Full SAP Calculation Printout

Property Reference	16a Chesham Road	**Issued on Date**	14/12/2023
Assessment Reference	Baseline	**Prop Type Ref**	
Property	16a, Chesham Rd, Weston Super Mare, Bristol, BS22 8LP		

SAP Rating	78 C	**DER**	5.44	**TER**	12.99
Environmental	95 A	**% DER < TER**			58.12
CO_2 Emissions (t/year)	0.4	**DFEE**	43.80	**TFEE**	46.44
Compliance Check	See BREL	**% DFEE < TFEE**			5.70
% DPER < TPER	15.85	**DPER**	57.42	**TPER**	68.24

Assessor Details	Ms. Katrina Humphris	**Assessor ID**	AW87-0001
Client			

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)	
Ground floor	48.4000 (1b)	x	2.2500 (2b)	=	108.9000	(1b) - (3b)
First floor	28.5600 (1c)	x	2.3200 (2c)	=	66.2592	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	76.9600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	175.1592	(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		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		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =		30.0000 / (5) =	0.1713	(8)
Pressure test			Yes	
Pressure Test Method			Blower Door	
Measured/design AP50			5.0000	(17)
Infiltration rate			0.4213	(18)
Number of sides sheltered			1	(19)
Shelter factor		(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor		(21) = (18) x (20) =	0.3897	(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	0.4968	0.4871	0.4774	0.4286	0.4189	0.3702	0.3702	0.3605	0.3897	0.4189	0.4384	0.4579	(22b)
Effective ac	0.6234	0.6186	0.6139	0.5919	0.5877	0.5685	0.5685	0.5650	0.5759	0.5877	0.5961	0.6048	(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	
Solid Door			1.9300	1.0000	1.9300			(26)
Windows and Glazed Doors (Uw = 1.20)			9.9400	1.1450	11.3817			(27)
N Roof Light			0.3700	1.2357	0.4572			(27a)
New Ground Floor			48.4000	0.1300	6.2920	110.0000	5324.0000	(28a)
Exposed Floor			0.3800	0.1300	0.0494			(28b)
New External Wall	84.4800	11.8700	72.6100	0.1800	13.0698	70.0000	5082.7000	(29a)
Stud Wall	34.2700		34.2700	0.1800	6.1686	9.0000	308.4300	(29a)
Cold Pitched Roof	40.5200		40.5200	0.1100	4.4572	9.0000	364.6800	(30)
Warm Pitched Roof	11.7600	0.3700	11.3900	0.1100	1.2529	9.0000	102.5100	(30)
Total net area of external elements Aum(A, m2)			219.8100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.0588			(33)
Internal Wall GF			49.9700			9.0000	449.7300	(32c)
Internal Wall FF			14.1400			9.0000	127.2600	(32c)
Internal Floor 1			28.5600			18.0000	514.0800	(32d)
Internal Ceiling 1			28.5600			9.0000	257.0400	(32e)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		12530.4300	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							162.8174	(35)

List of Thermal Bridges

	K1 Element	Length	Psi-value	Total
E2	Other lintels (including other steel lintels)	6.7800	0.0240	0.1627
E3	Sill	3.1500	0.0180	0.0567
E4	Jamb	19.4200	0.0130	0.2525
E5	Ground floor (normal)	28.8000	0.0470	1.3536
E20	Exposed floor (normal)	1.3800	0.0470	0.0649
E21	Exposed floor (inverted)	1.3800	0.3200	0.4416
E6	Intermediate floor within a dwelling	25.0400	0.0030	0.0751
E10	Eaves (insulation at ceiling level)	25.6400	0.0480	1.2307
E12	Gable (insulation at ceiling level)	18.0000	0.0400	0.7200
E13	Gable (insulation at rafter level)	3.3900	0.0390	0.1322
E16	Corner (normal)	25.8700	0.0450	1.1642
E17	Corner (inverted - internal area greater than external area)	10.2500	-0.0960	-0.9840
R1	Head of roof window	0.6500	0.2400	0.1560
R2	Sill of roof window	0.6500	0.2400	0.1560
R3	Jamb of roof window	1.1300	0.2400	0.2712
R6	Flat ceiling	24.2400	0.1200	2.9088
R8	Roof to wall (rafter)	14.7500	0.1200	1.7700
R5	Ridge (inverted)	1.3900	0.1200	0.1668

