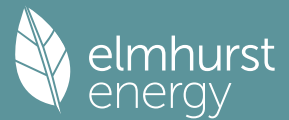


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Property Reference	23-262		Issued on Date	09/01/2024	
Assessment Reference	23-262	Prop Type Ref	Bungalow		
Property	rear of 189, Newark Road, North Hykeham, Lincoln, Lincs, LN6 8				
SAP Rating	99 A	DER	-1.79	TER	10.54
Environmental	102 A	% DER < TER			116.98
CO ₂ Emissions (t/year)	-0.22	DFEE	43.76	TFEE	52.77
Compliance Check	See BREL	% DFEE < TFEE			17.06
% DPER < TPER	91.88	DPER	4.62	TPER	56.92
Assessor Details	Mrs. Kerry Simpson			Assessor ID	Y750-0001
Client	23-262, Adam Wilson				

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)
Ground floor	99.9000	2.8900	288.7110
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	99.9000		288.7110
Dwelling volume			288.7110

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		1.0000 (17)
Infiltration rate		0.0500 (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) =	0.0425 (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	0.0542	0.0531	0.0521	0.0468	0.0457	0.0404	0.0404	0.0393	0.0425	0.0457	0.0478	0.0499 (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) =												79.2000 (23c)
Effective ac	0.1582	0.1571	0.1561	0.1507	0.1497	0.1444	0.1444	0.1433	0.1465	0.1497	0.1518	0.1539 (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
Glazing (Uw = 1.00)			23.0700	0.9615	22.1827		(27)
Door			2.1000	1.0000	2.1000		(26)
S/E			2.1600	0.9615	2.0769		(27a)
S/W			2.1600	0.9615	2.0769		(27a)
Ground Floor			99.9000	0.1100	10.9890	110.0000	10989.0000 (28a)
External Wall	116.6800	25.1700	91.5100	0.1800	16.4718	60.0000	5490.6000 (29a)
wall to loft space	10.1700		10.1700	0.1300	1.3221	9.0000	91.5300 (29a)
Plane Roof	56.2800		56.2800	0.1000	5.6280	9.0000	506.5200 (30)
Slope Roof	47.0200	4.3200	42.7000	0.1400	5.9780	9.0000	384.3000 (30)
Total net area of external elements Aum(A, m ²)			330.0500				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	68.8254	(33)
Internal Wall 1			162.1900			9.0000	1459.7100 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 18921.6600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							189.4060 (35)

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List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E2 Other lintels (including other steel lintels)	13.8800	0.0600	0.8328
E3 Sill	6.8000	0.0160	0.1088
E4 Jamb	26.8100	0.0180	0.4826
E5 Ground floor (normal)	44.3800	0.0580	2.5740
E16 Corner (normal)	14.4000	0.0420	0.6048
R1 Head of roof window	3.6000	0.0610	0.2196
R2 Sill of roof window	3.6000	0.0600	0.2160
R3 Jamb of roof window	9.6000	0.0560	0.5376
E17 Corner (inverted - internal area greater than external area)	4.8000	-0.0700	-0.3360
E10 Eaves (insulation at ceiling level)	15.6600	0.0550	0.8613
E12 Gable (insulation at ceiling level)	8.3000	0.0570	0.4731
E11 Eaves (insulation at rafter level)	12.1200	0.0520	0.6302
E13 Gable (insulation at rafter level)	11.9700	0.0630	0.7541
R4 Ridge (vaulted ceiling)	6.0600	0.1200	0.7272
R10 All other roof or room-in-roof junctions	2.3300	0.3200	0.7456

