Full SAP Calculation Printout

Property Reference	Flat 4	Issued on Date	26/07/2023
Assessment Reference	Flat 4 - AM	Prop Type Ref	
Property	Flat 4, Pier View Hotel, 34 Oldminster Road, Sharpness, Berkeley, GI13 9NA		

SAP Rating	79 C	DER	15.60	TER	9.94
Environmental	86 B	% DER < TER			-56.94
CO_2 Emissions (t/year)	1.2	DFEE	59.66	TFEE	28.81
Compliance Check	See BREL	% DFEE < TFEE			-107.05
% DPER < TPER	-80.22	DPER	93.66	TPER	51.97

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		91.1100 (1b)	x	2.8000 (2b)	=	255.1080	(1b) -
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	91.1100						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	255.1080	(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) =	0.0784	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8284	(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) =	0.7663	(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	0.9770	0.9578	0.9387	0.8429	0.8237	0.7280	0.7280	0.7088	0.7663	0.8237	0.8621	0.9004	(22b)
Effective ac	0.9773	0.9587	0.9406	0.8552	0.8393	0.7650	0.7650	0.7512	0.7936	0.8393	0.8716	0.9053	(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			1.7200	1.4000	2.4080			(26)
New Windows (Uw = 1.40)			12.1600	1.3258	16.1212			(27)
External Wall	82.8500	12.1600	70.6900	0.2800	19.7932	9.0000	636.2100	(29a)
Corridor Wall	17.2800	1.7200	15.5600	0.3000	4.6680	9.0000	140.0400	(29a)
Total net area of external elements Aum(A, m2)			100.1300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		42.9904			(33)
Party Wall			29.1200	0.0000	0.0000	180.0000	5241.6000	(32)
Party Floor			91.1100			40.0000	3644.4000	(32d)

Party Ceiling	91.1100	30.0000	2733.3000 (32b)
Internal Wall Lower Floor	43.2700	9.0000	389.4300 (32c)
Internal Wall Upper Floor	56.8400	9.0000	511.5600 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) = 13296.5400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	145.9394 (35)
Thermal bridges (Default value 0.200 * total exposed area)	20.0260 (36)
Point Thermal bridges	(36a) = 0.0000
Total fabric heat loss	(33) + (36) + (36a) = 63.0164 (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	82.2710	80.7108	79.1815	71.9986	70.6547	64.3986	64.3986	63.2400	66.8083	70.6547	73.3734	76.2157	(38)
Heat transfer coeff	145.2874	143.7272	142.1980	135.0150	133.6711	127.4150	127.4150	126.2564	129.8248	133.6711	136.3898	139.2321	(39)
Average = Sum(39)m / 12 =												135.0086	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5946	1.5775	1.5607	1.4819	1.4671	1.3985	1.3985	1.3858	1.4249	1.4671	1.4970	1.5282	(40)
HLP (average)												1.4818	
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												2.6406	(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	41.6725	40.1571	38.6418	37.1264	35.6110	34.0957	34.0957	35.6110	37.1264	38.6418	40.1571	41.6725	(42c)
Average daily hot water use (litres/day)												37.8841	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	41.6725	40.1571	38.6418	37.1264	35.6110	34.0957	34.0957	35.6110	37.1264	38.6418	40.1571	41.6725	(44)
Energy conte	65.9990	57.1832	59.3910	50.8242	47.9393	41.9246	41.2358	44.0939	45.7806	52.4365	57.2112	65.2491	(45)
Energy content (annual)										Total = Sum(45)m =		629.2684	
Distribution loss (46)m = 0.15 x (45)m	9.8999	8.5775	8.9086	7.6236	7.1909	6.2887	6.1854	6.6141	6.8671	7.8655	8.5817	9.7874	(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	0.1650	0.1378	0.1377	0.1132	0.1024	0.0858	0.0844	0.0942	0.1020	0.1216	0.1378	0.1631	(61)
Total heat required for water heating calculated for each month	66.1641	57.3210	59.5287	50.9374	48.0417	42.0104	41.3201	44.1881	45.8825	52.5581	57.3490	65.4122	(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	66.1641	57.3210	59.5287	50.9374	48.0417	42.0104	41.3201	44.1881	45.8825	52.5581	57.3490	65.4122	(64)
								Total per year (kWh/year) = Sum(64)m =				630.7134	(64)
12Total per year (kWh/year)												631	(64)
Electric shower(s)	70.4665	62.7863	68.5602	65.4262	66.6539	63.5813	65.7007	66.6539	65.4262	68.5602	67.2710	70.4665	(64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				801.5527	(64a)
Heat gains from water heating, kWh/month	39.6026	34.7444	36.9220	33.2839	32.6289	29.8567	30.1572	31.3482	31.6041	34.6056	35.8749	39.3527	(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	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	131.8393	145.9649	131.8393	136.2339	131.8393	136.2339	131.8393	131.8393	136.2339	131.8393	136.2339	131.8393	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	241.1051	243.6070	237.3022	223.8802	206.9372	191.0133	180.3751	177.8732	184.1779	197.6000	214.5429	230.4669	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	(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)	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	(71)
Water heating gains (Table 5)	53.2293	51.7030	49.6263	46.2276	43.8560	41.4676	40.5338	42.1347	43.8945	46.5129	49.8263	52.8935	(72)
Total internal gains	491.7828	506.8841	484.3770	471.9509	448.2417	431.3240	415.3573	414.4563	426.9155	441.5613	466.2123	480.8088	(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	4.0500	10.6334	0.6300	0.7000	0.7700	13.1613 (74)
South	3.8900	46.7521	0.6300	0.7000	0.7700	55.5805 (78)
West	4.2200	19.6403	0.6300	0.7000	0.7700	25.3298 (80)

