Full SAP Calculation Printout

Property Reference	10 Pickett's Lock	**Issued on Date**	15/01/2024
Assessment Reference	03 Be Green	**Prop Type Ref**	New build
Property	New build at, 10, Pickett's Lock Lane, London, N9 0AY		

SAP Rating	84 B	**DER**	3.43	**TER**	9.86
Environmental	97 A	**% DER < TER**			65.21
CO_2 Emissions (t/year)	0.4	**DFEE**	38.51	**TFEE**	39.45
Compliance Check	See BREL	**% DFEE < TFEE**			2.39
% DPER < TPER	30.96	**DPER**	35.52	**TPER**	51.44

Assessor Details	Mr. Thomas McMahon	**Assessor ID**	R863-0001
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	60.3400 (1b)	x	2.4000 (2b)	=	144.8160	(1b) - (3b)
First floor	44.0500 (1c)	x	2.6100 (2c)	=	114.9705	(1c) - (3c)
Second floor	32.5100 (1d)	x	2.2800 (2d)	=	74.1228	(1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	136.9000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	333.9093	(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) =	0.1198	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3698	(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) =	0.2866	(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	0.3654	0.3582	0.3511	0.3152	0.3081	0.2723	0.2723	0.2651	0.2866	0.3081	0.3224	0.3367	(22b)
Effective ac	0.5668	0.5642	0.5616	0.5497	0.5475	0.5371	0.5371	0.5351	0.5411	0.5475	0.5520	0.5567	(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	
Glazing (Uw = 1.20)			23.0000	1.1450	26.3359			(27)
Door			1.9000	1.2000	2.2800			(26a)
N RW			2.3100	1.1450	2.6450			(27a)
Ground Floor			60.3400	0.1200	7.2408	110.0000	6637.4000	(28a)
External Wall	169.0400	22.3700	146.6700	0.1600	23.4672	60.0000	8800.2000	(29a)
Dormer Walls	17.4900	2.5300	14.9600	0.1700	2.5432	9.0000	134.6400	(29a)
Dwarf Walls (0.72)	10.1500		10.1500	0.1200	1.2180	9.0000	91.3500	(29a)
Joisted Roof	16.2900		16.2900	0.1100	1.7919	9.0000	146.6100	(30)
Rafter Roof	29.3500	2.3100	27.0400	0.1600	4.3264	9.0000	243.3600	(30)
Rafter Eaves (0.72)	7.6200		7.6200	0.1200	0.9144	9.0000	68.5800	(30)
Flat Dormer Roof	12.0600		12.0600	0.1400	1.6884	9.0000	108.5400	(30)
Total net area of external elements Aum(A, m2)			322.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		74.4512			(33)
Internal Wall			171.7200			9.0000	1545.4800	(32c)
Internal Floor 1			44.0500			18.0000	792.9000	(32d)
Internal Floor 2			32.5100			18.0000	585.1800	(32d)
Internal Ceiling 1			44.0500			9.0000	396.4500	(32e)
Internal Ceiling 2			32.5100			9.0000	292.5900	(32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 19843.2800 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 144.9473 (35)
List of Thermal Bridges

	K1 Element	Length	Psi-value	Total
E2	Other lintels (including other steel lintels)	14.5800	0.0700	1.0206
E2	Other lintels (including other steel lintels)	2.3000	1.0000	2.3000
E3	Sill	8.0900	0.0220	0.1780
E3	Sill	2.3000	0.1000	0.2300
E4	Jamb	22.6200	0.0180	0.4072
E4	Jamb	4.4000	0.1000	0.4400
E5	Ground floor (normal)	33.6200	0.0500	1.6810
E6	Intermediate floor within a dwelling	27.3800	0.0010	0.0274
E10	Eaves (insulation at ceiling level)	17.3600	0.0580	1.0069
E24	Eaves (insulation at ceiling level - inverted)	15.4300	0.1500	2.3145
E11	Eaves (insulation at rafter level)	10.2800	0.0210	0.2159
E12	Gable (insulation at ceiling level)	4.3400	0.0350	0.1519
E13	Gable (insulation at rafter level)	22.3600	0.0280	0.6261
E16	Corner (normal)	23.6000	0.0350	0.8260
E17	Corner (inverted - internal area greater than external area)	4.8000	-0.0660	-0.3168
R1	Head of roof window	2.1000	0.2400	0.5040
R2	Sill of roof window	2.1000	0.2400	0.5040
R3	Jamb of roof window	6.6000	0.2400	1.5840
R6	Flat ceiling	16.4900	0.1200	1.9788
R7	Flat ceiling (inverted)	7.7400	0.1200	0.9288
R9	Roof to wall (flat ceiling)	10.0000	0.3200	3.2000

