Full SAP Calculation Printout

Property Reference	6381-SUST-105W-HAMPTON PARK	Issued on Date	04/11/2025
Assessment Reference	00001	Prop Type Ref	6381-SUST-105W-HAMPTON PARK
Property	Land adjacent to, 36, Hampton Park, Cotham, Bristol, , BS6 6LH		

SAP Rating	76 C	DER	6.20	TER	13.81
Environmental	95 A	% DER < TER			55.10
CO_2 Emissions (t/year)	0.37	DFEE	49.52	TFEE	55.67
Compliance Check	See BREL	% DFEE < TFEE			11.04
% DPER < TPER	10.99	DPER	65.28	TPER	73.34

Assessor Details	[redacted]	Assessor ID	N388-0001
Client	105 West Architects Ltd, 105 West Architects Ltd		

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 (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	59.3700	(1b)	x 2.4500	(2b) =	145.4565	(1b) - (3b)
First floor	8.1200	(1c)	x 2.2000	(2c) =	17.8640	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.4900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		163.3205	(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		0 * 10 =	0.0000	(7a)
Number of passive vents		0 * 10 =	0.0000	(7b)
Number of flueless gas fires		0 * 40 =	0.0000	(7c)
		Air changes per hour		
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) =	72.0000	(23c)

Effective ac	0.3026	0.2994	0.2962	0.2802	0.2771	0.2611	0.2611	0.2579	0.2675	0.2771	0.2834	0.2898	(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								
Entrance door			1.9400	1.4000	2.7160			(26)
Glazed door & window			11.1200	1.1450	12.7328			(27)
Roof light			1.8400	1.2357	2.2738			(27a)
Roof window			1.1600	1.2357	1.4335			(27a)
Heatloss Floor GF			59.4000	0.1300	7.7220	117.0000	6949.8000	(28a)
External Wall 1	113.9000	13.0600	100.8400	0.1400	14.1176	181.8000	18332.7120	(29a)
External Roof FLAT	49.2000	1.8400	47.3600	0.1500	7.1040	9.0000	426.2400	(30)
External Roof RAFTER	9.0000	1.1600	7.8400	0.1500	1.1760	9.0000	70.5600	(30)
Total net area of external elements Aum(A, m2)			231.5000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	49.2756			(33)
Main dwelling								
Internal Wall 1			68.7600			100.0000	6876.0000	(32c)
Internal Floor 1			8.1200			18.0000	146.1600	(32d)
Internal Ceiling 1			8.1200			9.0000	73.0800	(32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 32874.5520 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 487.1026 (35)
List of Thermal Bridges

	K1 Element	Length	Psi-value	Total
E1	Steel lintel with perforated steel base plate	7.5500	0.2860	2.1593
E3	Sill	3.4500	0.0300	0.1035
E4	Jamb	20.6800	0.0240	0.4963
E5	Ground floor (normal)	36.0600	0.0450	1.6227
E6	Intermediate floor within a dwelling	9.1600	0.0010	0.0092
E16	Corner (normal)	23.7300	0.0500	1.1865
R1	Head of roof window	0.8000	0.2400	0.1920
R2	Sill of roof window	0.8000	0.2400	0.1920
R3	Jamb of roof window	2.9000	0.2400	0.6960
R11	Upstands or kerbs of rooflights	7.8000	0.2400	1.8720
E11	Eaves (insulation at rafter level)	4.4300	0.0210	0.0930
E13	Gable (insulation at rafter level)	4.9300	0.0380	0.1873
E14	Flat roof	30.7200	0.0500	1.5360
E17	Corner (inverted - internal area greater than external area)	2.4500	-0.0650	-0.1593
R7	Flat ceiling (inverted)	0.0000	0.1200	0.0000

