Full SAP Calculation Printout

Property Reference	Plot 108	**Issued on Date**	28/06/2024
Assessment Reference	001	**Prop Type Ref**	A 3.0 SD NSW
Property	A 3.0 SD, 108, Linmere Parcels 1 & 2, Linmere, Beds		

SAP Rating	84 B	**DER**	3.80	**TER**	11.52
Environmental	97 A	**% DER < TER**			67.01
CO_2 Emissions (t/year)	0.3	**DFEE**	35.41	**TFEE**	37.67
Compliance Check	See BREL	**% DFEE < TFEE**			6.00
% DPER < TPER	33.90	**DPER**	39.83	**TPER**	60.26

Assessor Details	Mr. Matthew Fitzpatrick	**Assessor ID**	7601-0001
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	42.0400 (1b)	x	2.4000 (2b)	=	100.8960	(1b) - (3b)
First floor	43.0100 (1c)	x	2.7000 (2c)	=	116.1270	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.0500					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	217.0230	(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		4.5000	(17)
Infiltration rate		0.2250	(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) =	0.1913	(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	0.2438	0.2391	0.2343	0.2104	0.2056	0.1817	0.1817	0.1769	0.1913	0.2056	0.2152	0.2247	(22b)

Mechanical extract ventilation - decentralised

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)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	(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	
Window (Uw = 1.30)			7.2100	1.2357	8.9097			(27)
Patio Door (Uw = 1.30)			3.3300	1.2357	4.1150			(27)
Front Door			2.1500	1.3000	2.7950			(26)
Suspended Ground Floor			42.0400	0.1100	4.6244	75.0000	3153.0000	(28a)
Exposed Floor			0.9100	0.1700	0.1547	20.0000	18.2000	(28a)
Brickwork	95.8140	12.6900	83.1240	0.2200	18.2873	60.0000	4987.4400	(29a)
Cold Roof	43.0100		43.0100	0.0800	3.4408	9.0000	387.0900	(30)
Total net area of external elements Aum(A, m2)			181.7740					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		42.3269			(33)
Party Wall 1			43.4400	0.0000	0.0000	45.0000	1954.8000	(32)
Metal GF			74.8000			9.0000	673.2000	(32c)
Metal FF			89.0700			9.0000	801.6300	(32c)
Internal Floor 1			43.0100			18.0000	774.1800	(32d)
Internal Ceiling 1			42.0400			9.0000	378.3600	(32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 13127.9000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 154.3551 (35)
List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E12 Gable (insulation at ceiling level)	9.8500	0.0390	0.3841
E1 Steel lintel with perforated steel base plate	7.7200	0.0500	0.3860
E3 Sill	5.1300	0.0340	0.1744
E4 Jamb	22.5000	0.0400	0.9000
E5 Ground floor (normal)	19.0200	0.0580	1.1032
E6 Intermediate floor within a dwelling	16.4500	0.0010	0.0164
E16 Corner (normal)	12.6000	0.0430	0.5418
E18 Party wall between dwellings	10.2000	0.0370	0.3774
P1 Party wall - Ground floor	8.2600	0.0430	0.3552
P2 Party wall - Intermediate floor within a dwelling	8.7400	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	8.7400	0.0500	0.4370
E17 Corner (inverted - internal area greater than external area)	2.4000	-0.0920	-0.2208
P4 Party wall - Roof (insulation at ceiling level)	8.7400	0.0330	0.2884
E21 Exposed floor (inverted)	2.6000	0.2000	0.5200
E20 Exposed floor (normal)	2.6000	0.2000	0.5200

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 5.7832 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 48.1101 (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	35.8088	35.8088	35.8088	35.8088	35.8088	35.8088	35.8088	35.8088	35.8088	35.8088	35.8088	35.8088	(38)
Heat transfer coeff	83.9189	83.9189	83.9189	83.9189	83.9189	83.9189	83.9189	83.9189	83.9189	83.9189	83.9189	83.9189	(39)
Average = Sum(39)m / 12 =												83.9189	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9867	0.9867	0.9867	0.9867	0.9867	0.9867	0.9867	0.9867	0.9867	0.9867	0.9867	0.9867	(40)
HLP (average)												0.9867	
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 2.5517 (42)
Hot water usage for mixer showers