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 19.8082 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 94.2594 (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	62.4512	62.1656	61.8856	60.5705	60.3244	59.1790	59.1790	58.9669	59.6202	60.3244	60.8222	61.3426	(38)
Heat transfer coeff	156.7106	156.4250	156.1450	154.8298	154.5838	153.4384	153.4384	153.2262	153.8796	154.5838	155.0816	155.6019	(39)

Average = Sum(39)m / 12 = 154.8287

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1447	1.1426	1.1406	1.1310	1.1292	1.1208	1.1208	1.1193	1.1240	1.1292	1.1328	1.1366	(40)
HLP (average)												1.1310	
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 2.9109 (42)
Hot water usage for mixer showers

73.0267	71.9292	70.3300	67.2703	65.0122	62.4941	61.0628	62.6499	64.3896	67.0933	70.2188	72.7469	(42a)

Hot water usage for baths

31.5271	31.0589	30.3995	29.1838	28.2735	27.2641	26.7188	27.3736	28.0865	29.1666	30.4073	31.4205	(42b)

Hot water usage for other uses

44.4409	42.8249	41.2088	39.5928	37.9768	36.3607	36.3607	37.9768	39.5928	41.2088	42.8249	44.4409	(42c)

Average daily hot water use (litres/day) 136.9596 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	148.9947	145.8130	141.9384	136.0469	131.2625	126.1189	124.1423	128.0002	132.0689	137.4687	143.4510	148.6083	(44)
Energy conte	235.9712	207.6357	218.1540	186.2413	176.7045	155.0779	150.1394	158.4910	162.8541	186.5438	204.3723	232.6847	(45)
Energy content (annual)										Total = Sum(45)m =		2274.8699	
Distribution loss (46)m = 0.15 x (45)m	35.3957	31.1454	32.7231	27.9362	26.5057	23.2617	22.5209	23.7736	24.4281	27.9816	30.6558	34.9027	(46)

Water storage loss:
Store volume 180.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.8000 (48)
Temperature factor from Table 2b 0.5400 (49)
Enter (49) or (54) in (55) 0.9720 (55)
Total storage loss

30.1320	27.2160	30.1320	29.1600	30.1320	29.1600	30.1320	30.1320	29.1600	30.1320	29.1600	30.1320	(56)

If cylinder contains dedicated solar storage

30.1320	27.2160	30.1320	29.1600	30.1320	29.1600	30.1320	30.1320	29.1600	30.1320	29.1600	30.1320	(57)
Primary loss 23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

289.3656	255.8629	271.5484	237.9133	230.0989	206.7499	203.5338	211.8854	214.5261	239.9382	256.0443	286.0791	(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

289.3656	255.8629	271.5484	237.9133	230.0989	206.7499	203.5338	211.8854	214.5261	239.9382	256.0443	286.0791	(64)
									Total per year (kWh/year) = Sum(64)m =		2903.5459	(64)
12Total per year (kWh/year)											2904	(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

