Full SAP Calculation Printout

Property Reference	Plot 2	**Issued on Date**	21/12/2023
Assessment Reference	Plot 2 Be Green	**Prop Type Ref**	Plot 1 Be Green
Property	Plot 1 , 95, Avenue Road, London, NW8 6HY		

SAP Rating	49 E	**DER**	10.33	**TER**	12.08
Environmental	89 B	**% DER < TER**			14.49
CO_2 Emissions (t/year)	1.49	**DFEE**	97.01	**TFEE**	56.59
Compliance Check	See BREL	**% DFEE < TFEE**			-71.41
% DPER < TPER	-66.48	**DPER**	106.67	**TPER**	64.07

Assessor Details	Mr. Graham Suttill	**Assessor ID**	P035-0001
Client	Carnell Warren Associates Ltd, Wendy Warren		

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

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Basement floor	99.1000	(1a)	x 2.6900	(2a) =	266.5790	(1a) - (3a)
Ground floor	69.6600	(1b)	x 3.2200	(2b) =	224.3052	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	168.7600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		490.8842	(5)

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2. Ventilation rate

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		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		6.0000	(17)
Infiltration rate		0.3000	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2325	(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	0.2964	0.2906	0.2848	0.2557	0.2499	0.2209	0.2209	0.2151	0.2325	0.2499	0.2616	0.2732	(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) =	75.6000	(23c)

Effective ac	0.4184	0.4126	0.4068	0.3777	0.3719	0.3429	0.3429	0.3371	0.3545	0.3719	0.3836	0.3952	(25)

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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	
Entrance Door			2.8800	1.4000	4.0320			(26)
Windows (Uw = 1.40)			28.5800	1.3258	37.8902			(27)
Glazed Doors (Uw = 1.40)			6.0200	1.3258	7.9811			(27)
Glazed Wall (Uw = 1.40)			27.7200	1.3258	36.7500			(27)
GF RL			2.9500	1.2357	3.6454			(27a)
1F RL			7.1700	1.2357	8.8603			(27a)
Basement Floor			77.2700	0.2500	19.3175	110.0000	8499.7000	(28)
Basement Floor 2			21.8700	0.2500	5.4675	110.0000	2405.7000	(28)
Retaining Wall	92.3800		92.3800	0.3000	27.7140	9.0000	831.4200	(29a)
External Wall	57.9400		57.9400	0.3000	17.3820	9.0000	521.4600	(29a)
New External Wall	108.5300	65.2000	43.3300	0.1800	7.7994	150.0000	6499.5000	(29a)
Flat Roof GF	30.4900	2.9500	27.5400	0.1500	4.1310	9.0000	247.8600	(30)
Flat Roof First Floor	69.6600	7.1700	62.4900	0.1500	9.3735	9.0000	562.4100	(30)
Total net area of external elements Aum(A, m2)			458.1400					(31)

