Full SAP Calculation Printout

Property Reference	Flat 2	Issued on Date	26/07/2023
Assessment Reference	Flat 2 - AM	Prop Type Ref	
Property	Flat 2, Pier View Hotel, 34 Oldminster Road, Sharpness, Berkeley, GI13 9NA		

SAP Rating	74 C	DER	22.22	TER	12.89
Environmental	79 C	% DER < TER			-72.38
CO_2 Emissions (t/year)	2.24	DFEE	93.76	TFEE	47.76
Compliance Check	See BREL	% DFEE < TFEE			-96.31
% DPER < TPER	-88.38	DPER	127.70	TPER	67.79

Assessor Details	[redacted]	Assessor ID	H055-0001
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	116.6300 (1b)	x	3.2000 (2b)	=	373.2160 (1b) -	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	116.6300					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	373.2160	(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	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0536 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8036 (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) =	0.7433 (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	0.9477	0.9291	0.9106	0.8177	0.7991	0.7062	0.7062	0.6876	0.7433	0.7991	0.8362	0.8734	(22b)
Effective ac	0.9491	0.9317	0.9146	0.8343	0.8193	0.7493	0.7493	0.7364	0.7763	0.8193	0.8496	0.8814	(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	
Door			3.7300	1.4000	5.2220			(26)
New Windows (Uw = 1.40)			19.7300	1.3258	26.1572			(27)
External Door			2.0200	1.0000	2.0200			(26)
Ground Floor			116.6300	0.2500	29.1575	110.0000	12829.3000	(28a)
External Wall	105.1500	23.9000	81.2500	0.2800	22.7500	9.0000	731.2500	(29a)
Corridor Wall	36.7000	1.5800	35.1200	0.3000	10.5360	9.0000	316.0800	(29a)
Total net area of external elements Aum(A, m2)			258.4800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	95.8427			(33)

Party Wall	23.7100	0.0000	0.0000	180.0000	4267.8000 (32)
Party Ceiling	116.6300			30.0000	3498.9000 (32b)
Internal Wall	258.6900			9.0000	2328.2100 (32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 23971.5400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 205.5349 (35)
Thermal bridges (Default value 0.200 * total exposed area) 51.6960 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 147.5387 (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	116.8921	114.7443	112.6390	102.7506	100.9005	92.2880	92.2880	90.6931	95.6054	100.9005	104.6432	108.5560	(38)
Heat transfer coeff	264.4308	262.2830	260.1777	250.2893	248.4392	239.8267	239.8267	238.2318	243.1441	248.4392	252.1819	256.0947	(39)

Average = Sum(39)m / 12 = 250.2804

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2673	2.2488	2.2308	2.1460	2.1301	2.0563	2.0563	2.0426	2.0847	2.1301	2.1622	2.1958	(40)
HLP (average)												2.1459	
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 2.8493 (42)
Hot water usage for mixer showers

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

43.8096	42.2166	40.6235	39.0304	37.4373	35.8443	35.8443	37.4373	39.0304	40.6235	42.2166	43.8096	(42c)

Average daily hot water use (litres/day) 39.8269 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	43.8096	42.2166	40.6235	39.0304	37.4373	35.8443	35.8443	37.4373	39.0304	40.6235	42.2166	43.8096	(44)
Energy conte	69.3838	60.1158	62.4368	53.4307	50.3978	44.0747	43.3505	46.3552	48.1284	55.1257	60.1452	68.5953	(45)

Energy content (annual) Total = Sum(45)m = 661.5400

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

10.4076	9.0174	9.3655	8.0146	7.5597	6.6112	6.5026	6.9533	7.2193	8.2689	9.0218	10.2893	(46)

Water storage loss:
Total storage 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	(56)

If cylinder contains dedicated solar storage

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary 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	(59)
Combi loss 0.1824	0.1523	0.1522	0.1251	0.1132	0.0948	0.0932	0.1041	0.1127	0.1344	0.1523	0.1803	(61)

Total heat required for water heating calculated for each month

69.5661	60.2681	62.5890	53.5558	50.5111	44.1695	43.4438	46.4594	48.2411	55.2601	60.2976	68.7756	(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

69.5661	60.2681	62.5890	53.5558	50.5111	44.1695	43.4438	46.4594	48.2411	55.2601	60.2976	68.7756	(64)