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 10.1866 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 59.4622 (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	16.3068	16.1350	15.9633	15.1043	14.9325	14.0735	14.0735	13.9017	14.4171	14.9325	15.2761	15.6197	(38)
Heat transfer coeff	75.7691	75.5973	75.4255	74.5665	74.3947	73.5358	73.5358	73.3640	73.8794	74.3947	74.7383	75.0819	(39)
Average = Sum(39)m / 12 =												74.5236	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1227	1.1201	1.1176	1.1049	1.1023	1.0896	1.0896	1.0870	1.0947	1.1023	1.1074	1.1125	(40)
HLP (average)												1.1042	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.1837 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	26.2833	25.8930	25.3433	24.3297	23.5708	22.7293	22.2748	22.8206	23.4149	24.3154	25.3498	26.1944	(42b)
Hot water usage for other uses	36.9931	35.6479	34.3027	32.9575	31.6123	30.2671	30.2671	31.6123	32.9575	34.3027	35.6479	36.9931	(42c)
Average daily hot water use (litres/day)												57.9988	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	63.2764	61.5408	59.6459	57.2872	55.1831	52.9964	52.5418	54.4329	56.3724	58.6180	60.9976	63.1875	(44)
Energy conte	100.2143	87.6333	91.6736	78.4233	74.2870	65.1652	63.5448	67.3993	69.5128	79.5441	86.9023	98.9364	(45)
Energy content (annual)										Total = Sum(45)m =		963.2364	
Distribution loss (46)m = 0.15 x (45)m	15.0321	13.1450	13.7510	11.7635	11.1431	9.7748	9.5317	10.1099	10.4269	11.9316	13.0353	14.8405	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8000	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.9720	(55)
Total storage loss	30.1320	27.2160	30.1320	29.1600	30.1320	29.1600	30.1320	30.1320	29.1600	30.1320	29.1600	30.1320	(56)
If cylinder contains dedicated solar storage	30.1320	27.2160	30.1320	29.1600	30.1320	29.1600	30.1320	30.1320	29.1600	30.1320	29.1600	30.1320	(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	153.6087	135.8605	145.0680	130.0953	127.6814	116.8372	116.9392	120.7937	121.1848	132.9385	138.5743	152.3308	(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	153.6087	135.8605	145.0680	130.0953	127.6814	116.8372	116.9392	120.7937	121.1848	132.9385	138.5743	152.3308	(64)
										Total per year (kWh/year) = Sum(64)m =		1591.9124	(64)
12Total per year (kWh/year)												1592	(64)
Electric shower(s)	52.3838	46.6744	50.9666	48.6368	49.5495	47.2654	48.8409	49.5495	48.6368	50.9666	50.0082	52.3838	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		595.8622	(64a)
Heat gains from water heating, kWh/month	89.1327	79.3884	85.9386	79.5726	79.8033	74.8214	76.0544	77.5131	76.6098	81.9056	82.7347	88.7078	(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	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	96.5832	106.9314	96.5832	99.8026	96.5832	99.8026	96.5832	96.5832	99.8026	96.5832	99.8026	96.5832	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	191.3694	193.3553	188.3511	177.6977	164.2498	151.6107	143.1669	141.1811	146.1853	156.8386	170.2866	182.9257	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	(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)	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	(71)
Water heating gains (Table 5)	119.8020	118.1375	115.5089	110.5174	107.2625	103.9186	102.2236	104.1843	106.4025	110.0882	114.9093	119.2309	(72)
Total internal gains	463.5099	474.1794	456.1984	443.7730	423.8507	411.0871	397.7290	397.7038	408.1457	419.2652	440.7537	454.4950	(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	0.5700	10.6334	0.6300	0.7000	0.7700	1.8523	(74)
East	10.5500	19.6403	0.6300	0.7000	0.7700	63.3245	(76)
Horizontal	1.8400	26.0000	0.5000	0.7000	1.0000	15.0696	(82)
East	1.1600	26.5849	0.5000	0.7000	1.0000	9.7141	(82)