Fabric heat loss, W/K = Sum (A x U)	(26)...(30) + (32) =	190.3438			(33)
Party Wall 1	52.9900	0.0000	0.0000	70.0000	3709.3000 (32)
Internal Wall 1	265.7400			75.0000	19930.5000 (32c)
Internal Floor 1	68.2000			18.0000	1227.6000 (32d)
Internal Ceiling 1	68.2000			9.0000	613.8000 (32e)
Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =				45049.2500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K					266.9427 (35)
Thermal bridges (Default value 0.200 * total exposed area)					91.6280 (36)
Point Thermal bridges				(36a) =	0.0000
Total fabric heat loss				(33) + (36) + (36a) =	281.9718 (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	67.7834	66.8419	65.9003	61.1924	60.2508	55.5429	55.5429	54.6014	57.4261	60.2508	62.1340	64.0171	(38)
Heat transfer coeff	349.7553	348.8137	347.8721	343.1642	342.2226	337.5147	337.5147	336.5732	339.3979	342.2226	344.1058	345.9889	(39)
Average = Sum(39)m / 12 =												342.9288	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0725	2.0669	2.0613	2.0334	2.0279	2.0000	2.0000	1.9944	2.0111	2.0279	2.0390	2.0502	(40)
HLP (average)												2.0321	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9609	(42)
Hot water usage for mixer showers	83.0977	81.8489	80.0291	76.5474	73.9779	71.1125	69.4838	71.2898	73.2695	76.3460	79.9026	82.7793	(42a)
Hot water usage for baths	31.8874	31.4138	30.7469	29.5173	28.5966	27.5756	27.0242	27.6864	28.4075	29.4999	30.7548	31.7796	(42b)
Hot water usage for other uses	44.9527	43.3180	41.6834	40.0488	38.4141	36.7795	36.7795	38.4141	40.0488	41.6834	43.3180	44.9527	(42c)
Average daily hot water use (litres/day)												147.0440	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	159.9377	156.5807	152.4594	146.1134	140.9886	135.4676	133.2875	137.3903	141.7257	147.5293	153.9755	159.5116	(44)
Energy conte	253.3023	222.9689	234.3245	200.0220	189.7978	166.5732	161.1996	170.1179	174.7619	200.1959	219.3663	249.7565	(45)
Energy content (annual)										Total = Sum(45)m =		2442.3868	
Distribution loss (46)m = 0.15 x (45)m	37.9953	33.4453	35.1487	30.0033	28.4697	24.9860	24.1799	25.5177	26.2143	30.0294	32.9049	37.4635	(46)
Water storage loss:													
Store volume												300.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												1.0800	(55)
Total storage loss	33.4800	30.2400	33.4800	32.4000	33.4800	32.4000	33.4800	33.4800	32.4000	33.4800	32.4000	33.4800	(56)
If cylinder contains dedicated solar storage	33.4800	30.2400	33.4800	32.4000	33.4800	32.4000	33.4800	33.4800	32.4000	33.4800	32.4000	33.4800	(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	310.0447	274.2201	291.0669	254.9340	246.5402	221.4852	217.9420	226.8603	229.6739	256.9383	274.2783	306.4989	(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	310.0447	274.2201	291.0669	254.9340	246.5402	221.4852	217.9420	226.8603	229.6739	256.9383	274.2783	306.4989	(64)
									Total per year (kWh/year) = Sum(64)m =			3110.4828	(64)
12Total per year (kWh/year)												3110	(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	102.8329	90.9461	96.5228	84.5169	81.7177	73.3952	72.2088	75.1741	76.1179	85.1751	90.9489	101.6540	(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	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	171.6337	190.0230	171.6337	177.3548	171.6337	177.3548	171.6337	171.6337	177.3548	171.6337	177.3548	171.6337	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	340.2829	343.8140	334.9158	315.9726	292.0603	269.5860	254.5718	251.0407	259.9389	278.8821	302.7945	325.2687	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	(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)	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	(71)
Water heating gains (Table 5)	138.2163	135.3365	129.7350	117.3846	109.8356	101.9378	97.0548	101.0405	105.7194	114.4826	126.3179	136.6317	(72)
Total internal gains	720.5465	739.5871	706.6981	681.1257	643.9432	616.2922	590.6740	591.1285	610.4267	635.4120	676.8808	703.9477	(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	7.8500	10.6334	0.4000	0.7000	0.5400	11.3589	(74)
East	17.3900	19.6403	0.4000	0.7000	0.5400	46.4773	(76)
West	3.3400	19.6403	0.4000	0.7000	0.5400	8.9266	(80)
North	6.0200	10.6334	0.4000	0.7000	0.5400	8.7109	(74)
North	20.2300	10.6334	0.4000	0.7000	0.5400	29.2726	(74)
West	7.4900	19.6403	0.4000	0.7000	0.5400	20.0181	(80)
East	7.1700	26.0000	0.4000	0.7000	1.0000	46.9778	(82)

