ceiling level - inverted)	39.1900	0.0400	1.5676
E11 Eaves (insulation at rafter level)	30.2500	0.0600	1.8150
E12 Gable (insulation at ceiling level)	10.1300	0.0800	0.8104
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000
E14 Flat roof	44.3000	0.0900	3.9870
E16 Corner (normal)	17.6400	-0.0900	-1.5876
E17 Corner (inverted - internal area greater than external area)	0.0000	0.0600	0.0000
E18 Party wall between dwellings	0.0000	0.0500	0.0000
E1 Steel lintel with perforated steel base plate	0.0000	0.3200	0.0000
E21 Exposed floor (inverted)	13.2500	0.0800	1.0600
R3 Jamb of roof window	19.2700	0.3200	6.1664
E20 Exposed floor (normal)	4.3400	0.0800	0.3472
R1 Head of roof window	4.3400	0.0600	0.2604
R2 Sill of roof window	0.0000	0.0800	0.0000
P5 Party wall - Roof (insulation at rafter level)			35.6803 (36)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			(36a) = 0.0000
Point Thermal bridges			(33) + (36) + (36a) = 617.1123 (37)
Total fabric heat loss			

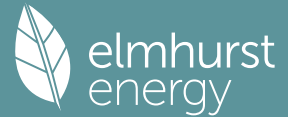
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	1093.8242	1089.7151	1085.6874	1066.7694	1063.2299	1046.7528	1046.7528	1043.7015	1053.0995	1063.2299	1070.3902	1077.8761	(38)
Average = Sum(39)m / 12 =	1710.9366	1706.8275	1702.7998	1683.8817	1680.3422	1663.8652	1663.8652	1660.8139	1670.2119	1680.3422	1687.5026	1694.9884	(39)
												1683.8647	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0750	1.0724	1.0699	1.0580	1.0558	1.0454	1.0454	1.0435	1.0494	1.0558	1.0603	1.0650	(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													4.8110 (42)
Hot water usage for mixer showers													
Hot water usage for baths	104.8848	103.3086	101.0117	96.6171	93.3740	89.7573	87.7016	89.9810	92.4797	96.3630	100.8520	104.4829	(42a)
Hot water usage for other uses	45.2271	44.5554	43.6095	41.8655	40.5596	39.1116	38.3294	39.2687	40.2913	41.8408	43.6207	45.0742	(42b)
Average daily hot water use (litres/day)	63.8993	61.5757	59.2521	56.9285	54.6048	52.2812	52.2812	54.6048	56.9285	59.2521	61.5757	63.8993	(42c)
												196.7231	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	214.0111	209.4396	203.8733	195.4111	188.5384	181.1501	178.3122	183.8545	189.6995	197.4558	206.0484	213.4564	(44)
Energy content (annual)	338.9413	298.2392	313.3457	267.5080	253.8090	222.7452	215.6531	227.6503	233.9185	267.9457	293.5537	334.2211	(45)
Distribution loss (46)m = 0.15 x (45)m	50.8412	44.7359	47.0018	40.1262	38.0713	33.4118	32.3480	34.1475	35.0878	40.1919	44.0331	50.1332	(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													
Primary 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	(57)
Combi 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)
Total heat required for water heating calculated for each month	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)
WWHRS	397.5702	351.1943	371.9745	324.2455	312.4378	279.4827	274.2820	286.2791	290.6561	326.5745	350.2913	392.8499	(62)
PV diverter	-47.9489	-42.4064	-44.4056	-36.7696	-34.2679	-29.3233	-27.4859	-29.2285	-30.3390	-35.7664	-40.5189	-47.0610	(63a)
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	(63b)
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	(63c)
Output from w/h	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)
	349.6212	308.7879	327.5689	287.4760	278.1698	250.1594	246.7960	257.0506	260.3171	290.8082	309.7723	345.7889	(64)
Total per year (kWh/year) = Sum(64)m =												3512.3163	(64)