Solar gains	89.9605	178.3387	299.5388	446.0035	554.7075	571.4330	542.5521	460.6123	351.3529	213.1510	112.5937	73.7082	(83)
Total gains	553.4704	652.5181	755.7372	889.7765	978.5582	982.5201	940.2811	858.3161	759.4986	632.4162	553.3473	528.2033	(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	120.5217	120.7956	121.0707	122.4654	122.7482	124.1820	124.1820	124.4728	123.6045	122.7482	122.1839	121.6248	
alpha	9.0348	9.0530	9.0714	9.1644	9.1832	9.2788	9.2788	9.2982	9.2403	9.1832	9.1456	9.1083	
util living area	0.9997	0.9984	0.9889	0.9078	0.6982	0.4787	0.3441	0.3931	0.6656	0.9671	0.9985	0.9998	(86)
Living	20.4794	20.5793	20.7291	20.9013	20.9601	20.9662	20.9664	20.9665	20.9633	20.8552	20.6334	20.4646	
Non living	19.3817	19.5112	19.7011	19.9031	19.9525	19.9662	19.9663	19.9684	19.9609	19.8638	19.5897	19.3700	
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	20.7337	20.5793	20.7291	20.9013	20.9601	20.9662	20.9664	20.9665	20.9633	20.8552	20.6334	20.5395	(87)
Th 2	19.9824	19.9844	19.9865	19.9969	19.9989	20.0094	20.0094	20.0114	20.0052	19.9989	19.9948	19.9906	(88)
util rest of house	0.9995	0.9973	0.9817	0.8658	0.6275	0.4048	0.2666	0.3087	0.5730	0.9407	0.9973	0.9996	(89)
MIT 2	19.7429	19.5112	19.7011	19.9031	19.9525	19.9662	19.9663	19.9684	19.9609	19.8638	19.5897	19.4819	(90)
Living area fraction										fLA = Living area / (4) =		0.7988	(91)
MIT	20.5343	20.3644	20.5222	20.7005	20.7574	20.7650	20.7652	20.7656	20.7616	20.6557	20.4233	20.3267	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.5343	20.3644	20.5222	20.7005	20.7574	20.7650	20.7652	20.7656	20.7616	20.6557	20.4233	20.3267	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9996	0.9977	0.9860	0.8965	0.6815	0.4612	0.3257	0.3731	0.6438	0.9596	0.9979	0.9997	(94)
Useful gains	553.2465	651.0442	745.1505	797.7026	666.8451	453.1622	306.2820	320.2597	488.9759	606.8919	552.2039	528.0475	(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	1230.0585	1169.0633	1057.6344	879.9209	673.8219	453.3489	306.2883	320.2807	492.1579	748.0904	995.7646	1210.8223	(97)
Space heating kWh	503.5481	348.1088	232.4880	59.1972	5.1907	0.0000	0.0000	0.0000	0.0000	105.0516	319.3637	507.9845	(98a)
Space heating requirement - total per year (kWh/year)												2080.9326	
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	503.5481	348.1088	232.4880	59.1972	5.1907	0.0000	0.0000	0.0000	0.0000	105.0516	319.3637	507.9845	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2080.9326	
Space heating per m2											(98c) / (4) =	30.8332	(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 %)	206.7922	(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	503.5481	348.1088	232.4880	59.1972	5.1907	0.0000	0.0000	0.0000	0.0000	105.0516	319.3637	507.9845	(98)
Space heating efficiency (main heating system 1)	206.7922	206.7922	206.7922	206.7922	206.7922	0.0000	0.0000	0.0000	0.0000	206.7922	206.7922	206.7922	(210)
Space heating fuel (main heating system)	243.5044	168.3375	112.4259	28.6264	2.5101	0.0000	0.0000	0.0000	0.0000	50.8006	154.4370	245.6497	(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	153.6087	135.8605	145.0680	130.0953	127.6814	116.8372	116.9392	120.7937	121.1848	132.9385	138.5743	152.3308	(64)
Efficiency of water heater												171.2135	(216)
(217)m	171.2135	171.2135	171.2135	171.2135	171.2135	171.2135	171.2135	171.2135	171.2135	171.2135	171.2135	171.2135	(217)
Fuel for water heating, kWh/month	89.7176	79.3515	84.7293	75.9843	74.5744	68.2407	68.3002	70.5515	70.7799	77.6449	80.9366	88.9713	(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	11.8459	10.6995	11.8459	11.4638	11.8459	11.4638	11.8459	11.8459	11.4638	11.8459	11.4638	11.8459	(231)
Lighting	23.1536	18.5747	16.7244	12.2530	9.4646	7.7327	8.6339	11.2227	14.5772	19.1261	21.6028	23.7971	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)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	(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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(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	1006.2916	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	171.2135	
Water heating fuel used	929.7823	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
(BalancedWithHeatRecovery, DataSheet: in-use factor = 1.4000, SFP = 0.7000)		
mechanical ventilation fans (SFP = 0.7000)	139.4757	(230a)
Total electricity for the above, kWh/year	139.4757	(231)
Electricity for lighting (calculated in Appendix L)	186.8629	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(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	2858.2747	(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	1006.2916	0.1575	158.5211	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	929.7823	0.1404	130.5840	(264)
Energy for instantaneous electric shower(s)	595.8622	0.1391	82.8976	(264a)
Space and water heating			289.1050	(265)
Pumps, fans and electric keep-hot	139.4757	0.1387	19.3470	(267)
Energy for lighting	186.8629	0.1443	26.9701	(268)
Total CO2, kg/year			418.3197	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.2000	(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	1006.2916	1.5831	1593.1094	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	929.7823	1.5193	1412.6129	(278)
Energy for instantaneous electric shower(s)	595.8622	1.5143	902.3345	(278a)
Space and water heating			3005.7224	(279)
Pumps, fans and electric keep-hot	139.4757	1.5128	210.9988	(281)
Energy for lighting	186.8629	1.5338	286.6165	(282)
Total Primary energy kWh/year			4405.6722	(286)
Dwelling Primary energy Rate (DPER)			65.2800	(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						
Ground floor	59.3700	(1b)	x 2.4500	(2b) =	145.4565	(1b) - (3b)
First floor	8.1200	(1c)	x 2.2000	(2c) =	17.8640	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.4900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		163.3205	(5)