67.0039	65.9970	64.5297	61.7222	59.6504	57.3400	56.0267	57.4829	59.0792	61.5599	64.4276	66.7472	(42a)

Hot water usage for baths

28.9371	28.5073	27.9022	26.7863	25.9508	25.0243	24.5238	25.1248	25.7791	26.7705	27.9093	28.8393	(42b)

Hot water usage for other uses

40.7623	39.2800	37.7978	36.3155	34.8332	33.3510	33.3510	34.8332	36.3155	37.7978	39.2800	40.7623	(42c)

Average daily hot water use (litres/day) 125.6612 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.7033	133.7843	130.2296	124.8240	120.4344	115.7152	113.9015	117.4409	121.1738	126.1282	131.6170	136.3488	(44)
Energy conte	216.5046	190.5071	200.1580	170.8779	162.1279	142.2854	137.7540	145.4164	149.4194	171.1547	187.5125	213.4892	(45)
Energy content (annual)										Total = Sum(45)m =		2087.2071	

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

32.4757	28.5761	30.0237	25.6317	24.3192	21.3428	20.6631	21.8125	22.4129	25.6732	28.1269	32.0234	(46)

Water storage loss:
Store volume 200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)
Temperature factor from Table 2b 0.5400 (49)
Enter (49) or (54) in (55) 0.6480 (55)
Total storage loss

20.0880	18.1440	20.0880	19.4400	20.0880	19.4400	20.0880	20.0880	19.4400	20.0880	19.4400	20.0880	(56)

If cylinder contains dedicated solar storage

20.0880	18.1440	20.0880	19.4400	20.0880	19.4400	20.0880	20.0880	19.4400	20.0880	19.4400	20.0880	(57)
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)
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)

Primary loss / Combi loss

Total heat required for water heating calculated for each month

259.8550	229.6623	243.5084	212.8299	205.4783	184.2374	181.1044	188.7668	191.3714	214.5051	229.4645	256.8396	(62)
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)
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)
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)
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)

WWHRS / PV diverter / Solar input / FGHRS

Output from w/h

259.8550	229.6623	243.5084	212.8299	205.4783	184.2374	181.1044	188.7668	191.3714	214.5051	229.4645	256.8396	(64)

Total per year (kWh/year) = Sum(64)m = 2597.6231 (64)
12Total per year (kWh/year) 2598 (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

106.6681	94.6678	101.2329	90.3785	88.5878	80.8715	80.4835	83.0313	83.2436	91.5893	95.9095	105.6655	(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	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	127.6666	141.3452	127.6666	131.9222	127.6666	131.9222	127.6666	127.6666	131.9222	127.6666	131.9222	127.6666	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	229.6710	232.0542	226.0485	213.2629	197.1235	181.9547	171.8210	169.4377	175.4435	188.2290	204.3685	219.5373	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	(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)	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	(71)
Water heating gains (Table 5)	143.3711	140.8747	136.0657	125.5257	119.0697	112.3215	108.1768	111.6012	115.6160	123.1038	133.2077	142.0235	(72)
Total internal gains	561.9847	575.5501	551.0568	531.9868	505.1358	487.4743	468.9404	469.9815	484.2577	500.2755	530.7743	550.5034	(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	
Southeast	4.1400	36.7938	0.4400	0.0000	0.7700	51.6082	(77)
Northwest	3.0700	11.2829	0.4400	0.0000	0.7700	11.7356	(81)
Northwest	3.3300	11.2829	0.4400	0.0000	0.7700	12.7295	(81)