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 9.4318 (36)
 Point Thermal bridges (36a) = 0.0000
 Total fabric heat loss (33) + (36) + (36a) = 78.2572 (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	15.0713	14.9700	14.8688	14.3627	14.2614	13.7553	13.7553	13.6540	13.9577	14.2614	14.4639	14.6663 (38)
Heat transfer coeff	93.3285	93.2272	93.1260	92.6199	92.5186	92.0125	92.0125	91.9113	92.2149	92.5186	92.7211	92.9235 (39)
Average = Sum(39)m / 12 =												92.5946
HLP	0.9342	0.9332	0.9322	0.9271	0.9261	0.9210	0.9210	0.9200	0.9231	0.9261	0.9281	0.9302 (40)
HLP (average)												0.9269
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.7386 (42)

Hot water usage for mixer showers

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot water usage for mixer showers	87.6713	86.3538	84.4339	80.7605	78.0497	75.0265	73.3082	75.2136	77.3022	80.5481	84.3004	87.3354 (42a)
Hot water usage for baths	30.2845	29.8347	29.2013	28.0335	27.1591	26.1894	25.6657	26.2946	26.9794	28.0170	29.2088	30.1821 (42b)
Hot water usage for other uses	42.6760	41.1241	39.5723	38.0204	36.4686	34.9167	34.9167	36.4686	38.0204	39.5723	41.1241	42.6760 (42c)
Average daily hot water use (litres/day)												147.7049 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	160.6318	157.3126	153.2075	146.8145	141.6773	136.1327	133.8906	137.9768	142.3021	148.1374	154.6334	160.1935 (44)
Energy conte	254.4015	224.0111	235.4743	200.9817	190.7249	167.3910	161.9291	170.8441	175.4727	201.0210	220.3036	250.8243 (45)
Energy content (annual)												Total = Sum(45)m = 2453.3792
Distribution loss (46)m = 0.15 x (45)m	38.1602	33.6017	35.3211	30.1473	28.6087	25.1087	24.2894	25.6266	26.3209	30.1532	33.0455	37.6236 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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	308.8003	273.1455	289.8731	253.6257	245.1237	220.0350	216.3279	225.2429	228.1167	255.4198	272.9476	305.2231 (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	308.8003	273.1455	289.8731	253.6257	245.1237	220.0350	216.3279	225.2429	228.1167	255.4198	272.9476	305.2231 (64)
Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 3093.8812 (64)
Electric shower(s)												3094 (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	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	128.1075	113.7912	121.8142	108.9416	106.9351	97.7727	97.3605	100.3247	100.4599	110.3585	115.3661	126.9181 (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	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	129.2063	143.0499	129.2063	133.5132	129.2063	133.5132	129.2063	129.2063	133.5132	129.2063	133.5132	129.2063 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	256.1660	258.8242	252.1256	237.8651	219.8638	202.9451	191.6424	188.9842	195.6828	209.9433	227.9446	244.8633 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930 (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)	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439 (71)
Water heating gains (Table 5)	172.1875	169.3322	163.7288	151.3078	143.7299	135.7954	130.8608	134.8450	139.5276	148.3314	160.2308	170.5889 (72)
Total internal gains	621.6389	635.2852	609.1397	586.7651	556.8791	536.3328	515.7886	517.1145	532.8026	551.5599	585.7675	608.7375 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
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	W/m2		or Table 6b			or Table 6c			Table 6d		
Northeast	1.4700	11.2829	0.6400	0.7000	0.7700	5.1493 (75)					
Southeast	4.8600	36.7938	0.6400	0.7000	0.7700	55.5166 (77)					
Southwest	1.6200	36.7938	0.6400	0.7000	0.7700	18.5055 (79)					
Northwest	15.1200	11.2829	0.6400	0.7000	0.7700	52.9646 (81)					
Southeast	2.1600	37.0308	0.6400	0.7000	1.0000	32.2506 (82)					
Southwest	2.1600	37.0308	0.6400	0.7000	1.0000	32.2506 (82)					