Total per year (kWh/year) = Sum(64)m = 663.1370 (64)
12Total per year (kWh/year) 663 (64)
Electric shower(s)

74.0782	66.0043	72.0741	68.7795	70.0701	66.8401	69.0681	70.0701	68.7795	72.0741	70.7189	74.0782	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 842.6350 (64a)
Heat gains from water heating, kWh/month

41.6352	36.5276	38.8168	34.9918	34.3031	31.3885	31.7044	32.9567	33.2257	36.3814	37.7161	41.3726	(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	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	146.1825	161.8449	146.1825	151.0552	146.1825	151.0552	146.1825	146.1825	151.0552	146.1825	151.0552	146.1825	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	280.7587	283.6721	276.3304	260.7009	240.9714	222.4284	210.0406	207.1272	214.4689	230.0984	249.8279	268.3708	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	(71)
Water heating gains (Table 5)	55.9613	54.3566	52.1731	48.5998	46.1063	43.5952	42.6134	44.2966	46.1469	48.8998	52.3835	55.6083	(72)
Total internal gains	551.6419	568.6130	543.4254	529.0953	501.9996	482.8183	464.5760	463.3458	477.4104	493.9201	522.0061	538.9011	(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	5.6600	10.6334	0.6300	0.7000	0.7700	18.3933 (74)
East	9.6700	19.6403	0.6300	0.7000	0.7700	58.0424 (76)
South	4.4000	46.7521	0.6300	0.7000	0.7700	62.8674 (78)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	139.3031	251.6544	377.8726	516.8859	617.9282	629.1436	600.1421	523.3273	426.2961	287.6235	169.5819	117.3880	(83)
Total gains	690.9451	820.2674	921.2980	1045.9813	1119.9278	1111.9619	1064.7181	986.6731	903.7066	781.5436	691.5879	656.2891	(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	25.1815	25.3877	25.5931	26.6043	26.8024	27.7649	27.7649	27.9508	27.3861	26.8024	26.4046	26.0012	
alpha	2.6788	2.6925	2.7062	2.7736	2.7868	2.8510	2.8510	2.8634	2.8257	2.7868	2.7603	2.7334	
util living area	0.9941	0.9902	0.9833	0.9651	0.9268	0.8454	0.7370	0.7787	0.9114	0.9748	0.9909	0.9950	(86)
MIT	17.7753	18.0415	18.5055	19.2170	19.8731	20.4663	20.7573	20.7054	20.2376	19.3866	18.5167	17.8051	(87)
Th 2	19.1611	19.1726	19.1839	19.2378	19.2480	19.2961	19.2961	19.3051	19.2774	19.2480	19.2274	19.2060	(88)
util rest of house	0.9922	0.9868	0.9770	0.9500	0.8884	0.7450	0.5399	0.5997	0.8461	0.9612	0.9872	0.9934	(89)
MIT 2	15.5613	15.9067	16.5041	17.4319	18.2477	18.9532	19.2134	19.1893	18.7113	17.6602	16.5431	15.6213	(90)
Living area fraction										fLA = Living area / (4) =		0.1386	(91)
MIT	15.8682	16.2027	16.7816	17.6794	18.4731	19.1630	19.4275	19.3995	18.9229	17.8996	16.8167	15.9241	(92)
Temperature adjustment												-0.1500	
adjusted MIT	15.7182	16.0527	16.6316	17.5294	18.3231	19.0130	19.2775	19.2495	18.7729	17.7496	16.6667	15.7741	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9851	0.9763	0.9614	0.9262	0.8575	0.7218	0.5371	0.5917	0.8164	0.9405	0.9771	0.9873	(94)
Useful gains	680.6450	800.8481	885.7309	968.7784	960.3347	802.5807	571.8176	583.8460	737.7522	735.0550	675.7647	647.9686	(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	3019.3357	2925.1559	2636.0118	2159.8338	1645.4263	1058.3578	642.1312	678.8335	1136.1994	1776.2304	2412.5494	2964.0583	(97)
Space heating kWh	1739.9859	1427.5349	1302.2090	857.5599	509.7081	0.0000	0.0000	0.0000	0.0000	774.6345	1250.4850	1723.1707	(98a)
Space heating requirement - total per year (kWh/year)												9585.2879	
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	1739.9859	1427.5349	1302.2090	857.5599	509.7081	0.0000	0.0000	0.0000	0.0000	774.6345	1250.4850	1723.1707	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												9585.2879	
Space heating per m2											(98c) / (4) =	82.1854	(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 %)	89.1000 (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	1739.9859	1427.5349	1302.2090	857.5599	509.7081	0.0000	0.0000	0.0000	0.0000	774.6345	1250.4850	1723.1707	(98)
Space heating efficiency (main heating system 1)	89.1000	89.1000	89.1000	89.1000	89.1000	0.0000	0.0000	0.0000	0.0000	89.1000	89.1000	89.1000	(210)
Space heating fuel (main heating system)	1952.8462	1602.1716	1461.5140	962.4690	572.0630	0.0000	0.0000	0.0000	0.0000	869.3990	1403.4624	1933.9739	(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	69.5661	60.2681	62.5890	53.5558	50.5111	44.1695	43.4438	46.4594	48.2411	55.2601	60.2976	68.7756	(64)
Efficiency of water heater												85.0000	(216)
(217)m	88.9351	88.9262	88.9033	88.8481	88.7142	85.0000	85.0000	85.0000	85.0000	88.8147	88.9027	88.9354	(217)