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 10.0989 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 55.1577 (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	36.0355	35.7585	35.4869	34.2115	33.9729	32.8620	32.8620	32.6563	33.2899	33.9729	34.4556	34.9603	(38)
Heat transfer coeff	91.1932	90.9162	90.6447	89.3692	89.1306	88.0197	88.0197	87.8140	88.4476	89.1306	89.6133	90.1180	(39)

Average = Sum(39)m / 12 = 89.3681

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1849	1.1813	1.1778	1.1612	1.1581	1.1437	1.1437	1.1410	1.1493	1.1581	1.1644	1.1710	(40)
HLP (average)												1.1612	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4026 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	88.6933	87.3604	85.4181	81.7019	78.9595	75.9011	74.1627	76.0903	78.2033	81.4870	85.2831	88.3535	(42a)
Hot water usage for baths	27.8621	27.4484	26.8657	25.7912	24.9867	24.0947	23.6128	24.1915	24.8215	25.7760	26.8726	27.7680	(42b)
Hot water usage for other uses	39.2355	37.8088	36.3820	34.9553	33.5285	32.1018	32.1018	33.5285	34.9553	36.3820	37.8088	39.2355	(42c)

Average daily hot water use (litres/day) 143.2735 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	155.7910	152.6176	148.6658	142.4485	137.4748	132.0976	129.8774	133.8103	137.9801	143.6451	149.9644	155.3570	(44)
Energy conte	246.7348	217.3254	228.4938	195.0048	185.0674	162.4294	157.0754	165.6851	170.1432	194.9251	213.6518	243.2515	(45)
Energy content (annual)										Total = Sum(45)m =		2379.7877	
Distribution loss (46)m = 0.15 x (45)m	37.0102	32.5988	34.2741	29.2507	27.7601	24.3644	23.5613	24.8528	25.5215	29.2388	32.0478	36.4877	(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 0.7800 (49)
Enter (49) or (54) in (55) 1.4508 (55)

Total storage loss	44.9748	40.6224	44.9748	43.5240	44.9748	43.5240	44.9748	44.9748	43.5240	44.9748	43.5240	44.9748	(56)
If cylinder contains dedicated solar storage	44.9748	40.6224	44.9748	43.5240	44.9748	43.5240	44.9748	44.9748	43.5240	44.9748	43.5240	44.9748	(57)
Primary loss	54.8576	49.5488	54.8576	53.0880	54.8576	22.5120	23.2624	23.2624	22.5120	54.8576	53.0880	54.8576	(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	346.5672	307.4966	328.3262	291.6168	284.8998	228.4654	225.3126	233.9223	236.1792	294.7575	310.2638	343.0839	(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	346.5672	307.4966	328.3262	291.6168	284.8998	228.4654	225.3126	233.9223	236.1792	294.7575	310.2638	343.0839	(64)
										Total per year (kWh/year) = Sum(64)m =		3430.8913	(64)
12Total per year (kWh/year)												3431	(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

	125.9254	111.8997	119.8603	107.3095	105.4210	72.0174	70.8375	73.7002	74.5822	108.6987	113.5096	124.7672	(65)

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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	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	116.1710	128.6179	116.1710	120.0434	116.1710	120.0434	116.1710	116.1710	120.0434	116.1710	120.0434	116.1710	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	212.9699	215.1799	209.6108	197.7550	182.7892	168.7234	159.3266	157.1167	162.6857	174.5415	189.5073	203.5731	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	(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)	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	(71)
Water heating gains (Table 5)	169.2546	166.5174	161.1025	149.0410	141.6949	100.0241	95.2117	99.0594	103.5864	146.1003	157.6522	167.6978	(72)
Total internal gains	557.4352	569.3550	545.9241	525.8791	499.6948	447.8307	429.7491	431.3869	445.3552	495.8526	526.2427	546.4817	(73)

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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	7.7900	10.6334	0.6300	0.7000	0.7700	25.3152	(74)
West	2.1500	19.6403	0.6300	0.7000	0.7700	12.9050	(80)
North	0.3700	15.2954	0.4700	0.7000	1.0000	1.6757	(82)