West			2.9500	26.0000	0.4000	0.7000	1.0000	19.3284 (82)					
Solar gains	191.0708	379.5505	648.0349	994.2813	1270.6476	1325.7858	1251.7769	1038.8822	768.5240	455.6334	239.0706	156.7128 (83)	
Total gains	911.6173	1119.1376	1354.7330	1675.4069	1914.5908	1942.0780	1842.4508	1630.0107	1378.9507	1091.0454	915.9515	860.6605 (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	35.7784	35.8750	35.9721	36.4656	36.5659	37.0760	37.0760	37.1797	36.8702	36.5659	36.3658	36.1679	
alpha	3.3852	3.3917	3.3981	3.4310	3.4377	3.4717	3.4717	3.4786	3.4580	3.4377	3.4244	3.4112	
util living area	0.9984	0.9966	0.9916	0.9730	0.9224	0.8157	0.6865	0.7563	0.9273	0.9880	0.9972	0.9987	(86)
MIT	18.9862	19.1526	19.4637	19.9209	20.3543	20.6843	20.8245	20.7870	20.4925	19.9363	19.3934	18.9717	(87)
Th 2	19.2854	19.2891	19.2928	19.3111	19.3148	19.3334	19.3334	19.3371	19.3259	19.3148	19.3074	19.3001	(88)
util rest of house	0.9978	0.9952	0.9877	0.9591	0.8767	0.6954	0.4770	0.5596	0.8618	0.9798	0.9957	0.9982	(89)
MIT 2	17.0011	17.2167	17.6165	18.2064	18.7326	19.0946	19.1974	19.1848	18.9161	18.2360	17.5381	16.9925	(90)
Living area fraction										fLA = Living area / (4) =		0.1647	(91)
MIT	17.3281	17.5356	17.9208	18.4889	18.9998	19.3564	19.4654	19.4487	19.1758	18.5161	17.8438	17.3185	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.3281	17.5356	17.9208	18.4889	18.9998	19.3564	19.4654	19.4487	19.1758	18.5161	17.8438	17.3185	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9966	0.9928	0.9828	0.9490	0.8649	0.6975	0.4967	0.5762	0.8531	0.9733	0.9937	0.9972	(94)
Useful gains	908.4729	1111.1273	1331.4646	1589.9701	1655.9736	1354.6553	915.1866	939.1788	1176.4142	1061.9428	910.1432	858.2588	(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	4556.6509	4407.4699	3972.9836	3290.5534	2498.1479	1605.3637	967.1279	1026.1115	1722.7021	2709.0545	3696.9876	4538.8620	(97)
Space heating kWh	2714.2444	2215.1422	1965.2901	1224.4200	626.5777	0.0000	0.0000	0.0000	0.0000	1225.4511	2006.5280	2738.3688	(98a)
Space heating requirement - total per year (kWh/year)												14716.0223	
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	2714.2444	2215.1422	1965.2901	1224.4200	626.5777	0.0000	0.0000	0.0000	0.0000	1225.4511	2006.5280	2738.3688	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												14716.0223	
Space heating per m2											(98c) / (4) =	87.2009	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
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	
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	3172.6386	2497.6091	2557.9561	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6201	0.7028	0.6367	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1967.3741	1755.4023	1628.6026	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	2203.5315	2089.9664	1842.3290	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	170.0333	248.9157	159.0124	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		0.5926	(105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	25.1886	36.8742	23.5560	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												85.6188	(107)

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 %)												170.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Cooling System Energy Efficiency Ratio (see Table 10c)												5.6000	(209)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	2714.2444	2215.1422	1965.2901	1224.4200	626.5777	0.0000	0.0000	0.0000	0.0000	1225.4511	2006.5280	2738.3688	(98)
Space heating efficiency (main heating system 1)	170.0000	170.0000	170.0000	170.0000	170.0000	0.0000	0.0000	0.0000	0.0000	170.0000	170.0000	170.0000	(210)
Space heating fuel (main heating system)	1596.6144	1303.0248	1156.0530	720.2471	368.5751	0.0000	0.0000	0.0000	0.0000	720.8536	1180.3106	1610.8052	(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	310.0447	274.2201	291.0669	254.9340	246.5402	221.4852	217.9420	226.8603	229.6739	256.9383	274.2783	306.4989	(64)
Efficiency of water heater												170.0000	(216)
(217)m	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	170.0000	(217)
Fuel for water heating, kWh/month	182.3792	161.3059	171.2158	149.9612	145.0236	130.2854	128.2012	133.4472	135.1023	151.1402	161.3402	180.2935	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	4.4980	6.5847	4.2064	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	59.8157	54.0271	59.8157	57.8861	59.8157	57.8861	59.8157	59.8157	57.8861	59.8157	57.8861	59.8157	(231)
Lighting	42.6002	34.1755	30.7712	22.5443	17.4139	14.2273	15.8855	20.6486	26.8205	35.1899	39.7469	43.7842	(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	8656.4837	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	170.0000	
Water heating fuel used	1829.6958	(219)
Space cooling fuel	15.2891	(221)
Electricity for pumps and fans:		
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 1.1760)		
mechanical ventilation fans (SFP = 1.1760)	704.2814	(230a)
Total electricity for the above, kWh/year	704.2814	(231)
Electricity for lighting (calculated in Appendix L)	343.8080	(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	11549.5579	(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	8656.4837	0.1543	1336.0797	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1829.6958	0.1410	257.9188	(264)
Space and water heating			1593.9985	(265)
Space cooling	15.2891	0.1139	1.7418	(266)
Pumps, fans and electric keep-hot	704.2814	0.1387	97.6925	(267)
Energy for lighting	343.8080	0.1443	49.6221	(268)
Total CO2, kg/year			1743.0549	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			10.3300	(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	8656.4837	1.5714	13603.0542	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1829.6958	1.5212	2783.3917	(278)
Space and water heating			16386.4459	(279)
Space cooling	15.2891	1.4199	21.7097	(280)
Pumps, fans and electric keep-hot	704.2814	1.5128	1065.4369	(281)
Energy for lighting	343.8080	1.5338	527.3442	(282)
Total Primary energy kWh/year			18000.9366	(286)
Dwelling Primary energy Rate (DPER)			106.6700	(287)