---

2. Ventilation rate

---

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1225	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3725	(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) =	0.3166 (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	0.4037	0.3957	0.3878	0.3482	0.3403	0.3008	0.3008	0.2928	0.3166	0.3403	0.3562	0.3720	(22b)
Effective ac	0.5815	0.5783	0.5752	0.5606	0.5579	0.5452	0.5452	0.5429	0.5501	0.5579	0.5634	0.5692	(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			1.9400	1.0000	1.9400			(26)
TER Opening Type			11.1200	1.1450	12.7328			(27)
TER Roof Window			1.1600	1.1450	1.7444			(27a)
TER Roof Light			1.8400	1.5918	3.7206			(27a)
Heatloss Floor GF			59.4000	0.1300	7.7220			(28a)
External Wall 1	113.9000	13.0600	100.8400	0.1800	18.1512			(29a)
External Roof FLAT	49.2000	1.8400	47.3600	0.1100	5.2096			(30)
External Roof RAFTER	9.0000	1.1600	7.8400	0.1100	0.8624			(30)
Total net area of external elements Aum(A, m2)			231.5000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		52.0830			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	487.1026	(35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	7.5500	0.0500	0.3775
E3 Sill	3.4500	0.0500	0.1725
E4 Jamb	20.6800	0.0500	1.0340
E5 Ground floor (normal)	36.0600	0.1600	5.7696
E6 Intermediate floor within a dwelling	9.1600	0.0000	0.0000
E16 Corner (normal)	23.7300	0.0900	2.1357
R1 Head of roof window	0.8000	0.0800	0.0640
R2 Sill of roof window	0.8000	0.0600	0.0480
R3 Jamb of roof window	2.9000	0.0800	0.2320
R11 Upstands or kerbs of rooflights	7.8000	0.0800	0.6240
E11 Eaves (insulation at rafter level)	4.4300	0.0400	0.1772
E13 Gable (insulation at rafter level)	4.9300	0.0800	0.3944
E14 Flat roof	30.7200	0.0800	2.4576
E17 Corner (inverted - internal area greater than external area)	2.4500	-0.0900	-0.2205
R7 Flat ceiling (inverted)	0.0000	0.0400	0.0000