Solar gains	76.0732	137.7071	210.0018	296.3820	364.9956	376.8819	357.3094	303.8999	239.5653	158.0156	92.5981	64.1452	(83)
Total gains	638.0579	713.2572	761.0586	828.3688	870.1314	864.3562	826.2498	773.8814	723.8230	658.2911	623.3724	614.6486	(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	43.4543	43.4543	43.4543	43.4543	43.4543	43.4543	43.4543	43.4543	43.4543	43.4543	43.4543	43.4543	
alpha	3.8970	3.8970	3.8970	3.8970	3.8970	3.8970	3.8970	3.8970	3.8970	3.8970	3.8970	3.8970	
util living area	0.9741	0.9590	0.9331	0.8680	0.7504	0.5806	0.4360	0.4816	0.6991	0.8906	0.9575	0.9774	(86)
Living	19.5280	19.7410	20.0438	20.4405	20.7594	20.9334	20.9830	20.9749	20.8622	20.4593	19.9250	19.4730	
Non living	18.3819	18.6497	19.0278	19.5097	19.8732	20.0472	20.0863	20.0815	19.9862	19.5423	18.8850	18.3126	
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	20.2470	19.7410	20.0438	20.4405	20.7594	20.9334	20.9830	20.9749	20.8622	20.4593	19.9250	19.6866	(87)
Th 2	20.0944	20.0944	20.0944	20.0944	20.0944	20.0944	20.0944	20.0944	20.0944	20.0944	20.0944	20.0944	(88)
util rest of house	0.9691	0.9514	0.9203	0.8426	0.7046	0.5109	0.3508	0.3937	0.6332	0.8640	0.9482	0.9731	(89)
MIT 2	19.4117	18.6497	19.0278	19.5097	19.8732	20.0472	20.0863	20.0815	19.9862	19.5423	18.8850	18.6337	(90)
Living area fraction										fLA = Living area / (4) =		0.3644	(91)
MIT	19.7161	19.0474	19.3980	19.8489	20.1961	20.3702	20.4130	20.4071	20.3054	19.8764	19.2639	19.0173	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.7161	19.0474	19.3980	19.8489	20.1961	20.3702	20.4130	20.4071	20.3054	19.8764	19.2639	19.0173	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9667	0.9403	0.9084	0.8348	0.7101	0.5329	0.3813	0.4248	0.6496	0.8566	0.9374	0.9665	(94)
Useful gains	616.8117	670.6488	691.3743	691.5482	617.8701	460.5736	315.0737	328.7540	470.1726	563.8907	584.3751	594.0404	(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	1293.6990	1187.2326	1082.3819	918.8154	712.9809	484.2245	319.9840	336.2674	520.7497	778.4682	1020.7830	1243.4527	(97)
Space heating kWh	503.6042	347.1443	290.9097	163.6324	70.7625	0.0000	0.0000	0.0000	0.0000	159.6456	314.2137	483.1628	(98a)
Space heating requirement - total per year (kWh/year)												2333.0751	
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	503.6042	347.1443	290.9097	163.6324	70.7625	0.0000	0.0000	0.0000	0.0000	159.6456	314.2137	483.1628	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2333.0751	
Space heating per m2											(98c) / (4) =	27.4318	(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 %)	245.4493	(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	503.6042	347.1443	290.9097	163.6324	70.7625	0.0000	0.0000	0.0000	0.0000	159.6456	314.2137	483.1628	(98)
Space heating efficiency (main heating system 1)	245.4493	245.4493	245.4493	245.4493	245.4493	0.0000	0.0000	0.0000	0.0000	245.4493	245.4493	245.4493	(210)
Space heating fuel (main heating system)	205.1765	141.4322	118.5213	66.6665	28.8298	0.0000	0.0000	0.0000	0.0000	65.0422	128.0157	196.8483	(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	259.8550	229.6623	243.5084	212.8299	205.4783	184.2374	181.1044	188.7668	191.3714	214.5051	229.4645	256.8396	(64)
Efficiency of water heater												267.7450	(216)
(217)m	267.7450	267.7450	267.7450	267.7450	267.7450	267.7450	267.7450	267.7450	267.7450	267.7450	267.7450	267.7450	(217)
Fuel for water heating, kWh/month	97.0532	85.7765	90.9479	79.4898	76.7440	68.8108	67.6406	70.5025	71.4753	80.1155	85.7026	95.9270	(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	4.3850	3.9606	4.3850	4.2435	4.3850	4.2435	4.3850	4.3850	4.2435	4.3850	4.2435	4.3850	(231)