Solar gains	94.0716	165.7288	240.2934	318.7131	374.8950	379.7313	362.9850	320.1356	267.4187	186.9165	113.7012	79.8285 (83)
Total gains	585.8543	672.6129	724.6703	790.6639	823.1367	811.0552	778.3423	734.5919	694.3342	628.4777	579.9135	560.6373 (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	25.4219	25.6979	25.9742	27.3561	27.6311	28.9878	28.9878	29.2538	28.4498	27.6311	27.0803	26.5275	
alpha	2.6948	2.7132	2.7316	2.8237	2.8421	2.9325	2.9325	2.9503	2.8967	2.8421	2.8054	2.7685	
util living area	0.9834	0.9749	0.9620	0.9291	0.8683	0.7477	0.6141	0.6537	0.8292	0.9398	0.9747	0.9854	(86)
MIT	18.1050	18.3945	18.8468	19.5537	20.1468	20.6566	20.8642	20.8343	20.4777	19.7090	18.8676	18.1586	(87)
Th 2	19.6173	19.6299	19.6423	19.7011	19.7122	19.7645	19.7645	19.7743	19.7443	19.7122	19.6898	19.6664	(88)
util rest of house	0.9797	0.9692	0.9526	0.9101	0.8279	0.6634	0.4788	0.5247	0.7630	0.9199	0.9680	0.9821	(89)
MIT 2	16.3014	16.6757	17.2564	18.1762	18.9051	19.5116	19.7001	19.6884	19.3193	18.3864	17.3129	16.3955	(90)
Living area fraction									fLA = Living area / (4) =			0.1123	(91)
MIT	16.5039	16.8687	17.4350	18.3308	19.0446	19.6402	19.8308	19.8171	19.4494	18.5349	17.4875	16.5935	(92)
Temperature adjustment												-0.1500	
adjusted MIT	16.3539	16.7187	17.2850	18.1808	18.8946	19.4902	19.6808	19.6671	19.2994	18.3849	17.3375	16.4435	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9646	0.9495	0.9275	0.8786	0.7942	0.6409	0.4683	0.5115	0.7328	0.8896	0.9485	0.9686	(94)
Useful gains	565.1037	638.6233	672.1512	694.6627	653.7502	519.8165	364.5050	375.7800	508.7971	559.1057	550.0370	543.0572	(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	1751.2791	1698.6676	1533.6068	1253.0511	961.7036	623.0818	392.5438	412.4925	675.0055	1040.6220	1396.2890	1704.6868	(97)
Space heating kWh	882.5145	712.3498	640.9230	402.0397	229.1173	0.0000	0.0000	0.0000	0.0000	358.2482	609.3015	864.2524	(98a)
Space heating requirement - total per year (kWh/year)												4698.7464	
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	882.5145	712.3498	640.9230	402.0397	229.1173	0.0000	0.0000	0.0000	0.0000	358.2482	609.3015	864.2524	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4698.7464	
Space heating per m2										(98c) / (4) =		51.5722	(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	882.5145	712.3498	640.9230	402.0397	229.1173	0.0000	0.0000	0.0000	0.0000	358.2482	609.3015	864.2524	(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)	990.4765	799.4947	719.3299	451.2230	257.1463	0.0000	0.0000	0.0000	0.0000	402.0743	683.8400	969.9803	(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	66.1641	57.3210	59.5287	50.9374	48.0417	42.0104	41.3201	44.1881	45.8825	52.5581	57.3490	65.4122	(64)
Efficiency of water heater												85.0000	(216)
(217)m	88.8013	88.7811	88.7362	88.6193	88.3612	85.0000	85.0000	85.0000	85.0000	88.5535	88.7318	88.7986	(217)
Fuel for water heating, kWh/month	74.5080	64.5644	67.0849	57.4789	54.3697	49.4240	48.6119	51.9860	53.9795	59.3518	64.6319	73.6635	(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	33.6970	27.0330	24.3402	17.8327	13.7745	11.2539	12.5655	16.3331	21.2151	27.8354	31.4400	34.6335	(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	5273.5649 (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	719.6546 (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)	271.9539 (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	7152.7261 (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	5273.5649	0.2100	1107.4486	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	719.6546	0.2100	151.1275	(264)