Thermal bridges (Sum(L x Psi) calculated using Appendix K)	13.2660	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	65.3490	(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	31.3386	31.1681	31.0010	30.2160	30.0692	29.3855	29.3855	29.2589	29.6488	30.0692	30.3663	30.6769	(38)
Heat transfer coeff	96.6876	96.5171	96.3500	95.5650	95.4182	94.7345	94.7345	94.6079	94.9978	95.4182	95.7153	96.0259	(39)
Average = Sum(39)m / 12 =												95.5643	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4326	1.4301	1.4276	1.4160	1.4138	1.4037	1.4037	1.4018	1.4076	1.4138	1.4182	1.4228	(40)
HLP (average)												1.4160	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.1837	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	60.8328	59.9186	58.5864	56.0375	54.1565	52.0589	50.8666	52.1886	53.6379	55.8901	58.4938	60.5997	(42a)
Hot water usage for baths	26.2833	25.8930	25.3433	24.3297	23.5708	22.7293	22.2748	22.8206	23.4149	24.3154	25.3498	26.1944	(42b)
Hot water usage for other uses	36.9931	35.6479	34.3027	32.9575	31.6123	30.2671	30.2671	31.6123	32.9575	34.3027	35.6479	36.9931	(42c)
Average daily hot water use (litres/day)												114.0846	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	124.1091	121.4594	118.2323	113.3247	109.3396	105.0552	103.4084	106.6215	110.0103	114.5082	119.4914	123.7872	(44)
Energy conte	196.5585	172.9565	181.7187	155.1359	147.1922	129.1777	125.0635	132.0197	135.6537	155.3865	170.2374	193.8208	(45)
Energy content (annual)										Total = Sum(45)m =		1894.9210	
Distribution loss (46)m = 0.15 x (45)m	29.4838	25.9435	27.2578	23.2704	22.0788	19.3767	18.7595	19.8030	20.3481	23.3080	25.5356	29.0731	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(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	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)
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	243.1534	215.0422	228.3136	200.2277	193.7871	174.2695	171.6584	178.6146	180.7455	201.9814	215.3292	240.4157	(62)
WWHRS	-27.8102	-24.5956	-25.7551	-21.3262	-19.8753	-17.0074	-15.9417	-16.9524	-17.5965	-20.7443	-23.5008	-27.2952	(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	215.3432	190.4467	202.5585	178.9015	173.9118	157.2621	155.7167	161.6622	163.1490	181.2371	191.8284	213.1205	(64)
										Total per year (kWh/year) = Sum(64)m =		2185.1377	(64)
12Total per year (kWh/year)												2185	(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