121.1759	107.6206	115.2517	103.2628	101.4698	92.9010	92.6369	95.4138	95.4866	104.7413	109.2914	120.0832	(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	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	156.5024	173.2705	156.5024	161.7191	156.5024	161.7191	156.5024	156.5024	161.7191	156.5024	161.7191	156.5024	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	305.8589	309.0328	301.0348	284.0079	262.5146	242.3139	228.8186	225.6447	233.6428	250.6696	272.1629	292.3636	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	(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)	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	(71)
Water heating gains (Table 5)	162.8709	160.1498	154.9082	143.4206	136.3841	129.0292	124.5119	128.2443	132.6203	140.7814	151.7936	161.4021	(72)
Total internal gains	691.8962	709.1171	679.1094	655.8117	622.0651	599.7262	576.4969	577.0555	594.6462	614.6174	652.3397	676.9322	(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	5.9000	10.6334	0.6300	0.7000	0.7700	19.1732	(74)
South	16.0200	46.7521	0.6300	0.7000	0.7700	228.8944	(78)
West	1.0800	19.6403	0.6300	0.7000	0.7700	6.4825	(80)
North	2.3100	15.6897	0.6300	0.7000	1.0000	14.3849	(82)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	268.9351	451.1743	609.0365	757.2554	862.5378	865.8025	830.5365	748.4278	658.6948	495.4351	320.6168	231.2591	(83)
Total gains	960.8313	1160.2914	1288.1459	1413.0671	1484.6029	1465.5287	1407.0334	1325.4833	1253.3410	1110.0525	972.9565	908.1913	(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	35.1733	35.2375	35.3007	35.6005	35.6572	35.9234	35.9234	35.9731	35.8204	35.6572	35.5427	35.4239	
alpha	3.3449	3.3492	3.3534	3.3734	3.3771	3.3949	3.3949	3.3982	3.3880	3.3771	3.3695	3.3616	
util living area	0.9775	0.9583	0.9289	0.8661	0.7590	0.6015	0.4583	0.5007	0.7044	0.8896	0.9612	0.9811	(86)
Living	19.4304	19.6687	19.9669	20.3345	20.6339	20.8202	20.8825	20.8729	20.7507	20.3603	19.8303	19.3876	
Non living	18.1290	18.4304	18.8045	19.2591	19.6063	19.8038	19.8547	19.8502	19.7399	19.3009	18.6440	18.0796	
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	20.1970	19.6687	19.9669	20.3345	20.6339	20.8202	20.8825	20.8729	20.7507	20.3603	19.8303	19.6132	(87)
Th 2	19.9645	19.9662	19.9678	19.9756	19.9771	19.9839	19.9839	19.9851	19.9813	19.9771	19.9741	19.9710	(88)
util rest of house	0.9731	0.9504	0.9151	0.8396	0.7112	0.5255	0.3610	0.4020	0.6345	0.8620	0.9525	0.9774	(89)
MIT 2	19.2327	18.4304	18.8045	19.2591	19.6063	19.8038	19.8547	19.8502	19.7399	19.3009	18.6440	18.4204	(90)
Living area fraction										fLA = Living area / (4) =		0.1490	(91)
MIT	19.3764	18.6149	18.9777	19.4194	19.7594	19.9553	20.0079	20.0026	19.8906	19.4588	18.8208	18.5982	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.3764	18.6149	18.9777	19.4194	19.7594	19.9553	20.0079	20.0026	19.8906	19.4588	18.8208	18.5982	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9701	0.9370	0.8987	0.8228	0.6999	0.5232	0.3634	0.4038	0.6276	0.8450	0.9395	0.9709	(94)
Useful gains	932.1417	1087.2450	1157.6090	1162.6209	1039.0065	766.7528	511.3428	535.2358	786.5966	937.9532	914.0732	881.7223	(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	2362.6361	2145.3554	1948.3274	1628.7139	1245.8571	821.7071	522.9001	552.0066	891.0478	1369.4270	1817.6726	2240.3806	(97)
Space heating kWh	1064.2878	711.0502	588.2945	335.5869	153.8968	0.0000	0.0000	0.0000	0.0000	321.0165	650.5916	1010.8418	(98a)
Space heating requirement - total per year (kWh/year)												4835.5661	
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	1064.2878	711.0502	588.2945	335.5869	153.8968	0.0000	0.0000	0.0000	0.0000	321.0165	650.5916	1010.8418	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4835.5661	
Space heating per m2											(98c) / (4) =	35.3219	(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 %)	258.1071	(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	1064.2878	711.0502	588.2945	335.5869	153.8968	0.0000	0.0000	0.0000	0.0000	321.0165	650.5916	1010.8418	(98)
Space heating efficiency (main heating system 1)	258.1071	258.1071	258.1071	258.1071	258.1071	0.0000	0.0000	0.0000	0.0000	258.1071	258.1071	258.1071	(210)
Space heating fuel (main heating system)	412.3434	275.4865	227.9265	130.0185	59.6252	0.0000	0.0000	0.0000	0.0000	124.3734	252.0626	391.6365	(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	289.3656	255.8629	271.5484	237.9133	230.0989	206.7499	203.5338	211.8854	214.5261	239.9382	256.0443	286.0791	(64)
Efficiency of water heater												295.0194	(216)
(217)m	295.0194	295.0194	295.0194	295.0194	295.0194	295.0194	295.0194	295.0194	295.0194	295.0194	295.0194	295.0194	(217)
Fuel for water heating, kWh/month	98.0836	86.7275	92.0443	80.6433	77.9945	70.0801	68.9900	71.8208	72.7159	81.3296	86.7890	96.9696	(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	33.3268	26.7360	24.0728	17.6368	13.6231	11.1302	12.4275	16.1537	20.9821	27.5296	31.0947	34.2531	(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	1873.4725	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	295.0194	
Water heating fuel used	984.1881	(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)	268.9664	(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	3126.6270	(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	1873.4725	0.1556	291.4387	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	984.1881	0.1410	138.7288	(264)
Space and water heating			430.1676	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	268.9664	0.1443	38.8202	(268)
Total CO2, kg/year			468.9877	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.4300	(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	1873.4725	1.5759	2952.3598	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	984.1881	1.5212	1497.1599	(278)
Space and water heating			4449.5197	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	268.9664	1.5338	412.5496	(282)
Total Primary energy kWh/year			4862.0693	(286)
Dwelling Primary energy Rate (DPER)			35.5200	(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	60.3400 (1b)	x	2.4000 (2b)	=	144.8160	(1b) - (3b)
First floor	44.0500 (1c)	x	2.6100 (2c)	=	114.9705	(1c) - (3c)
Second floor	32.5100 (1d)	x	2.2800 (2d)	=	74.1228	(1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	136.9000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	333.9093	(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) =	0.1198	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	