Lighting	27.1411	21.7736	19.6047	14.3632	11.0946	9.0644	10.1208	13.1555	17.0876	22.4199	25.3232	27.8954	(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	950.5325	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	267.7450	
Water heating fuel used	970.1856	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
(MEVDecentralised, Database: total watage = 5.6550, total flow = 29.0000, SFP = 0.1950)		
mechanical ventilation fans (SFP = 0.1950)	51.6298	(230a)
Total electricity for the above, kWh/year	51.6298	(231)
Electricity for lighting (calculated in Appendix L)	219.0441	(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	2191.3919	(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	950.5325	0.1555	147.8079	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	970.1856	0.1410	136.8107	(264)
Space and water heating			284.6186	(265)
Pumps, fans and electric keep-hot	51.6298	0.1387	7.1617	(267)
Energy for lighting	219.0441	0.1443	31.6148	(268)
Total CO2, kg/year			323.3952	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.8000	(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	950.5325	1.5757	1497.7219	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	970.1856	1.5214	1476.0676	(278)
Space and water heating			2973.7895	(279)
Pumps, fans and electric keep-hot	51.6298	1.5128	78.1055	(281)
Energy for lighting	219.0441	1.5338	335.9771	(282)
Total Primary energy kWh/year			3387.8722	(286)
Dwelling Primary energy Rate (DPER)			39.8300	(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	42.0400 (1b)	x	2.4000 (2b)	=	100.8960	(1b) - (3b)
First floor	43.0100 (1c)	x	2.7000 (2c)	=	116.1270	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	85.0500					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	217.0230	(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) =	0.1382	(8)
Pressure test			Yes	
Pressure Test Method			Blower Door	
Measured/design AP50			5.0000	(17)
Infiltration rate			0.3882	(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) =	0.3300	(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	0.4207	0.4125	0.4042	0.3630	0.3547	0.3135	0.3135	0.3052	0.3300	0.3547	0.3712	0.3877	(22b)
Effective ac	0.5885	0.5851	0.5817	0.5659	0.5629	0.5491	0.5491	0.5466	0.5544	0.5629	0.5689	0.5752	(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			2.1500	1.0000	2.1500			(26)
TER Opening Type (Uw = 1.20)			10.5400	1.1450	12.0687			(27)
Suspended Ground Floor			42.0400	0.1300	5.4652			(28a)
Exposed Floor			0.9100	0.1300	0.1183			(28a)
Brickwork	95.8140	12.6900	83.1240	0.1800	14.9623			(29a)
Cold Roof	43.0100		43.0100	0.1100	4.7311			(30)
Total net area of external elements Aum(A, m2)			181.7740					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	39.4956			(33)
Party Wall 1			43.4400	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 154.3551 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E12 Gable (insulation at ceiling level)	9.8500	0.0600	0.5910
E1 Steel lintel with perforated steel base plate	7.7200	0.0500	0.3860
E3 Sill	5.1300	0.0500	0.2565
E4 Jamb	22.5000	0.0500	1.1250
E5 Ground floor (normal)	19.0200	0.1600	3.0432
E6 Intermediate floor within a dwelling	16.4500	0.0000	0.0000
E16 Corner (normal)	12.6000	0.0900	1.1340
E18 Party wall between dwellings	10.2000	0.0600	0.6120
P1 Party wall - Ground floor	8.2600	0.0800	0.6608
P2 Party wall - Intermediate floor within a dwelling	8.7400	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	8.7400	0.0600	0.5244
E17 Corner (inverted - internal area greater than external area)	2.4000	-0.0900	-0.2160
P4 Party wall - Roof (insulation at ceiling level)	8.7400	0.1200	1.0488
E21 Exposed floor (inverted)	2.6000	0.3200	0.8320
E20 Exposed floor (normal)	2.6000	0.3200	0.8320