Fuel for water heating, kWh/month	78.2213	67.7731	70.4011	60.2779	56.9368	51.9641	51.1103	54.6581	56.7542	62.2195	67.8242	77.3322	(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	38.5890	30.9576	27.8738	20.4216	15.7742	12.8877	14.3898	18.7044	24.2951	31.8765	36.0044	39.6615	(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	10757.8989 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	85.0000
Water heating fuel used	755.4729 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
central heating pump	41.0000 (230c)
main heating flue fan	45.0000 (230e)
Total electricity for the above, kWh/year	86.0000 (231)
Electricity for lighting (calculated in Appendix L)	311.4356 (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	12753.4423 (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	10757.8989	0.2100	2259.1588	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	755.4729	0.2100	158.6493	(264)
Energy for instantaneous electric shower(s)	842.6350	0.1391	117.2292	(264a)
Space and water heating			2417.8081	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	311.4356	0.1443	44.9498	(268)
Total CO2, kg/year			2591.9163	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			22.2200	(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	10757.8989	1.1300	12156.4257	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	755.4729	1.1300	853.6844	(278)
Energy for instantaneous electric shower(s)	842.6350	1.5143	1276.0310	(278a)
Space and water heating			13010.1101	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	311.4356	1.5338	477.6903	(282)
Total Primary energy kWh/year			14893.9321	(286)
Dwelling Primary energy Rate (DPER)			127.7000	(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		116.6300 (1b)	x	3.2000 (2b)	=	373.2160 (1b) -	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	116.6300						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	373.2160	(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	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) =	0.1072	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3572	(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) =	0.3304	(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	0.4212	0.4130	0.4047	0.3634	0.3552	0.3139	0.3139	0.3056	0.3304	0.3552	0.3717	0.3882	(22b)
Effective ac	0.5887	0.5853	0.5819	0.5660	0.5631	0.5493	0.5493	0.5467	0.5546	0.5631	0.5691	0.5754	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Opaque door			5.7500	1.0000	5.7500			(26)
TER Opening Type (Uw = 1.20)			19.7300	1.1450	22.5916			(27)
Ground Floor			116.6300	0.1300	15.1619			(28a)
External Wall	105.1500	23.9000	81.2500	0.1800	14.6250			(29a)
Corridor Wall	36.7000	1.5800	35.1200	0.1800	6.3216			(29a)
Total net area of external elements Aum(A, m2)			258.4800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		64.4501			(33)
Party Wall			23.7100	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							215.5349	(35)
Thermal bridges (User defined value 0.050 * total exposed area)							12.9240	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss						(33) + (36) + (36a) =	77.3741	(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	72.5080	72.0836	71.6677	69.7142	69.3487	67.6472	67.6472	67.3321	68.3026	69.3487	70.0881	70.8611	(38)
Heat transfer coeff	149.8821	149.4577	149.0418	147.0883	146.7228	145.0213	145.0213	144.7062	145.6767	146.7228	147.4622	148.2352	(39)
Average = Sum(39)m / 12 =												147.0865	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2851	1.2815	1.2779	1.2612	1.2580	1.2434	1.2434	1.2407	1.2490	1.2580	1.2644	1.2710	(40)
HLP (average)												1.2611	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.8493	(42)
Hot water usage for mixer showers	92.5014	91.1113	89.0856	85.2098	82.3496	79.1599	77.3469	79.3573	81.5610	84.9857	88.9447	92.1470	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	43.8096	42.2166	40.6235	39.0304	37.4373	35.8443	35.8443	37.4373	39.0304	40.6235	42.2166	43.8096	(42c)
Average daily hot water use (litres/day)												125.1101	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	136.3110	133.3278	129.7091	124.2402	119.7870	115.0042	113.1912	116.7946	120.5914	125.6092	131.1613	135.9566	(44)
Energy conte	215.8833	189.8570	199.3580	170.0787	161.2563	141.4111	136.8949	144.6161	148.7012	170.4505	186.8633	212.8752	(45)
Energy content (annual)										Total = Sum(45)m =		2078.2457	
Distribution loss (46)m = 0.15 x (45)m	32.3825	28.4786	29.9037	25.5118	24.1884	21.2117	20.5342	21.6924	22.3052	25.5676	28.0295	31.9313	(46)
Water storage loss:													