Measured/design AP50	5.0000	(17)
Infiltration rate	0.3698	(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) =	0.2866	(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	0.3654	0.3582	0.3511	0.3152	0.3081	0.2723	0.2723	0.2651	0.2866	0.3081	0.3224	0.3367	(22b)
Effective ac	0.5668	0.5642	0.5616	0.5497	0.5475	0.5371	0.5371	0.5351	0.5411	0.5475	0.5520	0.5567	(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 Semi-glazed door			1.9000	1.0000	1.9000			(26a)
TER Opening Type (Uw = 1.20)			23.0000	1.1450	26.3359			(27)
N RW			2.3100	1.5038	3.4737			(27a)
Ground Floor			60.3400	0.1300	7.8442			(28a)
External Wall	169.0400	22.3700	146.6700	0.1800	26.4006			(29a)
Dormer Walls	17.4900	2.5300	14.9600	0.1800	2.6928			(29a)
Dwarf Walls (0.72)	10.1500		10.1500	0.1800	1.8270			(29a)
Joisted Roof	16.2900		16.2900	0.1100	1.7919			(30)
Rafter Roof	29.3500	2.3100	27.0400	0.1100	2.9744			(30)
Rafter Eaves (0.72)	7.6200		7.6200	0.1100	0.8382			(30)
Flat Dormer Roof	12.0600		12.0600	0.1100	1.3266			(30)
Total net area of external elements Aum(A, m2)			322.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		77.4053			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	144.9473	(35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E2 Other lintels (including other steel lintels)	14.5800	0.0500	0.7290
E2 Other lintels (including other steel lintels)	2.3000	0.0500	0.1150
E3 Sill	8.0900	0.0500	0.4045
E3 Sill	2.3000	0.0500	0.1150
E4 Jamb	22.6200	0.0500	1.1310
E4 Jamb	4.4000	0.0500	0.2200
E5 Ground floor (normal)	33.6200	0.1600	5.3792
E6 Intermediate floor within a dwelling	27.3800	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	17.3600	0.0600	1.0416
E24 Eaves (insulation at ceiling level - inverted)	15.4300	0.2400	3.7032
E11 Eaves (insulation at rafter level)	10.2800	0.0400	0.4112
E12 Gable (insulation at ceiling level)	4.3400	0.0600	0.2604
E13 Gable (insulation at rafter level)	22.3600	0.0800	1.7888
E16 Corner (normal)	23.6000	0.0900	2.1240
E17 Corner (inverted - internal area greater than external area)	4.8000	-0.0900	-0.4320
R1 Head of roof window	2.1000	0.0800	0.1680
R2 Sill of roof window	2.1000	0.0600	0.1260
R3 Jamb of roof window	6.6000	0.0800	0.5280
R6 Flat ceiling	16.4900	0.0600	0.9894
R7 Flat ceiling (inverted)	7.7400	0.0400	0.3096
R9 Roof to wall (flat ceiling)	10.0000	0.0400	0.4000

Thermal bridges (Sum(L x Psi) calculated using Appendix K)	19.5119	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	96.9172	(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	62.4512	62.1656	61.8856	60.5705	60.3244	59.1790	59.1790	58.9669	59.6202	60.3244	60.8222	61.3426	(38)
Heat transfer coeff	159.3684	159.0827	158.8028	157.4876	157.2416	156.0961	156.0961	155.8840	156.5373	157.2416	157.7393	158.2597	(39)
Average = Sum(39)m / 12 =												157.4865	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1641	1.1620	1.1600	1.1504	1.1486	1.1402	1.1402	1.1387	1.1434	1.1486	1.1522	1.1560	(40)
HLP (average)												1.1504	
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	2.9109	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
73.0267	71.9292	70.3300	67.2703	65.0122	62.4941	61.0628	62.6499	64.3896	67.0933	70.2188	72.7469	(42a)