Solar gains	196.6371	366.8012	580.5023	841.2875	1046.6068	1083.0244	1025.9853	867.3332	670.6073	427.1720	241.4722	164.3542 (83)
Total gains	818.2760	1002.0864	1189.6421	1428.0526	1603.4859	1619.3572	1541.7739	1384.4477	1203.4099	978.7320	827.2397	773.0916 (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	56.3174	56.3786	56.4398	56.7483	56.8104	57.1229	57.1229	57.1858	56.9975	56.8104	56.6863	56.5628	
alpha	4.7545	4.7586	4.7627	4.7832	4.7874	4.8082	4.8082	4.8124	4.7998	4.7874	4.7791	4.7709	
util living area	0.9772	0.9461	0.8744	0.7145	0.5236	0.3619	0.2623	0.3047	0.5167	0.8201	0.9534	0.9820 (86)	
Living	20.1407	20.3563	20.6103	20.8301	20.9135	20.9326	20.9351	20.9346	20.9204	20.7681	20.4111	20.0952	
Non living	19.1384	19.4067	19.7126	19.9616	20.0449	20.0652	20.0668	20.0675	20.0550	19.9041	19.4822	19.0839	
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	20.5604	20.3563	20.6103	20.8301	20.9135	20.9326	20.9351	20.9346	20.9204	20.7681	20.4111	20.2217 (87)	
Th 2	20.1385	20.1394	20.1402	20.1445	20.1454	20.1496	20.1496	20.1505	20.1479	20.1454	20.1436	20.1419 (88)	
util rest of house	0.9722	0.9354	0.8524	0.6773	0.4792	0.3145	0.2117	0.2488	0.4572	0.7821	0.9421	0.9780 (89)	
MIT 2	19.7398	19.4067	19.7126	19.9616	20.0449	20.0652	20.0668	20.0675	20.0550	19.9041	19.4822	19.2745 (90)	
Living area fraction									fLA = Living area / (4) =			0.4367 (91)	
MIT	20.0982	19.8214	20.1047	20.3409	20.4242	20.4440	20.4460	20.4462	20.4329	20.2814	19.8879	19.6882 (92)	
Temperature adjustment												0.0000	
adjusted MIT	20.0982	19.8214	20.1047	20.3409	20.4242	20.4440	20.4460	20.4462	20.4329	20.2814	19.8879	19.6882 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9720	0.9308	0.8514	0.6861	0.4938	0.3310	0.2294	0.2683	0.4774	0.7886	0.9382	0.9755 (94)
Useful gains	795.3479	932.7642	1012.8871	979.8361	791.8751	535.9270	353.6528	371.4065	574.4982	771.8525	776.0904	754.1147 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	14.1000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1474.4219	1391.0818	1266.9514	1059.6532	807.1538	537.7214	353.8832	371.8935	583.9912	895.7143	1185.7073	1439.2191 (97)
Space heating kWh	505.2310	307.9895	189.0238	57.4683	11.3673	0.0000	0.0000	0.0000	0.0000	92.1531	294.9242	509.7177 (98a)
Space heating requirement - total per year (kWh/year)												1967.8750
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	505.2310	307.9895	189.0238	57.4683	11.3673	0.0000	0.0000	0.0000	0.0000	92.1531	294.9242	509.7177 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1967.8750
Space heating per m2										(98c) / (4) =		19.6984 (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 %)													343.8468 (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	505.2310	307.9895	189.0238	57.4683	11.3673	0.0000	0.0000	0.0000	0.0000	92.1531	294.9242	509.7177 (98)	
Space heating efficiency (main heating system 1)	343.8468	343.8468	343.8468	343.8468	343.8468	0.0000	0.0000	0.0000	0.0000	343.8468	343.8468	343.8468 (210)	
Space heating fuel (main heating system)	146.9349	89.5717	54.9733	16.7133	3.3059	0.0000	0.0000	0.0000	0.0000	26.8006	85.7720	148.2398 (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	308.8003	273.1455	289.8731	253.6257	245.1237	220.0350	216.3279	225.2429	228.1167	255.4198	272.9476	305.2231 (64)	
Efficiency of water heater	190.0507	190.0507	190.0507	190.0507	190.0507	190.0507	190.0507	190.0507	190.0507	190.0507	190.0507	190.0507 (216)	
Fuel for water heating, kWh/month	162.4831	143.7225	152.5241	133.4516	128.9781	115.7770	113.8264	118.5173	120.0294	134.3956	143.6183	160.6009 (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	25.8467	23.3454	25.8467	25.0130	25.8467	25.0130	25.8467	25.8467	25.0130	25.8467	25.0130	25.8467 (221)	
Lighting	25.3736	20.3557	18.3280	13.4279	10.3721	8.4741	9.4618	12.2988	15.9749	20.9599	23.6742	26.0788 (232)	
Electricity generated by PVs (Appendix M) (negative quantity)	-77.6594	-110.0795	-157.2974	-170.8656	-180.0768	-166.6731	-164.4363	-157.2267	-141.1323	-121.8463	-84.6613	-66.7658 (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)	-41.3606	-93.9567	-202.2641	-324.6994	-441.2034	-447.1498	-440.0567	-365.4326	-259.0648	-142.4955	-57.6396	-32.0430 (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)	