Solar gains	39.8959	76.7436	129.2857	202.4340	266.4168	282.2395	264.7006	214.0558	154.0537	91.2738	49.3632	33.1344	(83)
Total gains	597.3311	646.0985	675.2098	728.3131	766.1116	730.0702	694.4497	645.4426	599.4089	587.1264	575.6059	579.6161	(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	38.1681	38.2844	38.3991	38.9471	39.0514	39.5443	39.5443	39.6369	39.3530	39.0514	38.8410	38.6235	
alpha	3.5445	3.5523	3.5599	3.5965	3.6034	3.6363	3.6363	3.6425	3.6235	3.6034	3.5894	3.5749	
util living area	0.9777	0.9687	0.9523	0.9059	0.8125	0.6735	0.5261	0.5779	0.7907	0.9194	0.9653	0.9798	(86)
Living	19.5706	19.7142	19.9519	20.3080	20.6173	20.8117	20.8835	20.8707	20.7183	20.3573	19.9226	19.5565	
Non living	18.2714	18.4549	18.7564	19.2060	19.5699	19.7834	19.8420	19.8366	19.6950	19.2753	18.7306	18.2617	
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	20.2688	19.7142	19.9519	20.3080	20.6173	20.8117	20.8835	20.8707	20.7183	20.3573	19.9226	19.7584	(87)
Th 2	19.9321	19.9350	19.9378	19.9511	19.9536	19.9653	19.9653	19.9675	19.9608	19.9536	19.9486	19.9433	(88)
util rest of house	0.9729	0.9619	0.9415	0.8835	0.7666	0.5928	0.4153	0.4668	0.7236	0.8956	0.9567	0.9755	(89)
MIT 2	19.2700	18.4549	18.7564	19.2060	19.5699	19.7834	19.8420	19.8366	19.6950	19.2753	18.7306	18.5647	(90)
Living area fraction										fLA = Living area / (4) =		0.3996	(91)
MIT	19.6691	18.9581	19.2341	19.6463	19.9884	20.1943	20.2582	20.2498	20.1038	19.7076	19.2069	19.0416	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.6691	18.9581	19.2341	19.6463	19.9884	20.1943	20.2582	20.2498	20.1038	19.7076	19.2069	19.0416	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9715	0.9541	0.9326	0.8758	0.7683	0.6120	0.4480	0.4989	0.7340	0.8889	0.9490	0.9708	(94)
Useful gains	580.3017	616.4550	629.7200	637.8668	588.6179	446.7778	311.1271	321.9973	439.9431	521.8855	546.2306	562.7199	(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	1401.5561	1278.1059	1154.2763	960.3869	738.7518	492.4070	321.9910	338.0640	531.0247	811.7663	1084.9389	1337.4996	(97)
Space heating kWh	611.0133	444.6294	390.2699	232.2145	111.6996	0.0000	0.0000	0.0000	0.0000	215.6713	387.8700	576.4361	(98a)
Space heating requirement - total per year (kWh/year)												2969.8041	
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	611.0133	444.6294	390.2699	232.2145	111.6996	0.0000	0.0000	0.0000	0.0000	215.6713	387.8700	576.4361	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2969.8041	
Space heating per m2											(98c) / (4) =	38.5889	(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 %)	354.8423	(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	611.0133	444.6294	390.2699	232.2145	111.6996	0.0000	0.0000	0.0000	0.0000	215.6713	387.8700	576.4361	(98)
Space heating efficiency (main heating system 1)	354.8423	354.8423	354.8423	354.8423	354.8423	0.0000	0.0000	0.0000	0.0000	354.8423	354.8423	354.8423	(210)
Space heating fuel (main heating system)	172.1929	125.3034	109.9840	65.4416	31.4787	0.0000	0.0000	0.0000	0.0000	60.7795	109.3077	162.4485	(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	346.5672	307.4966	328.3262	291.6168	284.8998	228.4654	225.3126	233.9223	236.1792	294.7575	310.2638	343.0839	(64)
Efficiency of water heater												190.4080	(216)
(217)m	190.4080	190.4080	190.4080	190.4080	190.4080	190.4080	190.4080	190.4080	190.4080	190.4080	190.4080	190.4080	(217)
Fuel for water heating, kWh/month	182.0129	161.4935	172.4330	153.1536	149.6260	119.9873	118.3315	122.8532	124.0385	154.8031	162.9468	180.1835	(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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	28.8736	23.1635	20.8561	15.2801	11.8028	9.6430	10.7669	13.9952	18.1784	23.8511	26.9397	29.6761	(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	836.9363	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	190.4080	
Water heating fuel used	1801.8627	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	233.0264	(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	2871.8254	(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	836.9363	0.1550	129.7075	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1801.8627	0.1415	254.9945	(264)
Space and water heating			384.7020	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	233.0264	0.1443	33.6329	(268)
Total CO2, kg/year			418.3349	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.4400	(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	836.9363	1.5738	1317.1318	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1801.8627	1.5233	2744.8192	(278)
Space and water heating			4061.9510	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	233.0264	1.5338	357.4237	(282)
Total Primary energy kWh/year			4419.3747	(286)
Dwelling Primary energy Rate (DPER)			57.4200	(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)	
Ground floor		48.4000 (1b)	x	2.2500 (2b)	=	108.9000	(1b) - (3b)
First floor		28.5600 (1c)	x	2.3200 (2c)	=	66.2592	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	76.9600						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	175.1592	(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	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	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1713	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.4213	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3897	(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	0.4968	0.4871	0.4774	0.4286	0.4189	0.3702	0.3702	0.3605	0.3897	0.4189	0.4384	0.4579 (22b)
Effective ac	0.6234	0.6186	0.6139	0.5919	0.5877	0.5685	0.5685	0.5650	0.5759	0.5877	0.5961	0.6048 (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	
TER Opaque door			1.9300	1.0000	1.9300			(26)
TER Opening Type (Uw = 1.20)			9.9400	1.1450	11.3817			(27)
N Roof Light			0.3700	1.8519	0.6852			(27a)
New Ground Floor			48.4000	0.1300	6.2920			(28a)
Exposed Floor			0.3800	0.1300	0.0494			(28b)
New External Wall	84.4800	11.8700	72.6100	0.1800	13.0698			(29a)
Stud Wall	34.2700		34.2700	0.1800	6.1686			(29a)
Cold Pitched Roof	40.5200		40.5200	0.1100	4.4572			(30)
Warm Pitched Roof	11.7600	0.3700	11.3900	0.1100	1.2529			(30)
Total net area of external elements Aum(A, m2)			219.8100					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	45.2868			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 162.8174 (35)