Hot water usage for baths

31.5271	31.0589	30.3995	29.1838	28.2735	27.2641	26.7188	27.3736	28.0865	29.1666	30.4073	31.4205	(42b)

Hot water usage for other uses

44.4409	42.8249	41.2088	39.5928	37.9768	36.3607	36.3607	37.9768	39.5928	41.2088	42.8249	44.4409	(42c)

Average daily hot water use (litres/day)	136.9596	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	148.9947	145.8130	141.9384	136.0469	131.2625	126.1189	124.1423	128.0002	132.0689	137.4687	143.4510	148.6083	(44)
Energy conte	235.9712	207.6357	218.1540	186.2413	176.7045	155.0779	150.1394	158.4910	162.8541	186.5438	204.3723	232.6847	(45)
Energy content (annual)										Total = Sum(45)m =		2274.8699	

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

35.3957	31.1454	32.7231	27.9362	26.5057	23.2617	22.5209	23.7736	24.4281	27.9816	30.6558	34.9027	(46)

Water storage loss:		
Store volume	180.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):	1.5520	(48)
Temperature factor from Table 2b	0.5400	(49)
Enter (49) or (54) in (55)	0.8381	(55)

Total storage loss

25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)

If cylinder contains dedicated solar storage

25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(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

285.2138	252.1130	267.3967	233.8955	225.9472	202.7321	199.3821	207.7337	210.5083	235.7864	252.0265	281.9274	(62)

WWHRS	-33.3848	-29.5257	-30.9177	-25.6010	-23.8593	-20.4165	-19.1372	-20.3505	-21.1237	-24.9026	-28.2116	-32.7665	(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													
	251.8291	222.5872	236.4790	208.2945	202.0879	182.3155	180.2448	187.3831	189.3846	210.8839	223.8149	249.1609	(64)
										Total per year (kWh/year) = Sum(64)m =		2544.4655	(64)
12Total per year (kWh/year)												2544	(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													
	117.8545	104.6207	111.9304	100.0486	98.1484	89.6868	89.3155	92.0924	92.2724	101.4199	106.0771	116.7618	(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	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	145.5469	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	156.5024	173.2705	156.5024	161.7191	156.5024	161.7191	156.5024	156.5024	161.7191	156.5024	161.7191	156.5024	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	305.8589	309.0328	301.0348	284.0079	262.5146	242.3139	228.8186	225.6447	233.6428	250.6696	272.1629	292.3636	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	37.5547	(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)													
	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	-116.4375	(71)
Water heating gains (Table 5)													
	158.4067	155.6855	150.4440	138.9564	131.9199	124.5649	120.0477	123.7801	128.1561	136.3171	147.3294	156.9379	(72)
Total internal gains													
	690.4320	707.6529	677.6452	654.3475	620.6009	595.2620	572.0327	572.5913	590.1820	613.1532	650.8755	675.4680	(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	5.9000	10.6334	0.6300	0.7000	0.7700	19.1732	(74)
South	16.0200	46.7521	0.6300	0.7000	0.7700	228.8944	(78)
West	1.0800	19.6403	0.6300	0.7000	0.7700	6.4825	(80)
North	2.3100	15.6897	0.6300	0.7000	1.0000	14.3849	(82)