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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											572.3115	(211)
Space heating fuel - main system 2											0.0000	(213)
Space heating fuel - secondary											0.0000	(215)
Efficiency of water heater											190.0507	
Water heating fuel used											1627.9244	(219)
Space cooling fuel											0.0000	(221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.6000, SFP = 0.8640)												
mechanical ventilation fans (SFP = 0.8640)											304.3245	(230a)
Total electricity for the above, kWh/year											304.3245	(231)
Electricity for lighting (calculated in Appendix L)											204.7796	(232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation											-4446.0866	(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											-1736.7466	(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	572.3115	0.1577	90.2787 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1627.9244	0.1410	229.5128 (264)
Space and water heating			319.7915 (265)
Pumps, fans and electric keep-hot	304.3245	0.1387	42.2136 (267)
Energy for lighting	204.7796	0.1443	29.5560 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1598.7205	0.1350	-215.8601
PV Unit electricity exported	-2847.3662	0.1243	-354.0323
Total			-569.8924 (269)
Total CO2, kg/year			-178.3313 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			-1.7900 (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	572.3115	1.5839	906.4803 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1627.9244	1.5213	2476.5868 (278)
Space and water heating			3383.0671 (279)
Pumps, fans and electric keep-hot	304.3245	1.5128	460.3821 (281)
Energy for lighting	204.7796	1.5338	314.0978 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1598.7205	1.4990	-2396.5525
PV Unit electricity exported	-2847.3662	0.4564	-1299.4039
Total			-3695.9563 (283)
Total Primary energy kWh/year			461.5907 (286)
Dwelling Primary energy Rate (DPER)			4.6200 (287)

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	99.9000 (1b)	x 2.8900 (2b)	= 288.7110 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	99.9000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 288.7110 (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	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
	Air changes per hour

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Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 30.0000 / (5) = 0.1039 (8)

Pressure test Yes
 Pressure Test Method Blower Door
 Measured/design AP50 5.0000 (17)
 Infiltration rate 0.3539 (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) = 0.3008 (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 infiltr rate	0.3836	0.3760	0.3685	0.3309	0.3234	0.2858	0.2858	0.2783	0.3008	0.3234	0.3384	0.3535 (22b)
Effective ac	0.5736	0.5707	0.5679	0.5547	0.5523	0.5408	0.5408	0.5387	0.5452	0.5523	0.5573	0.5625 (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 Opaque door			2.1000	1.0000	2.1000		(26)
TER Opening Type (Uw = 1.20)			19.2700	1.1450	22.0649		(27)
S/E			1.8000	1.5918	2.8652		(27a)
S/W			1.8000	1.5918	2.8652		(27a)
Ground Floor			99.9000	0.1300	12.9870		(28a)
External Wall	116.6800	21.3700	95.3100	0.1800	17.1558		(29a)
wall to loft space	10.1700		10.1700	0.1800	1.8306		(29a)
Plane Roof	56.2800		56.2800	0.1100	6.1908		(30)
Slope Roof	47.0200	3.6000	43.4200	0.1100	4.7762		(30)
Total net area of external elements Aum(A, m2)			330.0500				(31)
Fabric heat loss, W/K = Sum (A x U)					72.8356		(33)