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

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)			Volume (m3)	
Basement floor	99.1000	(1a)	x	2.6900	(2a)	= 266.5790	(1a) - (3a)
Ground floor	69.6600	(1b)	x	3.2200	(2b)	= 224.3052	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	168.7600						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)		= 490.8842	(5)

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2. Ventilation rate

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	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)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.0815 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.3315 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2569 (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	0.3275	0.3211	0.3147	0.2826	0.2762	0.2441	0.2441	0.2376	0.2569	0.2762	0.2890	0.3019	(22b)
Effective ac	0.5536	0.5516	0.5495	0.5399	0.5381	0.5298	0.5298	0.5282	0.5330	0.5381	0.5418	0.5456	(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			2.8800	1.0000	2.8800			(26)
TER Opening Type (Uw = 1.20)			33.8200	1.1450	38.7252			(27)
GF RL			1.6000	2.0221	3.2353			(27a)
1F RL			3.8900	2.0221	7.8658			(27a)
Basement Floor			77.2700	0.1300	10.0451			(28)
Basement Floor 2			21.8700	0.1300	2.8431			(28)
Retaining Wall	92.3800		92.3800	0.1800	16.6284			(29a)
External Wall	57.9400		57.9400	0.1800	10.4292			(29a)
New External Wall	108.5300	36.7000	71.8300	0.1800	12.9294			(29a)
Flat Roof GF	30.4900	1.6000	28.8900	0.1100	3.1779			(30)
Flat Roof First Floor	69.6600	3.8900	65.7700	0.1100	7.2347			(30)
Total net area of external elements Aum(A, m2)			458.1400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		115.9941			(33)
Party Wall 1			52.9900	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		266.9427 (35)
Thermal bridges (User defined value 0.050 * total exposed area)		22.9070 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	138.9011 (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	89.6858	89.3484	89.0176	87.4641	87.1734	85.8203	85.8203	85.5697	86.3415	87.1734	87.7614	88.3762	(38)
Heat transfer coeff	228.5869	228.2495	227.9187	226.3652	226.0745	224.7214	224.7214	224.4708	225.2426	226.0745	226.6625	227.2772	(39)
Average = Sum(39)m / 12 =												226.3638	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3545	1.3525	1.3505	1.3413	1.3396	1.3316	1.3316	1.3301	1.3347	1.3396	1.3431	1.3467	(40)
HLP (average)												1.3413	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.9609 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
73.8646	72.7545	71.1370	68.0421	65.7582	63.2111	61.7634	63.3687	65.1284	67.8631	71.0245	73.5816	(42a)

Hot water usage for baths

31.8874	31.4138	30.7469	29.5173	28.5966	27.5756	27.0242	27.6864	28.4075	29.4999	30.7548	31.7796	(42b)

Hot water usage for other uses

44.9527	43.3180	41.6834	40.0488	38.4141	36.7795	36.7795	38.4141	40.0488	41.6834	43.3180	44.9527	(42c)