Energy for instantaneous electric shower(s)	801.5527	0.1391	111.5137	(264a)
Space and water heating			1258.5761	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	271.9539	0.1443	39.2513	(268)
Total CO2, kg/year			1421.2704	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			15.6000	(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	5273.5649	1.1300	5959.1284	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	719.6546	1.1300	813.2097	(278)
Energy for instantaneous electric shower(s)	801.5527	1.5143	1213.8187	(278a)
Space and water heating			6772.3381	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	271.9539	1.5338	417.1319	(282)
Total Primary energy kWh/year			8533.3894	(286)
Dwelling Primary energy Rate (DPER)			93.6600	(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		91.1100 (1b)	x	2.8000 (2b)	=	255.1080 (1b) -	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	91.1100						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	255.1080	(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		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) =	0.1176 (8)
Pressure test			Yes
Pressure Test Method			Blower Door
Measured/design AP50			5.0000 (17)
Infiltration rate			0.3676 (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) =		0.3400 (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	0.4335	0.4250	0.4165	0.3740	0.3655	0.3230	0.3230	0.3145	0.3400	0.3655	0.3825	0.3995	(22b)
Effective ac	0.5940	0.5903	0.5868	0.5699	0.5668	0.5522	0.5522	0.5495	0.5578	0.5668	0.5732	0.5798	(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			1.7200	1.0000	1.7200			(26)
TER Opening Type (Uw = 1.20)			12.1600	1.1450	13.9237			(27)
External Wall	82.8500	12.1600	70.6900	0.1800	12.7242			(29a)
Corridor Wall	17.2800	1.7200	15.5600	0.1800	2.8008			(29a)
Total net area of external elements Aum(A, m2)			100.1300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		31.1687			(33)
Party Wall			29.1200	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		155.9394 (35)
Thermal bridges (User defined value 0.050 * total exposed area)		5.0065 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	36.1752 (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	50.0043	49.6971	49.3959	47.9815	47.7169	46.4850	46.4850	46.2569	46.9595	47.7169	48.2523	48.8119	(38)
Heat transfer coeff	86.1794	85.8722	85.5711	84.1567	83.8921	82.6602	82.6602	82.4321	83.1347	83.8921	84.4274	84.9871	(39)
Average = Sum(39)m / 12 =												84.1554	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9459	0.9425	0.9392	0.9237	0.9208	0.9073	0.9073	0.9048	0.9125	0.9208	0.9267	0.9328	(40)
HLP (average)												0.9237	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.6406 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
87.9915	86.6692	84.7423	81.0555	78.3347	75.3005	73.5759	75.4882	77.5845	80.8423	84.6083	87.6544	(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