Solar gains	268.9351	451.1743	609.0365	757.2554	862.5378	865.8025	830.5365	748.4278	658.6948	495.4351	320.6168	231.2591	(83)
Total gains	959.3671	1158.8271	1286.6817	1411.6029	1483.1387	1461.0645	1402.5692	1321.0191	1248.8767	1108.5882	971.4923	906.7271	(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	34.5867	34.6488	34.7099	34.9997	35.0545	35.3117	35.3117	35.3598	35.2122	35.0545	34.9439	34.8290	
alpha	3.3058	3.3099	3.3140	3.3333	3.3370	3.3541	3.3541	3.3573	3.3475	3.3370	3.3296	3.3219	
util living area	0.9778	0.9590	0.9302	0.8690	0.7640	0.6091	0.4658	0.5085	0.7113	0.8920	0.9618	0.9813	(86)
MIT	18.9870	19.3055	19.7070	20.2039	20.6138	20.8717	20.9607	20.9467	20.7747	20.2417	19.5256	18.9292	(87)
Th 2	19.9488	19.9505	19.9521	19.9599	19.9614	19.9681	19.9681	19.9694	19.9655	19.9614	19.9584	19.9553	(88)
util rest of house	0.9734	0.9511	0.9165	0.8426	0.7161	0.5319	0.3660	0.4075	0.6409	0.8645	0.9531	0.9776	(89)
MIT 2	17.6106	18.0128	18.5162	19.1289	19.6046	19.8764	19.9494	19.9421	19.7881	19.1883	18.3009	17.5414	(90)
Living area fraction										fLA = Living area / (4) =		0.1490	(91)
MIT	17.8157	18.2054	18.6937	19.2891	19.7550	20.0248	20.1001	20.0918	19.9351	19.3453	18.4834	17.7482	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8157	18.2054	18.6937	19.2891	19.7550	20.0248	20.1001	20.0918	19.9351	19.3453	18.4834	17.7482	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9605	0.9334	0.8955	0.8224	0.7054	0.5365	0.3793	0.4201	0.6386	0.8445	0.9362	0.9661	(94)
Useful gains	921.4920	1081.6810	1152.2251	1160.9619	1046.2487	783.7912	531.9972	554.9871	797.5714	936.1578	909.4796	875.9848	(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	2153.9701	2116.6660	1936.3855	1636.1592	1266.5813	846.7835	546.3523	575.4900	913.4073	1375.1251	1795.6109	2144.1397	(97)
Space heating kWh	916.9637	695.5099	583.4154	342.1421	163.9275	0.0000	0.0000	0.0000	0.0000	326.5917	638.0146	943.5072	(98a)
Space heating requirement - total per year (kWh/year)												4610.0720	
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	916.9637	695.5099	583.4154	342.1421	163.9275	0.0000	0.0000	0.0000	0.0000	326.5917	638.0146	943.5072	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4610.0720	
Space heating per m2											(98c) / (4) =	33.6747	(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													
	916.9637	695.5099	583.4154	342.1421	163.9275	0.0000	0.0000	0.0000	0.0000	326.5917	638.0146	943.5072	(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)													
	993.4602	753.5319	632.0860	370.6848	177.6029	0.0000	0.0000	0.0000	0.0000	353.8371	691.2401	1022.2180	(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													
	251.8291	222.5872	236.4790	208.2945	202.0879	182.3155	180.2448	187.3831	189.3846	210.8839	223.8149	249.1609	(64)
Efficiency of water heater												79.8000	(216)
(217)m	86.6933	86.4365	86.0024	85.1653	83.5945	79.8000	79.8000	79.8000	79.8000	85.0370	86.2731	86.7559	(217)
Fuel for water heating, kWh/month													
	290.4826	257.5152	274.9679	244.5768	241.7477	228.4656	225.8707	234.8159	237.3241	247.9907	259.4260	287.1975	(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	32.5181	26.0872	23.4887	17.2088	13.2926	10.8601	12.1259	15.7617	20.4729	26.8616	30.3401	33.4219	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-54.8912	-76.5996	-108.9710	-121.1689	-129.4492	-120.2942	-118.6925	-112.5694	-101.6909	-86.8329	-60.0200	-47.5398	(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	-33.4584	-70.0896	-138.8086	-207.8065	-274.1858	-275.3753	-272.2436	-230.8727	-169.6330	-100.1412	-44.6311	-26.4902	(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	4994.6609	(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	3030.3808	(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)	262.4397	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-2982.4557	(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	5391.0258	(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	4994.6609	0.2100	1048.8788	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3030.3808	0.2100	636.3800	(264)
Space and water heating			1685.2588	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	262.4397	0.1443	37.8782	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1138.7197	0.1348	-153.5357	
PV Unit electricity exported	-1843.7360	0.1260	-232.2784	
Total			-385.8142	(269)
Total CO2, kg/year			1349.2520	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.8600	(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	4994.6609	1.1300	5643.9669	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3030.3808	1.1300	3424.3303	(278)
Space and water heating			9068.2972	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	262.4397	1.5338	402.5388	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1138.7197	1.4983	-1706.1776	
PV Unit electricity exported	-1843.7360	0.4624	-852.6274	
Total			-2558.8050	(283)
Total Primary energy kWh/year			7042.1318	(286)
Target Primary Energy Rate (TPER)			51.4400	(287)