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12Total per year (kWh/year)	3512 (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 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)											
Heat gains from water heating, kWh/month	159.6010	141.5286	151.0905	134.3364	131.2945	119.4528	118.6077	122.5968	123.1680	135.9950	142.9967 (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	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492	240.5492 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	666.1364	737.5081	666.1364	688.3409	666.1364	688.3409	666.1364	666.1364	688.3409	666.1364	688.3409	666.1364 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	1232.0334	1244.8180	1212.6011	1144.0152	1057.4377	976.0670	921.7065	908.9218	941.1387	1009.7247	1096.3022	1177.6728 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549	47.0549 (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)	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394	-192.4394 (71)
Water heating gains (Table 5)	214.5175	210.6080	203.0786	186.5784	176.4711	165.9067	159.4190	164.7806	171.0666	182.7890	198.6065	212.4080 (72)
Total internal gains	2210.8520	2291.0989	2179.9809	2117.0992	1998.2099	1925.4794	1842.4265	1835.0035	1895.7110	1956.8148	2081.4143	2154.3820 (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	
North				41.1100	10.6334		0.6300	0.7000	0.7700		133.5953 (74)	
East				42.8800	19.6403		0.6300	0.7000	0.7700		257.3795 (76)	
South				24.6000	46.7521		0.6300	0.7000	0.7700		351.4858 (78)	
West				92.2200	19.6403		0.6300	0.7000	0.7700		553.5339 (80)	
East				18.9500	26.0000		0.6300	0.7000	1.0000		195.5526 (82)	
Solar gains	1491.5471	2823.4170	4501.5783	6463.8704	7915.8080	8120.2440	7722.5032	6622.8050	5190.9093	3303.4988	1840.7526	1239.8898 (83)
Total gains	3702.3991	5114.5159	6681.5592	8580.9697	9914.0179	10045.7234	9564.9297	8457.8085	7086.6202	5260.3136	3922.1669	3394.2717 (84)

7. Mean internal temperature (heating season)

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

Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	51.6799	51.8044	51.9269	52.5103	52.6209	53.1420	53.1420	53.2396	52.9401	52.6209	52.3976	52.1662
alpha	4.4453	4.4536	4.4618	4.5007	4.5081	4.5428	4.5428	4.5493	4.5293	4.5081	4.4932	4.4777
util living area	0.9999	0.9995	0.9979	0.9881	0.9488	0.8426	0.6964	0.7758	0.9543	0.9969	0.9997	0.9999 (86)
MIT	18.9775	19.1800	19.5327	20.0290	20.4920	20.8212	20.9460	20.9117	20.6106	20.0011	19.4062	18.9558 (87)
Th 2	20.0213	20.0234	20.0255	20.0353	20.0371	20.0457	20.0457	20.0472	20.0424	20.0371	20.0334	20.0295 (88)
util rest of house	0.9999	0.9994	0.9972	0.9837	0.9277	0.7749	0.5745	0.6634	0.9264	0.9954	0.9996	0.9999 (89)
MIT 2	17.6008	17.8620	18.3155	18.9555	19.5329	19.9116	20.0206	20.0003	19.6898	18.9240	18.1590	17.5785 (90)
Living area fraction	17.6656	17.9241	18.3728	19.0060	19.5781	19.9544	20.0642	20.0432	19.7331	18.9748	18.2178	17.6434 (91)
MIT	17.6656	17.9241	18.3728	19.0060	19.5781	19.9544	20.0642	20.0432	19.7331	18.9748	18.2178	17.6434 (92)
Temperature adjustment	17.6656	17.9241	18.3728	19.0060	19.5781	19.9544	20.0642	20.0432	19.7331	18.9748	18.2178	17.6434 (93)