List of Thermal Bridges

	K1 Element	Length	Psi-value	Total
E2	Other lintels (including other steel lintels)	6.7800	0.0500	0.3390
E3	Sill	3.1500	0.0500	0.1575
E4	Jamb	19.4200	0.0500	0.9710
E5	Ground floor (normal)	28.8000	0.1600	4.6080
E20	Exposed floor (normal)	1.3800	0.3200	0.4416
E21	Exposed floor (inverted)	1.3800	0.3200	0.4416
E6	Intermediate floor within a dwelling	25.0400	0.0000	0.0000
E10	Eaves (insulation at ceiling level)	25.6400	0.0600	1.5384
E12	Gable (insulation at ceiling level)	18.0000	0.0600	1.0800
E13	Gable (insulation at rafter level)	3.3900	0.0800	0.2712
E16	Corner (normal)	25.8700	0.0900	2.3283
E17	Corner (inverted - internal area greater than external area)	10.2500	-0.0900	-0.9225
R1	Head of roof window	0.6500	0.0800	0.0520
R2	Sill of roof window	0.6500	0.0600	0.0390
R3	Jamb of roof window	1.1300	0.0800	0.0904
R6	Flat ceiling	24.2400	0.0600	1.4544
R8	Roof to wall (rafter)	14.7500	0.0600	0.8850
R5	Ridge (inverted)	1.3900	0.0400	0.0556

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 13.8305 (36)

Point Thermal bridges (36a) = 0.0000

Total fabric heat loss (33) + (36) + (36a) = 59.1173 (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	36.0355	35.7585	35.4869	34.2115	33.9729	32.8620	32.8620	32.6563	33.2899	33.9729	34.4556	34.9603	(38)
Heat transfer coeff	95.1528	94.8757	94.6042	93.3288	93.0901	91.9793	91.9793	91.7735	92.4071	93.0901	93.5729	94.0776	(39)