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 10.8297 (36)

Point Thermal bridges (36a) = 0.0000

Total fabric heat loss (33) + (36) + (36a) = 50.3253 (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	42.1480	41.9019	41.6606	40.5273	40.3152	39.3281	39.3281	39.1454	39.7084	40.3152	40.7442	41.1926	(38)
Heat transfer coeff	92.4733	92.2272	91.9859	90.8526	90.6405	89.6535	89.6535	89.4707	90.0337	90.6405	91.0695	91.5179	(39)

Average = Sum(39)m / 12 = 90.8516

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0873	1.0844	1.0816	1.0682	1.0657	1.0541	1.0541	1.0520	1.0586	1.0657	1.0708	1.0760	(40)
HLP (average)												1.0682	
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 2.5517 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
67.0039	65.9970	64.5297	61.7222	59.6504	57.3400	56.0267	57.4829	59.0792	61.5599	64.4276	66.7472	(42a)

Hot water usage for baths

28.9371	28.5073	27.9022	26.7863	25.9508	25.0243	24.5238	25.1248	25.7791	26.7705	27.9093	28.8393	(42b)

Hot water usage for other uses

40.7623	39.2800	37.7978	36.3155	34.8332	33.3510	33.3510	34.8332	36.3155	37.7978	39.2800	40.7623	(42c)

Average daily hot water use (litres/day) 125.6612 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.7033	133.7843	130.2296	124.8240	120.4344	115.7152	113.9015	117.4409	121.1738	126.1282	131.6170	136.3488	(44)
Energy conte	216.5046	190.5071	200.1580	170.8779	162.1279	142.2854	137.7540	145.4164	149.4194	171.1547	187.5125	213.4892	(45)
Energy content (annual)										Total = Sum(45)m =		2087.2071	
Distribution loss (46)m = 0.15 x (45)m	32.4757	28.5761	30.0237	25.6317	24.3192	21.3428	20.6631	21.8125	22.4129	25.6732	28.1269	32.0234	(46)

Water storage loss:

Store volume 200.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.6525 (48)

Temperature factor from Table 2b 0.5400 (49)

Enter (49) or (54) in (55) 0.8924 (55)

Total storage loss

27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)

If cylinder contains dedicated solar storage

27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(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

267.4307	236.5049	251.0841	220.1612	213.0540	191.5686	188.6801	196.3425	198.7027	222.0808	236.7958	264.4153	(62)
WWHRS -30.6314	-27.0907	-28.3678	-23.4896	-21.8915	-18.7327	-17.5589	-18.6722	-19.3816	-22.8487	-25.8849	-30.0641	(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

236.7993	209.4142	222.7163	196.6715	191.1625	172.8359	171.1211	177.6703	179.3211	199.2320	210.9110	234.3511	(64)

Total per year (kWh/year) = Sum(64)m = 2402.2065 (64)

12Total per year (kWh/year) 2402 (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

112.7286	100.1418	107.2934	96.2435	94.6484	86.7365	86.5441	89.0918	89.1086	97.6498	101.7746	111.7260	(65)