Average daily hot water use (litres/day)		138.5314 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	150.7047	147.4864	143.5673	137.6082	132.7689	127.5662	125.5670	129.4692	133.5846	139.0464	145.0974	150.3139	(44)
Energy conte	238.6793	210.0187	220.6576	188.3787	178.7324	156.8576	151.8624	160.3099	164.7232	188.6847	206.7178	235.3552	(45)
Energy content (annual)										Total = Sum(45)m =		2300.9776	
Distribution loss (46)m = 0.15 x (45)m	35.8019	31.5028	33.0986	28.2568	26.8099	23.5286	22.7794	24.0465	24.7085	28.3027	31.0077	35.3033	(46)
Water storage loss:													
Store volume												300.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												2.1127	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												1.1409	(55)
Total storage loss	35.3664	31.9439	35.3664	34.2256	35.3664	34.2256	35.3664	35.3664	34.2256	35.3664	34.2256	35.3664	(56)
If cylinder contains dedicated solar storage	35.3664	31.9439	35.3664	34.2256	35.3664	34.2256	35.3664	35.3664	34.2256	35.3664	34.2256	35.3664	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	297.3082	262.9737	279.2864	245.1163	237.3612	213.5951	210.4913	218.9387	221.4607	247.3135	263.4554	293.9840	(62)
WWHRS	-33.7678	-29.8645	-31.2724	-25.8948	-24.1330	-20.6508	-19.3568	-20.5840	-21.3661	-25.1883	-28.5353	-33.1425	(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	263.5404	233.1092	248.0140	219.2215	213.2282	192.9443	191.1344	198.3547	200.0946	222.1252	234.9201	260.8415	(64)
										Total per year (kWh/year) = Sum(64)m =		2677.5283	(64)
12Total per year (kWh/year)												2678	(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	126.2639	112.1953	120.2717	108.0260	106.3316	97.5452	97.3973	100.2061	100.1605	109.6407	114.1237	125.1586	(65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	148.0455	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	172.7571	191.2668	172.7571	178.5157	172.7571	178.5157	172.7571	172.7571	178.5157	172.7571	178.5157	172.7571	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	340.2829	343.8140	334.9158	315.9726	292.0603	269.5860	254.5718	251.0407	259.9389	278.8821	302.7945	325.2687	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	37.8046	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	-118.4364	(71)
Water heating gains (Table 5)													
	169.7096	166.9572	161.6555	150.0361	142.9188	135.4794	130.9104	134.6856	139.1118	147.3666	158.5052	168.2240	(72)
Total internal gains													
	753.1633	772.4517	739.7421	714.9381	678.1498	650.9948	625.6530	625.8972	644.9801	669.4195	710.2290	736.6635	(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	18.5100	10.6334	0.6300	0.7000	0.5400	42.1845	(74)
East	9.4400	19.6403	0.6300	0.7000	0.5400	39.7369	(76)
West	5.8700	19.6403	0.6300	0.7000	0.5400	24.7093	(80)
East	3.8900	26.0000	0.6300	0.7000	1.0000	40.1425	(82)
West	1.6000	26.0000	0.6300	0.7000	1.0000	16.5110	(82)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	163.2842	324.3522	553.7899	849.6859	1085.8692	1132.9936	1069.7450	887.8034	656.7571	389.3697	204.3033	133.9231	(83)
Total gains	916.4475	1096.8039	1293.5320	1564.6239	1764.0191	1783.9884	1695.3980	1513.7005	1301.7372	1058.7892	914.5323	870.5866	(84)