(26)...(30) + (32) = 72.8356

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 189.4060 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	13.8800	0.0500	0.6940
E3 Sill	6.8000	0.0500	0.3400
E4 Jamb	26.8100	0.0500	1.3405
E5 Ground floor (normal)	44.3800	0.1600	7.1008
E16 Corner (normal)	14.4000	0.0900	1.2960
R1 Head of roof window	3.6000	0.0800	0.2880
R2 Sill of roof window	3.6000	0.0600	0.2160
R3 Jamb of roof window	9.6000	0.0800	0.7680
E17 Corner (inverted - internal area greater than external area)	4.8000	-0.0900	-0.4320
E10 Eaves (insulation at ceiling level)	15.6600	0.0600	0.9396
E12 Gable (insulation at ceiling level)	8.3000	0.0600	0.4980
E11 Eaves (insulation at rafter level)	12.1200	0.0400	0.4848
E13 Gable (insulation at rafter level)	11.9700	0.0800	0.9576
R4 Ridge (vaulted ceiling)	6.0600	0.0800	0.4848
R10 All other roof or room-in-roof junctions	2.3300	0.0800	0.1864

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 15.1625 (36)

Point Thermal bridges (36a) = 0.0000
 Total fabric heat loss (33) + (36) + (36a) = 87.9981 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	54.6453	54.3731	54.1064	52.8535	52.6191	51.5279	51.5279	51.3259	51.9482	52.6191	53.0933	53.5891 (38)
Average = Sum(39)m / 12 =	142.6434	142.3713	142.1045	140.8517	140.6173	139.5261	139.5261	139.3240	139.9464	140.6173	141.0915	141.5872 (39)
												140.8505

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.4279	1.4251	1.4225	1.4099	1.4076	1.3967	1.3967	1.3946	1.4009	1.4076	1.4123	1.4173 (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 2.7386 (42)

Hot water usage for mixer showers 70.1371 69.0831 67.5471 64.6084 62.4397 60.0212 58.6466 60.1709 61.8418 64.4385 67.4403 69.8684 (42a)

Hot water usage for baths 30.2845 29.8347 29.2013 28.0335 27.1591 26.1894 25.6657 26.2946 26.9794 28.0170 29.2088 30.1821 (42b)

Hot water usage for other uses 42.6760 41.1241 39.5723 38.0204 36.4686 34.9167 34.9167 36.4686 38.0204 39.5723 41.1241 42.6760 (42c)

Average daily hot water use (litres/day) 131.5389 (43)

Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	143.0975	140.0419	136.3207	130.6624	126.0674	121.1274	119.2290	122.9341	126.8416	132.0277	137.7733	142.7264 (44)
Energy content (annual)	226.6315	199.4178	209.5199	178.8702	169.7109	148.9403	144.1971	152.2181	156.4084	179.1604	196.2833	223.4751 (45)
Distribution loss (46)m = 0.15 x (45)m	33.9947	29.9127	31.4280	26.8305	25.4566	22.3410	21.6296	22.8327	23.4613	26.8741	29.4425	33.5213 (46)
Water storage loss:												150.0000 (47)
Store volume												1.3938 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.7527 (55)
Enter (49) or (54) in (55)												
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)
If cylinder contains dedicated solar storage												
Primary loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (57)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	273.2264	241.5035	256.1148	223.9621	216.3058	194.0321	190.7920	198.8130	201.5002	225.7553	241.3751	270.0700 (62)
WWHRS	-32.0637	-28.3574	-29.6943	-24.5880	-22.9152	-19.6087	-18.3800	-19.5453	-20.2879	-23.9172	-27.0953	-31.4700 (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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	241.1627	213.1460	226.4205	199.3741	193.3907	174.4234	172.4120	179.2677	181.2124	201.8381	214.2799	238.6000 (64)
12Total per year (kWh/year)												2435.5275 (64)
Electric shower(s)												2436 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
												0.0000 (64a)
Heat gains from water heating, kWh/month												0.0000 (64a)
	112.6309	99.9750	106.9413	95.5478	93.7048	85.5961	85.2215	87.8884	88.0793	96.8468	101.3377	111.5814 (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	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299	136.9299 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	129.2063	143.0499	129.2063	133.5132	129.2063	133.5132	129.2063	129.2063	133.5132	129.2063	133.5132	129.2063 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	256.1660	258.8242	252.1256	237.8651	219.8638	202.9451	191.6424	188.9842	195.6828	209.9433	227.9446	244.8633 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930	36.6930 (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)	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439	-109.5439 (71)
Water heating gains (Table 5)	151.3856	148.7723	143.7383	132.7053	125.9473	118.8835	114.5450	118.1296	122.3323	130.1704	140.7468	149.9750 (72)
Total internal gains	603.8369	617.7253	592.1492	571.1626	542.0965	519.4208	499.4727	500.3991	515.6073	536.3990	569.2835	591.1236 (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	1.2300	11.2829	0.6300	0.7000	0.7700	4.2413 (75)						
Southeast	4.0600	36.7938	0.6300	0.7000	0.7700	45.6534 (77)						
Southwest	1.3500	36.7938	0.6300	0.7000	0.7700	15.1803 (79)						
Northwest	12.6300	11.2829	0.6300	0.7000	0.7700	43.5509 (81)						
Southeast	1.8000	37.0308	0.6300	0.7000	1.0000	26.4555 (82)						
Southwest	1.8000	37.0308	0.6300	0.7000	1.0000	26.4555 (82)						
Solar gains	161.5370	301.3288	476.8980	691.1702	859.8854	889.8212	842.9512	712.5802	550.9307	350.9265	198.3692	135.0166 (83)
Total gains	765.3739	919.0542	1069.0472	1262.3329	1401.9819	1409.2420	1342.4239	1212.9793	1066.5380	887.3254	767.6527	726.1401 (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	36.8472	36.9177	36.9870	37.3160	37.3782	37.6705	37.6705	37.7251	37.5574	37.3782	37.2525	37.1221
alpha	3.4565	3.4612	3.4658	3.4877	3.4919	3.5114	3.5114	3.5150	3.5038	3.4919	3.4835	3.4748
util living area	0.9865	0.9742	0.9477	0.8770	0.7496	0.5800	0.4409	0.5003	0.7378	0.9232	0.9765	0.9887 (86)
MIT	18.9675	19.2541	19.6902	20.2511	20.6778	20.9050	20.9723	20.9572	20.7755	20.1930	19.4815	18.9208 (87)
Th 2	19.7420	19.7441	19.7462	19.7557	19.7575	19.7659	19.7659	19.7674	19.7627	19.7575	19.7539	19.7501 (88)
util rest of house	0.9830	0.9676	0.9339	0.8451	0.6885	0.4865	0.3246	0.3783	0.6516	0.8957	0.9692	0.9857 (89)
MIT 2	17.4172	17.7808	18.3276	19.0119	19.4875	19.7092	19.7562	19.7507	19.6055	18.9640	18.0791	17.3629 (90)
Living area fraction												fLA = Living area / (4) = 0.4367 (91)
MIT	18.0943	18.4242	18.9227	19.5531	20.0073	20.2314	20.2873	20.2777	20.1164	19.5007	18.6916	18.0433 (92)
Temperature adjustment												0.0000
adjusted MIT	18.0943	18.4242	18.9227	19.5531	20.0073	20.2314	20.2873	20.2777	20.1164	19.5007	18.6916	18.0433 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9763	0.9580	0.9224	0.8390	0.7018	0.5234	0.3750	0.4306	0.6786	0.8887	0.9606	0.9798 (94)
Useful gains	747.2180	880.4885	986.0811	1059.1191	983.9767	737.5859	503.3933	522.3309	723.8035	788.5581	737.4137	711.4616 (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	1967.6593	1925.4640	1765.3202	1500.5056	1168.1522	785.7323	514.4771	540.2503	841.9789	1251.5977	1635.4769	1960.0331 (97)
Space heating kWh	908.0084	702.2235	579.7540	317.7983	137.0266	0.0000	0.0000	0.0000	0.0000	344.5014	646.6055	928.9372 (98a)
Space heating requirement - total per year (kWh/year)												4564.8549
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	908.0084	702.2235	579.7540	317.7983	137.0266	0.0000	0.0000	0.0000	0.0000	344.5014	646.6055	928.9372 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4564.8549
Space heating per m2												(98c) / (4) = 45.6942 (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	908.0084	702.2235	579.7540	317.7983	137.0266	0.0000	0.0000	0.0000	0.0000	344.5014	646.6055	928.9372 (98)