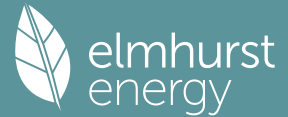
8. Space heating requirement

Utilisation	0.9997	0.9989	0.9952	0.9767	0.9144	0.7672	0.5771	0.6628	0.9136	0.9926	0.9993	0.9998 (94)
Useful gains	3701.4514	5108.8483	6649.4778	8381.1376	9065.2901	7707.0140	5519.7521	5606.1593	6474.3840	5221.1313	3919.4280	3393.6990 (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	22867.7266	22229.8276	20217.0660	17017.3350	13237.8425	8909.0807	5763.9447	6050.7438	9408.5059	14072.4805	18761.2379	22786.3508 (97)
Space heating kWh	14259.7088	11505.2981	10094.2856	6218.0621	3104.3790	0.0000	0.0000	0.0000	0.0000	6585.4038	10686.1031	14428.1330 (98a)
Space heating requirement - total per year (kWh/year)												76881.3736
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	14259.7088	11505.2981	10094.2856	6218.0621	3104.3790	0.0000	0.0000	0.0000	0.0000	6585.4038	10686.1031	14428.1330 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												76881.3736
Space heating per m2												(98c) / (4) = 48.3051 (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	14259.7088	11505.2981	10094.2856	6218.0621	3104.3790	0.0000	0.0000	0.0000	0.0000	6585.4038	10686.1031	14428.1330 (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)												

Full SAP Calculation Printout



15449.3053	12465.1117	10936.3875	6736.7954	3363.3575	0.0000	0.0000	0.0000	0.0000	7134.7820	11577.5765	15631.7800	(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												
349.6212	308.7879	327.5689	287.4760	278.1698	250.1594	246.7960	257.0506	260.3171	290.8082	309.7723	345.7889	(64)
Efficiency of water heater												
(217)m	88.5610	88.5390	88.4863	88.3596	87.9840	79.8000	79.8000	79.8000	79.8000	88.3785	88.5188	(216)
Fuel for water heating, kWh/month	394.7802	348.7591	370.1915	325.3476	316.1597	313.4830	309.2682	322.1186	326.2118	329.0487	349.9511	(217)
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	(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	(231)
Lighting	138.4100	111.0376	99.9771	73.2475	56.5785	46.2251	51.6128	67.0882	87.1410	114.3337	129.1396	(232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-210.2326	-293.5963	-417.6067	-463.6914	-494.0086	-457.6729	-450.8091	-427.9015	-387.5638	-331.8141	-229.6588	(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	(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	(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	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	-127.2795	-266.7839	-528.9573	-793.0560	-1047.9523	-1053.8578	-1042.6394	-884.1109	-648.9439	-382.4618	-170.1277	(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	(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	(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	(235d)
Annual totals kWh/year												
Space heating fuel - main system 1											83295.0960	(211)
Space heating fuel - main system 2											0.0000	(213)
Space heating fuel - secondary											0.0000	(215)
Efficiency of water heater											79.8000	(216)
Water heating fuel used											4095.7495	(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)											1117.0478	(232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation											-11393.5343	(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											77200.3590	(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	83295.0960	0.2100	17491.9702 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	4095.7495	0.2100	860.1074 (264)
Space and water heating			18352.0775 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	1117.0478	0.1443	161.2245 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-4346.5404	0.1349	-586.2912
PV Unit electricity exported	-7046.9939	0.1259	-887.3581
Total			-1473.6492 (269)
Total CO2, kg/year			17051.5821 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.7100 (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	83295.0960	1.1300	94123.4584 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	4095.7495	1.1300	4628.1969 (278)
Space and water heating			98751.6553 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	1117.0478	1.5338	1713.3652 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-4346.5404	1.4985	-6513.4499
PV Unit electricity exported	-7046.9939	0.4622	-3257.2035
Total			-9770.6534 (283)
Total Primary energy kWh/year			90824.4680 (286)
Target Primary Energy Rate (TPER)			57.0700 (287)