Total storage 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 (56)
If cylinder contains dedicated solar storage
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (57)
Primary 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 (59)
Combi loss 50.9589 46.0274 50.9589 49.3151 50.9589 49.3151 50.9589 50.9589 49.3151 50.9589 49.3151 50.9589 (61)
Total heat required for water heating calculated for each month
266.8422 235.8844 250.3169 219.3937 212.2152 190.7261 187.8538 195.5750 198.0163 221.4094 236.1784 263.8341 (62)
WWHRS -42.2878 -37.3996 -39.1628 -32.4283 -30.2220 -25.8612 -24.2407 -25.7776 -26.7570 -31.5435 -35.7350 -41.5047 (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
224.5545 198.4848 211.1542 186.9654 181.9931 164.8649 163.6131 169.7974 171.2593 189.8659 200.4434 222.3294 (64)
Total per year (kWh/year) = Sum(64)m = 2285.3254 (64)
12Total per year (kWh/year) 2285 (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
84.5209 74.6343 79.0263 68.8799 66.3574 59.3479 58.2573 60.8246 61.7719 69.4145 74.4608 83.5207 (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	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	142.4648	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	146.1825	161.8449	146.1825	151.0552	146.1825	151.0552	146.1825	146.1825	151.0552	146.1825	151.0552	146.1825	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	280.7587	283.6721	276.3304	260.7009	240.9714	222.4284	210.0406	207.1272	214.4689	230.0984	249.8279	268.3708	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	37.2465	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	-113.9719	(71)
Water heating gains (Table 5)													
	113.6034	111.0630	106.2181	95.6666	89.1901	82.4277	78.3028	81.7535	85.7943	93.2991	103.4178	112.2590	(72)
Total internal gains													
	609.2840	625.3194	597.4704	576.1621	545.0834	521.6508	500.2654	500.8026	517.0579	538.3194	573.0404	595.5518	(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	5.6600	10.6334	0.6300	0.7000	0.7700	18.3933	(74)
East	9.6700	19.6403	0.6300	0.7000	0.7700	58.0424	(76)
South	4.4000	46.7521	0.6300	0.7000	0.7700	62.8674	(78)

Solar gains	139.3031	251.6544	377.8726	516.8859	617.9282	629.1436	600.1421	523.3273	426.2961	287.6235	169.5819	117.3880	(83)
Total gains	748.5871	876.9738	975.3430	1093.0480	1163.0116	1150.7944	1100.4075	1024.1299	943.3540	825.9429	742.6223	712.9399	(84)