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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)	983.7577	760.8056	628.1191	344.3102	148.4578	0.0000	0.0000	0.0000	0.0000	373.2410	700.5476	1006.4325	(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	241.1627	213.1460	226.4205	199.3741	193.3907	174.4234	172.4120	179.2677	181.2124	201.8381	214.2799	238.6000	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.7469	86.5276	86.0736	85.1000	83.3013	79.8000	79.8000	79.8000	79.8000	85.2481	86.3753	86.7994	(217)
Fuel for water heating, kWh/month	278.0074	246.3329	263.0547	234.2821	232.1582	218.5757	216.0552	224.6462	227.0832	236.7656	248.0802	274.8866	(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	7.0685	7.3041	7.0685	7.3041	7.0685	(231)
Lighting	26.8465	21.5373	19.3919	14.2074	10.9742	8.9660	10.0110	13.0127	16.9022	22.1766	25.0484	27.5927	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-74.7964	-97.2186	-128.9646	-133.4678	-134.8916	-122.7741	-121.1381	-118.4975	-112.9605	-105.1696	-79.1868	-65.6681	(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	-71.4768	-145.6428	-281.2638	-411.1899	-533.3740	-532.3034	-526.1028	-450.1114	-336.2483	-204.3882	-94.0754	-56.8972	(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												4945.6716	(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												2899.9279	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:												86.0000	(231)
Total electricity for the above, kWh/year												216.6668	(232)
Electricity for lighting (calculated in Appendix L)													
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-4937.8078	(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												3210.4585	(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	4945.6716	0.2100	1038.5910 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2899.9279	0.2100	608.9849 (264)
Space and water heating			1647.5759 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	216.6668	0.1443	31.2717 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1294.7336	0.1364	-176.5662
PV Unit electricity exported	-3643.0742	0.1267	-461.6064
Total			-638.1727 (269)
Total CO2, kg/year			1052.6042 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.5400 (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	4945.6716	1.1300	5588.6089 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2899.9279	1.1300	3276.9185 (278)
Space and water heating			8865.5274 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	216.6668	1.5338	332.3308 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1294.7336	1.5041	-1947.4177
PV Unit electricity exported	-3643.0742	0.4651	-1694.5419
Total			-3641.9596 (283)
Total Primary energy kWh/year			5685.9994 (286)
Target Primary Energy Rate (TPER)			56.9200 (287)