41.6725	40.1571	38.6418	37.1264	35.6110	34.0957	34.0957	35.6110	37.1264	38.6418	40.1571	41.6725	(42c)

Average daily hot water use (litres/day)	119.0093 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.6640	126.8263	123.3840	118.1819	113.9457	109.3962	107.6716	111.0993	114.7109	119.4840	124.7654	129.3269	(44)
Energy conte	205.3561	180.5990	189.6367	161.7851	153.3929	134.5154	130.2195	137.5641	141.4500	162.1387	177.7512	202.4946	(45)
Energy content (annual)										Total = Sum(45)m =		1976.9032	
Distribution loss (46)m = 0.15 x (45)m													
	30.8034	27.0898	28.4455	24.2678	23.0089	20.1773	19.5329	20.6346	21.2175	24.3208	26.6627	30.3742	(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												
	256.3150	226.6264	240.5956	211.1001	204.3518	183.8305	181.1784	188.5230	190.7651	213.0976	227.0662	253.4535 (62)
WWHRS	-40.2260	-35.5762	-37.2534	-30.8473	-28.7486	-24.6003	-23.0589	-24.5208	-25.4525	-30.0056	-33.9928	-39.4811 (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												
	216.0890	191.0501	203.3422	180.2529	175.6032	159.2301	158.1195	164.0022	165.3126	183.0920	193.0735	213.9724 (64)
										Total per year (kWh/year) = Sum(64)m =		2203.1396 (64)
12Total per year (kWh/year)												2203 (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												
	81.0206	71.5560	75.7939	66.1223	63.7429	57.0551	56.0377	58.4798	59.3609	66.6509	71.4310	80.0692 (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	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	132.0305	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	131.8393	145.9649	131.8393	136.2339	131.8393	136.2339	131.8393	131.8393	136.2339	131.8393	136.2339	131.8393	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	241.1051	243.6070	237.3022	223.8802	206.9372	191.0133	180.3751	177.8732	184.1779	197.6000	214.5429	230.4669	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	36.2031	(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)													
	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	-105.6244	(71)
Water heating gains (Table 5)													
	108.8987	106.4822	101.8735	91.8365	85.6759	79.2432	75.3195	78.6019	82.4457	89.5845	99.2098	107.6199	(72)
Total internal gains													
	547.4522	561.6632	536.6242	517.5598	490.0615	469.0996	450.1430	450.9234	465.4666	484.6329	515.5957	535.5352	(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	4.0500	10.6334	0.6300	0.7000	0.7700	13.1613	(74)
South	3.8900	46.7521	0.6300	0.7000	0.7700	55.5805	(78)
West	4.2200	19.6403	0.6300	0.7000	0.7700	25.3298	(80)

Solar gains	94.0716	165.7288	240.2934	318.7131	374.8950	379.7313	362.9850	320.1356	267.4187	186.9165	113.7012	79.8285	(83)
Total gains	641.5237	727.3920	776.9176	836.2729	864.9565	848.8308	813.1279	771.0590	732.8853	671.5493	629.2970	615.3637	(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	45.7948	45.9586	46.1203	46.8954	47.0434	47.7445	47.7445	47.8766	47.4720	47.0434	46.7451	46.4372	
alpha	4.0530	4.0639	4.0747	4.1264	4.1362	4.1830	4.1830	4.1918	4.1648	4.1362	4.1163	4.0958	
util living area													
	0.9787	0.9637	0.9388	0.8752	0.7617	0.5877	0.4386	0.4787	0.6973	0.8945	0.9628	0.9816	(86)
MIT	19.5653	19.7938	20.0941	20.4905	20.7839	20.9461	20.9874	20.9820	20.8883	20.5161	19.9909	19.5382	(87)
Th 2	20.1287	20.1315	20.1343	20.1474	20.1499	20.1613	20.1613	20.1635	20.1569	20.1499	20.1449	20.1397	(88)
util rest of house													
	0.9745	0.9569	0.9270	0.8513	0.7181	0.5216	0.3587	0.3970	0.6345	0.8692	0.9546	0.9781	(89)
MIT 2	18.4521	18.7418	19.1193	19.6119	19.9494	20.1226	20.1552	20.1540	20.0686	19.6531	19.0030	18.4255	(90)
Living area fraction										fLA = Living area / (4) =		0.1123	(91)
MIT	18.5771	18.8599	19.2288	19.7105	20.0431	20.2150	20.2486	20.2470	20.1607	19.7500	19.1139	18.5504	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5771	18.8599	19.2288	19.7105	20.0431	20.2150	20.2486	20.2470	20.1607	19.7500	19.1139	18.5504	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9645	0.9439	0.9117	0.8373	0.7122	0.5261	0.3672	0.4054	0.6348	0.8551	0.9417	0.9690	(94)
Useful gains	618.7541	686.5859	708.3504	700.1877	616.0005	446.5308	298.5818	312.5647	465.2026	574.2345	592.6281	596.2730	(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													