	102.6316	91.1766	97.6974	87.6562	86.2173	79.0251	78.8595	81.1725	81.1783	88.9419	92.6774	101.7213 (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	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	109.1840	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	96.5832	106.9314	96.5832	99.8026	96.5832	99.8026	96.5832	96.5832	99.8026	96.5832	99.8026	96.5832	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	191.3694	193.3553	188.3511	177.6977	164.2498	151.6107	143.1669	141.1811	146.1853	156.8386	170.2866	182.9257	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	33.9184	(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)													
	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	-87.3472	(71)
Water heating gains (Table 5)													
	137.9457	135.6795	131.3137	121.7447	115.8835	109.7570	105.9940	109.1028	112.7477	119.5456	128.7186	136.7222	(72)
Total internal gains													
	484.6536	494.7213	475.0031	458.0002	435.4717	416.9255	401.4993	402.6223	414.4908	431.7227	457.5630	474.9863	(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	0.5700	10.6334	0.6300	0.7000	0.7700	1.8523	(74)
East	10.5500	19.6403	0.6300	0.7000	0.7700	63.3245	(76)
East	1.1600	26.5849	0.6300	0.7000	1.0000	12.2398	(82)
Horizontal	1.8400	26.0000	0.6300	0.7000	1.0000	18.9877	(82)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	96.4043	191.5786	322.8134	482.0942	600.7422	619.3329	587.8378	498.3217	379.1347	229.2574	120.7448	78.9314	(83)
Total gains	581.0578	686.2999	797.8165	940.0945	1036.2139	1036.2584	989.3371	900.9440	793.6255	660.9801	578.3078	553.9177	(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	94.4466	94.6135	94.7776	95.5561	95.7032	96.3938	96.3938	96.5228	96.1266	95.7032	95.4061	95.0975	
alpha	7.2964	7.3076	7.3185	7.3704	7.3802	7.4263	7.4263	7.4349	7.4084	7.3802	7.3604	7.3398	
util living area													
	0.9996	0.9986	0.9928	0.9506	0.8025	0.5805	0.4209	0.4819	0.7823	0.9828	0.9988	0.9997	(86)
MIT	20.0884	20.2339	20.4663	20.7680	20.9507	20.9958	20.9997	20.9991	20.9694	20.6972	20.3352	20.0648	(87)
Th 2	19.7384	19.7403	19.7422	19.7511	19.7528	19.7605	19.7605	19.7619	19.7575	19.7528	19.7494	19.7459	(88)
util rest of house													
	0.9994	0.9976	0.9877	0.9190	0.7186	0.4708	0.3026	0.3529	0.6646	0.9656	0.9977	0.9996	(89)
MIT 2	18.7065	18.8941	19.1899	19.5550	19.7258	19.7594	19.7605	19.7618	19.7461	19.4862	19.0312	18.6822	(90)
Living area fraction									fLA = Living area / (4) =			0.7988	(91)
MIT	19.8103	19.9643	20.2094	20.5239	20.7042	20.7470	20.7503	20.7502	20.7233	20.4535	20.0728	19.7866	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.8103	19.9643	20.2094	20.5239	20.7042	20.7470	20.7503	20.7502	20.7233	20.4535	20.0728	19.7866	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9994	0.9978	0.9900	0.9403	0.7843	0.5585	0.3972	0.4561	0.7585	0.9767	0.9981	0.9996	(94)
Useful gains	580.7054	684.7953	789.8055	883.9806	812.6663	578.7755	392.9272	410.8978	601.9909	645.6066	577.1908	553.6810	(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													
	1499.6532	1453.9606	1320.9031	1110.8395	859.1666	582.3345	393.1776	411.5587	629.1963	940.2046	1241.6949	1496.7191	(97)
Space heating kWh													
	683.6971	516.8791	395.1367	163.3384	34.5962	0.0000	0.0000	0.0000	0.0000	219.1809	478.4430	701.6203	(98a)
Space heating requirement - total per year (kWh/year)												3192.8916	
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													
	683.6971	516.8791	395.1367	163.3384	34.5962	0.0000	0.0000	0.0000	0.0000	219.1809	478.4430	701.6203	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3192.8916	
Space heating per m2											(98c) / (4) =	47.3091	(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													
	683.6971	516.8791	395.1367	163.3384	34.5962	0.0000	0.0000	0.0000	0.0000	219.1809	478.4430	701.6203	(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)													
	740.7336	559.9990	428.1004	176.9647	37.4823	0.0000	0.0000	0.0000	0.0000	237.4657	518.3564	760.1520	(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	215.3432	190.4467	202.5585	178.9015	173.9118	157.2621	155.7167	161.6622	163.1490	181.2371	191.8284	213.1205	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.4642	86.1829	85.5309	83.8562	81.1649	79.8000	79.8000	79.8000	79.8000	84.4872	86.0234	86.5264	(217)
Fuel for water heating, kWh/month	249.0547	220.9796	236.8251	213.3432	214.2697	197.0703	195.1337	202.5842	204.4474	214.5144	222.9957	246.3070	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	20.0681	16.0994	14.4957	10.6202	8.2033	6.7022	7.4833	9.7271	12.6346	16.5773	18.7240	20.6258	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-48.1602	-64.4556	-88.0412	-93.9587	-97.3350	-89.5185	-88.4220	-85.3616	-79.4591	-71.2449	-51.7144	-42.0560	(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	-38.7692	-79.8756	-155.7552	-229.7283	-299.8114	-299.7903	-296.2296	-252.5594	-187.5031	-112.7235	-51.2543	-30.7838	(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	3459.2542	(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	2617.5247	(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)	161.9609	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-2934.5110	(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	3390.2288	(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	3459.2542	0.2100	726.4434	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2617.5247	0.2100	549.6802	(264)
Space and water heating			1276.1236	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	161.9609	0.1443	23.3760	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-899.7272	0.1357	-122.0825	
PV Unit electricity exported	-2034.7838	0.1264	-257.2829	
Total			-379.3654	(269)
Total CO2, kg/year			932.0634	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.8100	(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	3459.2542	1.1300	3908.9572	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2617.5247	1.1300	2957.8029	(278)
Space and water heating			6866.7602	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	161.9609	1.5338	248.4210	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-899.7272	1.5015	-1350.9775	
PV Unit electricity exported	-2034.7838	0.4642	-944.4555	
Total			-2295.4330	(283)
Total Primary energy kWh/year			4949.8490	(286)
Target Primary Energy Rate (TPER)			73.3400	(287)