Average = Sum(39)m / 12 = 93.3276

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2364	1.2328	1.2293	1.2127	1.2096	1.1952	1.1952	1.1925	1.2007	1.2096	1.2159	1.2224	(40)
HLP (average)												1.2127	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4026 (42)

Hot water usage for mixer showers

64.5042	63.5348	62.1223	59.4196	57.4251	55.2008	53.9365	55.3384	56.8751	59.2633	62.0240	64.2571	(42a)

Hot water usage for baths

27.8621	27.4484	26.8657	25.7912	24.9867	24.0947	23.6128	24.1915	24.8215	25.7760	26.8726	27.7680	(42b)

Hot water usage for other uses

39.2355	37.8088	36.3820	34.9553	33.5285	32.1018	32.1018	33.5285	34.9553	36.3820	37.8088	39.2355	(42c)

Average daily hot water use (litres/day) 120.9720 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	131.6019	128.7920	125.3700	120.1661	115.9404	111.3973	109.6512	113.0584	116.6519	121.4214	126.7054	131.2606	(44)
Energy conte	208.4252	183.3981	192.6890	164.5014	156.0780	136.9759	132.6136	139.9899	143.8434	164.7676	180.5151	205.5223	(45)

Energy content (annual) Total = Sum(45)m = 2009.3196

Distribution loss (46)m = 0.15 x (45)m

31.2638	27.5097	28.9033	24.6752	23.4117	20.5464	19.8920	20.9985	21.5765	24.7151	27.0773	30.8283	(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

255.0201	225.4838	239.2839	209.5933	202.6729	182.0678	179.2085	186.5848	188.9353	211.3625	225.6069	252.1172	(62)
WWHRS -29.4886	-26.0800	-27.3095	-22.6133	-21.0748	-18.0339	-16.9039	-17.9756	-18.6585	-21.9963	-24.9192	-28.9425	(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

225.5315	199.4038	211.9744	186.9799	181.5981	164.0339	162.3046	168.6093	170.2768	189.3662	200.6877	223.1747	(64)

Total per year (kWh/year) = Sum(64)m = 2283.9409 (64)

12Total per year (kWh/year) 2284 (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

106.5773	94.6484	101.3450	90.7702	89.1719	81.6180	81.3699	83.8226	83.9014	92.0612	96.0947	105.6121	(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	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	120.1325	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	116.1710	128.6179	116.1710	120.0434	116.1710	120.0434	116.1710	116.1710	120.0434	116.1710	120.0434	116.1710	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	212.9699	215.1799	209.6108	197.7550	182.7892	168.7234	159.3266	157.1167	162.6857	174.5415	189.5073	203.5731	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	35.0132	(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)													
	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	-96.1060	(71)
Water heating gains (Table 5)													
	143.2491	140.8459	136.2164	126.0697	119.8546	113.3583	109.3682	112.6647	116.5297	123.7381	133.4649	141.9517	(72)
Total internal gains													
	534.4297	546.6834	524.0380	505.9079	480.8546	461.1648	443.9056	444.9922	458.2986	476.4904	505.0554	523.7356	(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	7.7900	10.6334	0.6300	0.7000	0.7700	25.3152	(74)
West	2.1500	19.6403	0.6300	0.7000	0.7700	12.9050	(80)
North	0.3700	15.2954	0.6300	0.7000	1.0000	2.2462	(82)