	1230.3912	1198.7683	1089.2164	909.7779	699.9225	464.1390	301.5944	317.1143	503.8512	767.6091	1014.3047	1219.5995	(97)
Space heating kWh													
	455.0580	344.1866	283.3644	150.9049	62.4380	0.0000	0.0000	0.0000	0.0000	143.8707	303.6071	463.7550	(98a)
Space heating requirement - total per year (kWh/year)												2207.1845	
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													
	455.0580	344.1866	283.3644	150.9049	62.4380	0.0000	0.0000	0.0000	0.0000	143.8707	303.6071	463.7550	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2207.1845	
Space heating per m2											(98c) / (4) =	24.2255	(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													
	455.0580	344.1866	283.3644	150.9049	62.4380	0.0000	0.0000	0.0000	0.0000	143.8707	303.6071	463.7550	(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)													
	492.4870	372.4963	306.6714	163.3170	67.5736	0.0000	0.0000	0.0000	0.0000	155.7042	328.5791	501.8993	(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													
	216.0890	191.0501	203.3422	180.2529	175.6032	159.2301	158.1195	164.0022	165.3126	183.0920	193.0735	213.9724	(64)
Efficiency of water heater												80.3000	(216)
(217)m	85.9367	85.6266	85.0925	84.0031	82.3906	80.3000	80.3000	80.3000	80.3000	83.8701	85.3468	85.9923	(217)
Fuel for water heating, kWh/month													
	251.4513	223.1199	238.9659	214.5789	213.1350	198.2941	196.9109	204.2368	205.8688	218.3043	226.2222	248.8273	(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	27.3936	21.9762	19.7871	14.4969	11.1978	9.1487	10.2150	13.2779	17.2466	22.6285	25.5588	28.1549	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-30.5796	-44.2777	-65.3328	-75.4510	-83.0510	-78.1078	-77.1373	-71.9934	-63.1916	-51.5203	-34.0275	-26.3024	(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	-13.8880	-29.5531	-59.3783	-90.1271	-120.1044	-121.0384	-119.6265	-100.8660	-73.3697	-42.5865	-18.6449	-10.9579	(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	2388.7278 (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	2639.9155 (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)	221.0820 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-1501.1133 (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	3834.6120 (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	2388.7278	0.2100	501.6328	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	2639.9155	0.2100	554.3823 (264)
Space and water heating			1056.0151 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	221.0820	0.1443	31.9090 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-700.9724	0.1340	-93.9571
PV Unit electricity exported	-800.1409	0.1256	-100.4848
Total			-194.4419 (269)
Total CO2, kg/year			905.4114 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.9400 (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	2388.7278	1.1300	2699.2625 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2639.9155	1.1300	2983.1045 (278)
Space and water heating			5682.3670 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	221.0820	1.5338	339.1029 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-700.9724	1.4954	-1048.2003
PV Unit electricity exported	-800.1409	0.4610	-368.8363
Total			-1417.0366 (283)
Total Primary energy kWh/year			4734.5342 (286)
Target Primary Energy Rate (TPER)			51.9700 (287)