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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	46.5882	46.7205	46.8508	47.4731	47.5913	48.1497	48.1497	48.2546	47.9331	47.5913	47.3527	47.1058	
alpha	4.1059	4.1147	4.1234	4.1649	4.1728	4.2100	4.2100	4.2170	4.1955	4.1728	4.1568	4.1404	
util living area													
	0.9951	0.9900	0.9790	0.9449	0.8652	0.7129	0.5538	0.6086	0.8323	0.9630	0.9906	0.9960	(86)
MIT	19.2351	19.4549	19.7874	20.2466	20.6384	20.8909	20.9709	20.9571	20.7775	20.2627	19.6754	19.2079	(87)
Th 2	19.8525	19.8554	19.8582	19.8714	19.8739	19.8854	19.8854	19.8876	19.8810	19.8739	19.8689	19.8636	(88)
util rest of house													
	0.9936	0.9870	0.9724	0.9265	0.8189	0.6204	0.4256	0.4798	0.7592	0.9471	0.9872	0.9948	(89)
MIT 2	17.8080	18.0899	18.5134	19.0934	19.5541	19.8171	19.8749	19.8703	19.7175	19.1247	18.3817	17.7805	(90)
Living area fraction										fLA = Living area / (4) =		0.1386	(91)
MIT	18.0059	18.2791	18.6900	19.2533	19.7044	19.9660	20.0269	20.0210	19.8645	19.2825	18.5611	17.9784	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.0059	18.2791	18.6900	19.2533	19.7044	19.9660	20.0269	20.0210	19.8645	19.2825	18.5611	17.9784	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9899	0.9808	0.9628	0.9135	0.8106	0.6277	0.4428	0.4964	0.7579	0.9355	0.9814	0.9916	(94)
Useful gains	741.0037	860.1530	939.0981	998.4647	942.7356	722.3871	487.2220	508.3428	714.9579	772.6594	728.7818	706.9698	(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

2054.2615	1999.6121	1816.8247	1522.8532	1174.4271	778.1820	496.9717	523.9783	839.7482	1273.9181	1690.0737	2042.4429	(97)

Space heating kWh

977.0638	765.7165	653.0286	377.5597	172.3785	0.0000	0.0000	0.0000	0.0000	372.9365	692.1302	993.5920	(98a)

Space heating requirement - total per year (kWh/year) 5004.4058

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

977.0638	765.7165	653.0286	377.5597	172.3785	0.0000	0.0000	0.0000	0.0000	372.9365	692.1302	993.5920	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 5004.4058

Space heating per m2 (98c) / (4) = 42.9084 (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 %) 92.4000 (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													
	977.0638	765.7165	653.0286	377.5597	172.3785	0.0000	0.0000	0.0000	0.0000	372.9365	692.1302	993.5920	(98)
Space heating efficiency (main heating system 1)													
	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000	(210)
Space heating fuel (main heating system)													
	1057.4284	828.6975	706.7409	408.6144	186.5568	0.0000	0.0000	0.0000	0.0000	403.6109	749.0586	1075.3161	(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													
	224.5545	198.4848	211.1542	186.9654	181.9931	164.8649	163.6131	169.7974	171.2593	189.8659	200.4434	222.3294	(64)
Efficiency of water heater												80.3000	(216)
(217)m	87.1556	86.9823	86.6330	85.8547	84.2652	80.3000	80.3000	80.3000	80.3000	85.8000	86.8121	87.1925	(217)
Fuel for water heating, kWh/month													
	257.6476	228.1898	243.7342	217.7695	215.9765	205.3113	203.7523	211.4538	213.2744	221.2889	230.8934	254.9868	(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	30.3738	24.3670	21.9398	16.0740	12.4160	10.1440	11.3263	14.7224	19.1229	25.0903	28.3395	31.2180	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-38.3169	-55.0557	-80.6195	-92.3668	-101.0230	-94.7492	-93.5292	-87.5734	-77.3356	-63.6804	-42.4720	-33.0029	(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	-18.6062	-39.4552	-79.0233	-119.5899	-159.0364	-160.1781	-158.3484	-133.7041	-97.4766	-56.7858	-24.9540	-14.6942	(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 5416.0236 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 80.3000

Water heating fuel used 2704.2785 (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) 245.1342 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation -1921.5767 (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 6529.8597 (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	5416.0236	0.2100	1137.3650	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2704.2785	0.2100	567.8985	(264)
Space and water heating			1705.2634	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	245.1342	0.1443	35.3804	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-859.7244	0.1342	-115.3809	
PV Unit electricity exported	-1061.8523	0.1257	-133.4376	
Total			-248.8185	(269)
Total CO2, kg/year			1503.7546	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.8900	(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	5416.0236	1.1300	6120.1067	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2704.2785	1.1300	3055.8347	(278)
Space and water heating			9175.9414	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	245.1342	1.5338	375.9951	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-859.7244	1.4960	-1286.1345	
PV Unit electricity exported	-1061.8523	0.4613	-489.7954	
Total			-1775.9299	(283)
Total Primary energy kWh/year			7906.1074	(286)
Target Primary Energy Rate (TPER)			67.7900	(287)