7. Mean internal temperature (heating season)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
tau	54.7436	54.8246	54.9041	55.2809	55.3520	55.6853	55.6853	55.7475	55.5565	55.3520	55.2084	55.0591	
alpha	4.6496	4.6550	4.6603	4.6854	4.6901	4.7124	4.7124	4.7165	4.7038	4.6901	4.6806	4.6706	
util living area	0.9990	0.9975	0.9923	0.9676	0.8881	0.7262	0.5631	0.6419	0.8891	0.9868	0.9978	0.9992	(86)
MIT	19.3102	19.4967	19.8222	20.2850	20.6872	20.9166	20.9801	20.9644	20.7682	20.2374	19.6943	19.2809	(87)
Th 2	19.7984	19.7999	19.8014	19.8086	19.8099	19.8162	19.8162	19.8173	19.8138	19.8099	19.8072	19.8044	(88)
util rest of house	0.9986	0.9965	0.9891	0.9533	0.8398	0.6228	0.4219	0.4964	0.8199	0.9789	0.9968	0.9989	(89)
MIT 2	17.8350	18.0748	18.4913	19.0764	19.5462	19.7703	19.8105	19.8056	19.6491	19.0267	18.3334	17.8016	(90)
Living area fraction										fLA = Living area / (4) =		0.1647	(91)
MIT	18.0780	18.3090	18.7105	19.2755	19.7342	19.9592	20.0032	19.9965	19.8334	19.2261	18.5576	18.0453	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.0780	18.3090	18.7105	19.2755	19.7342	19.9592	20.0032	19.9965	19.8334	19.2261	18.5576	18.0453	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9977	0.9946	0.9847	0.9447	0.8361	0.6366	0.4452	0.5201	0.8214	0.9731	0.9951	0.9982	(94)
Useful gains	914.3564	1090.8595	1273.7911	1478.1649	1474.8580	1135.6089	754.8058	787.3249	1069.2191	1030.3213	910.0422	869.0270	(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	3149.4788	3060.6073	2783.0063	2348.6490	1816.3192	1204.3173	764.7692	807.3022	1291.4156	1950.1431	2597.0062	3146.7176	(97)
Space heating kWh	1662.9311	1323.6705	1122.8561	626.7486	254.0471	0.0000	0.0000	0.0000	0.0000	684.3475	1214.6141	1694.6018	(98a)
Space heating requirement - total per year (kWh/year)												8583.8168	
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	1662.9311	1323.6705	1122.8561	626.7486	254.0471	0.0000	0.0000	0.0000	0.0000	684.3475	1214.6141	1694.6018	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												8583.8168	
Space heating per m2											(98c) / (4) =	50.8640	(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	1662.9311	1323.6705	1122.8561	626.7486	254.0471	0.0000	0.0000	0.0000	0.0000	684.3475	1214.6141	1694.6018	(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)	1801.6588	1434.0959	1216.5288	679.0342	275.2407	0.0000	0.0000	0.0000	0.0000	741.4382	1315.9416	1835.9717	(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													
	263.5404	233.1092	248.0140	219.2215	213.2282	192.9443	191.1344	198.3547	200.0946	222.1252	234.9201	260.8415	(64)
Efficiency of water heater												79.8000	(216)
(217)m	87.4508	87.3253	87.0243	86.2784	84.4536	79.8000	79.8000	79.8000	79.8000	86.4119	87.2060	87.4839	(217)
Fuel for water heating, kWh/month													
	301.3586	266.9436	284.9939	254.0861	252.4797	241.7849	239.5168	248.5648	250.7452	257.0540	269.3852	298.1596	(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	35.8955	28.7967	25.9283	18.9962	14.6732	11.9881	13.3854	17.3988	22.5993	29.6515	33.4913	36.8932	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-81.0123	-108.7272	-148.8139	-158.9738	-164.5703	-151.0368	-148.9311	-143.7018	-133.8299	-119.9718	-86.9823	-70.6797	(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	-64.0896	-132.1894	-258.1294	-381.3224	-498.3437	-498.7948	-493.1267	-420.3537	-311.7816	-187.1070	-84.8924	-50.9041	(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												9299.9099	(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												3165.0722	(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)												289.6974	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-4898.2658	(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												7942.4138	(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	9299.9099	0.2100	1952.9811	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3165.0722	0.2100	664.6652	(264)
Space and water heating			2617.6463	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	289.6974	0.1443	41.8123	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1517.2309	0.1357	-205.8753	
PV Unit electricity exported	-3381.0349	0.1264	-427.3033	
Total			-633.1787	(269)
Total CO2, kg/year			2038.2092	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.0800	(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	9299.9099	1.1300	10508.8982	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3165.0722	1.1300	3576.5316	(278)
Space and water heating			14085.4298	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	289.6974	1.5338	444.3476	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1517.2309	1.5016	-2278.2035	
PV Unit electricity exported	-3381.0349	0.4639	-1568.5681	
Total			-3846.7716	(283)
Total Primary energy kWh/year			10813.1066	(286)
Target Primary Energy Rate (TPER)			64.0700	(287)