Solar gains	40.4664	77.8057	131.1594	205.7546	271.2609	287.6003	269.6352	217.7317	156.3893	92.5436	50.0586	33.6172	(83)
Total gains	574.8961	624.4891	655.1974	711.6624	752.1155	748.7651	713.5407	662.7239	614.6879	569.0340	555.1140	557.3527	(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, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	36.5799	36.6867	36.7920	37.2948	37.3904	37.8420	37.8420	37.9268	37.6667	37.3904	37.1975	36.9979	
alpha	3.4387	3.4458	3.4528	3.4863	3.4927	3.5228	3.5228	3.5285	3.5111	3.4927	3.4798	3.4665	
util living area													
	0.9804	0.9724	0.9577	0.9154	0.8286	0.6776	0.5311	0.5829	0.7923	0.9291	0.9697	0.9824	(86)
MIT	19.0700	19.2664	19.5967	20.0954	20.5405	20.8453	20.9511	20.9318	20.7141	20.1674	19.5578	19.0491	(87)
Th 2	19.8910	19.8939	19.8967	19.9099	19.9123	19.9239	19.9239	19.9260	19.9194	19.9123	19.9073	19.9021	(88)
util rest of house													
	0.9761	0.9662	0.9477	0.8942	0.7837	0.5946	0.4158	0.4676	0.7237	0.9070	0.9619	0.9785	(89)
MIT 2	17.6634	17.9137	18.3327	18.9596	19.4868	19.8154	19.9019	19.8925	19.6930	19.0595	18.2944	17.6438	(90)
Living area fraction										fLA = Living area / (4) =		0.3996	(91)
MIT	18.2254	18.4542	18.8377	19.4134	19.9078	20.2269	20.3211	20.3077	20.1010	19.5022	18.7992	18.2053	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2254	18.4542	18.8377	19.4134	19.9078	20.2269	20.3211	20.3077	20.1010	19.5022	18.7992	18.2053	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9671	0.9555	0.9353	0.8825	0.7835	0.6196	0.4602	0.5108	0.7367	0.8966	0.9513	0.9701	(94)
Useful gains	556.0025	596.7098	612.8167	628.0708	589.2849	463.9597	328.3753	338.5309	452.8121	510.1993	528.0675	540.7015	(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													
	1325.0412	1285.9648	1167.2001	981.2048	764.0655	517.5583	342.2621	358.6270	554.5355	828.7040	1094.7308	1317.5822	(97)
Space heating kWh													
	572.1648	463.1793	412.4613	254.2565	130.0368	0.0000	0.0000	0.0000	0.0000	236.9675	407.9975	577.9992	(98a)
Space heating requirement - total per year (kWh/year)												3055.0628	
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													
	572.1648	463.1793	412.4613	254.2565	130.0368	0.0000	0.0000	0.0000	0.0000	236.9675	407.9975	577.9992	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3055.0628	
Space heating per m2											(98c) / (4) =	39.6968	(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													
	572.1648	463.1793	412.4613	254.2565	130.0368	0.0000	0.0000	0.0000	0.0000	236.9675	407.9975	577.9992	(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)													
	619.8968	501.8194	446.8703	275.4675	140.8849	0.0000	0.0000	0.0000	0.0000	256.7361	442.0342	626.2180	(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												
	225.5315	199.4038	211.9744	186.9799	181.5981	164.0339	162.3046	168.6093	170.2768	189.3662	200.6877	223.1747 (64)
Efficiency of water heater												79.8000 (216)
(217)m	86.0560	85.8849	85.5256	84.7496	83.3239	79.8000	79.8000	79.8000	79.8000	84.5638	85.6164	86.0952 (217)
Fuel for water heating, kWh/month												
	262.0754	232.1755	247.8491	220.6264	217.9425	205.5563	203.3892	211.2898	213.3794	223.9330	234.4035	259.2185 (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	24.1380	19.3644	17.4355	12.7740	9.8670	8.0614	9.0010	11.6999	15.1970	19.9392	22.5213	24.8089 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-42.8074	-59.1141	-83.2469	-91.6409	-97.2055	-90.1683	-89.0621	-84.8701	-77.2205	-66.6910	-46.6262	-37.1575 (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	-28.0597	-58.5485	-115.5024	-172.2373	-226.5588	-227.2065	-224.5161	-190.6121	-140.4142	-83.2849	-37.3167	-22.2235 (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	3309.9272 (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	2731.8386 (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)	194.8078 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-2392.2913 (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	3930.2824 (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	3309.9272	0.2100	695.0847	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2731.8386	0.2100	573.6861	(264)
Space and water heating			1268.7708	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	194.8078	0.1443	28.1168	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-865.8106	0.1350	-116.9081	
PV Unit electricity exported	-1526.4807	0.1261	-192.5050	
Total			-309.4130	(269)
Total CO2, kg/year			999.4039	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.9900	(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	3309.9272	1.1300	3740.2178	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2731.8386	1.1300	3086.9776	(278)
Space and water heating			6827.1954	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	194.8078	1.5338	298.8027	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-865.8106	1.4991	-1297.9042	
PV Unit electricity exported	-1526.4807	0.4629	-706.6407	
Total			-2004.5449	(283)
Total Primary energy kWh/year			5251.5540	(286)
Target Primary Energy Rate (TPER)			68.2400	(287)