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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	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	127.5867	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	127.6666	141.3452	127.6666	131.9222	127.6666	131.9222	127.6666	127.6666	131.9222	127.6666	131.9222	127.6666	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	229.6710	232.0542	226.0485	213.2629	197.1235	181.9547	171.8210	169.4377	175.4435	188.2290	204.3685	219.5373	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	35.7587	(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)													
	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	-102.0693	(71)
Water heating gains (Table 5)													
	151.5170	149.0206	144.2116	133.6716	127.2156	120.4674	116.3227	119.7471	123.7619	131.2497	141.3535	150.1694	(72)
Total internal gains													
	573.1306	586.6960	562.2026	543.1327	516.2817	495.6202	477.0863	478.1274	492.4036	511.4214	541.9202	561.6493	(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	
Southeast	4.1400	36.7938	0.6300	0.7000	0.7700	46.5529	(77)
Northwest	6.4000	11.2829	0.6300	0.7000	0.7700	22.0686	(81)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	68.6215	124.2181	189.4312	267.3501	329.2426	339.9646	322.3093	274.1315	216.0988	142.5372	83.5277	57.8619	(83)
Total gains	641.7521	710.9141	751.6338	810.4827	845.5243	835.5848	799.3956	752.2589	708.5024	653.9586	625.4478	619.5112	(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	39.4345	39.5397	39.6435	40.1380	40.2319	40.6748	40.6748	40.7579	40.5031	40.2319	40.0424	39.8462	
alpha	3.6290	3.6360	3.6429	3.6759	3.6821	3.7117	3.7117	3.7172	3.7002	3.6821	3.6695	3.6564	
util living area													
	0.9754	0.9630	0.9419	0.8872	0.7852	0.6224	0.4746	0.5192	0.7327	0.9028	0.9605	0.9782	(86)
MIT	19.3131	19.5288	19.8487	20.2979	20.6692	20.9005	20.9721	20.9610	20.8110	20.3491	19.7728	19.2837	(87)
Th 2	20.0112	20.0136	20.0159	20.0269	20.0289	20.0385	20.0385	20.0402	20.0348	20.0289	20.0248	20.0204	(88)
util rest of house													
	0.9705	0.9557	0.9300	0.8634	0.7398	0.5478	0.3787	0.4218	0.6653	0.8773	0.9514	0.9738	(89)
MIT 2	18.0547	18.3282	18.7311	19.2897	19.7221	19.9675	20.0252	20.0203	19.8852	19.3629	18.6469	18.0237	(90)
Living area fraction									fLA = Living area / (4) =			0.3644	(91)
MIT	18.5133	18.7657	19.1383	19.6571	20.0672	20.3074	20.3702	20.3631	20.2226	19.7223	19.0571	18.4828	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5133	18.7657	19.1383	19.6571	20.0672	20.3074	20.3702	20.3631	20.2226	19.7223	19.0571	18.4828	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9606	0.9438	0.9169	0.8529	0.7418	0.5697	0.4127	0.4557	0.6795	0.8678	0.9398	0.9646	(94)
Useful gains	616.4838	670.9473	689.1376	691.2650	627.1721	476.0244	329.8799	342.7933	481.4471	567.4759	587.8229	597.5809	(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													
	1314.3467	1278.7899	1162.5456	977.3083	758.4080	511.6921	338.0139	354.5781	551.2382	826.8487	1088.9301	1307.1358	(97)
Space heating kWh													
	519.2100	408.4702	352.2155	205.9512	97.6396	0.0000	0.0000	0.0000	0.0000	192.9734	360.7972	527.9089	(98a)
Space heating requirement - total per year (kWh/year)												2665.1658	
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													
	519.2100	408.4702	352.2155	205.9512	97.6396	0.0000	0.0000	0.0000	0.0000	192.9734	360.7972	527.9089	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2665.1658	
Space heating per m2											(98c) / (4) =	31.3365	(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													
	519.2100	408.4702	352.2155	205.9512	97.6396	0.0000	0.0000	0.0000	0.0000	192.9734	360.7972	527.9089	(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)													
	562.5243	442.5462	381.5986	223.1324	105.7850	0.0000	0.0000	0.0000	0.0000	209.0719	390.8962	571.9489	(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													
	236.7993	209.4142	222.7163	196.6715	191.1625	172.8359	171.1211	177.6703	179.3211	199.2320	210.9110	234.3511	(64)
Efficiency of water heater												79.8000	(216)
(217)m	85.7701	85.5307	85.0828	84.1633	82.6314	79.8000	79.8000	79.8000	79.8000	83.9882	85.2529	85.8241	(217)

Fuel for water heating, kWh/month

	276.0861	244.8411	261.7643	233.6784	231.3436	216.5864	214.4375	222.6445	224.7132	237.2142	247.3945	273.0597 (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	26.5266	21.2806	19.1608	14.0381	10.8434	8.8591	9.8917	12.8576	16.7008	21.9123	24.7499	27.2639 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-39.8566	-55.9825	-80.1602	-89.7554	-96.4529	-89.8950	-88.7834	-83.9902	-75.4620	-63.8543	-43.7453	-34.4828 (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	-23.1185	-48.5768	-96.4556	-144.7364	-191.2558	-192.1358	-189.8736	-160.8133	-117.9361	-69.4198	-30.8494	-18.2853 (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	2887.5036	(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	2883.7635	(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)	214.0848	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-2125.8770	(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	3945.4749	(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	2887.5036	0.2100	606.3758	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2883.7635	0.2100	605.5903	(264)
Space and water heating			1211.9661	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	214.0848	0.1443	30.8991	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-842.4206	0.1347	-113.4512	
PV Unit electricity exported	-1283.4564	0.1259	-161.6163	
Total			-275.0675	(269)
Total CO2, kg/year			979.7269	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.5200	(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	2887.5036	1.1300	3262.8791	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2883.7635	1.1300	3258.6527	(278)
Space and water heating			6521.5318	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	214.0848	1.5338	328.3705	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-842.4206	1.4977	-1261.7212	
PV Unit electricity exported	-1283.4564	0.4622	-593.2443	
Total			-1854.9655	(283)
Total Primary energy kWh/year			5125.0376	(286)
Target Primary Energy Rate (TPER)			60.2600	(287)