

Full SAP Calculation Printout



Plot Reference	10350	Issued on Date	23/04/2026
Assessment Reference	Green	Plot Type Ref	
Plot Address	2, Crossway Parade, London, N22 5QS	SAP Version	10.2
SAP Rating	77 C	DER	6.71
Environmental	95 A	TER	9.92
CO ₂ Emissions (t/year)	0.31	% DER < TER	32.36
Compliance Check	See BREL	DFEE	56.43
% DPER < TPER	-32.62	TFEE	35.63
		% DFEE < TFEE	-58.39
		DPER	70.64
		TPER	53.26
Assessor Details	Mr. Harry Davey	Assessor ID	R434-0001
Client			

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	51.1400 (1b)	3.3000 (2b)	168.7620 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.1400		168.7620 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 168.7620 (5)

2. Ventilation rate

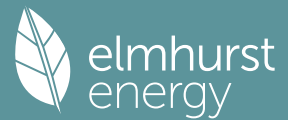
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1185 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3685 (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) = 0.2856 (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	0.3641	0.3570	0.3499	0.3142	0.3070	0.2713	0.2713	0.2642	0.2856	0.3070	0.3213	0.3356 (22b)
Effective ac	0.5663	0.5637	0.5612	0.5493	0.5471	0.5368	0.5368	0.5349	0.5408	0.5471	0.5516	0.5563 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
HGD			4.0000	1.4000	5.6000		(26a)
Window			3.1300	1.3258	4.1496		(27)
Heatloss Floor 1			51.1400	0.2000	10.2280		(28a)
upgrade	17.4900	3.0000	14.4900	0.2800	4.0572		(29a)
new	17.4900	4.1300	13.3600	0.1800	2.4048		(29a)
Total net area of external elements Aum(A, m ²)			86.1200				(31)
Fabric heat loss, W/K = Sum (A x U)					26.4396		(33)
Main dwelling							
Party Wall 1			63.6900	0.0000	0.0000		(32)
Party Ceiling 1			51.1400				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							200.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							17.2240 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	43.6636 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							
(38)m	31.5379	31.3945	31.2540	30.5939	30.4704	29.8955	29.8955
Heat transfer coeff						29.7890	30.1170
							30.4704
							30.7203
							30.9814 (38)

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Average = Sum(39)m / 12 =	75.2015	75.0581	74.9176	74.2575	74.1340	73.5591	73.5591	73.4527	73.7806	74.1340	74.3839	74.6451 (39)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.4705	1.4677	1.4650	1.4520	1.4496	1.4384	1.4384	1.4363	1.4427	1.4496	1.4545	1.4596 (40)
HLP (average)												1.4520
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7237 (42)
Hot water usage for mixer showers	68.1763	67.1518	65.6588	62.8022	60.6942	58.3433	57.0070	58.4887	60.1129	62.6371	65.5550	67.9151 (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	32.2824	31.1085	29.9346	28.7607	27.5868	26.4129	26.4129	27.5868	28.7607	29.9346	31.1085	32.2824 (42c)
Average daily hot water use (litres/day)												92.2039 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	100.4587	98.2603	95.5934	91.5629	88.2810	84.7562	83.4199	86.0755	88.8736	92.5717	96.6635	100.1975 (44)
Energy conte	159.1021	139.9213	146.9235	125.3451	118.8432	104.2176	100.8892	106.5795	109.5901	125.6189	137.7149	156.8851 (45)
Energy content (annual)										Total = Sum(45)m =		1531.6303
Distribution loss (46)m = 0.15 x (45)m	23.8653	20.9882	22.0385	18.8018	17.8265	15.6326	15.1334	15.9869	16.4385	18.8428	20.6572	23.5328 (46)
Water storage loss (or HIU loss):												
Store volume												250.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8000 (48)
Temperature factor from Table 2b												0.7020 (49)
Enter (49) or (54) in (55)												1.2636 (55)
Total storage loss	39.1716	35.3808	39.1716	37.9080	39.1716	37.9080	39.1716	39.1716	37.9080	39.1716	37.9080	39.1716 (56)
If cylinder contains dedicated solar storage	39.1716	35.3808	39.1716	37.9080	39.1716	37.9080	39.1716	39.1716	37.9080	39.1716	37.9080	39.1716 (57)
Primary loss	54.8576	49.5488	54.8576	53.0880	54.8576	22.5120	23.2624	23.2624	22.5120	54.8576	53.0880	54.8576 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143 (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	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143 (64)
								Total per year (kWh/year) = Sum(64)m =				2514.4059 (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)
												0.0000 (64a)
Heat gains from water heating, kWh/month	128.1248	114.4675	124.0754	114.4740	114.7387	82.9884	83.4928	85.3849	84.7747	116.9916	118.5870	127.3877 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
(66)m	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	24.1784	21.4750	17.4647	13.2219	9.8835	8.3441	9.0161	11.7194	15.7298	19.9726	23.3110	24.8504 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	224.1705	226.4967	220.6348	208.1555	192.4025	177.5970	167.7060	165.3798	171.2418	183.7211	199.4740	214.2795 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659 (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)	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480 (71)
Water heating gains (Table 5)	172.2108	170.3386	166.7680	158.9917	154.2187	115.2616	112.2216	114.7646	117.7426	157.2468	164.7042	171.2200 (72)
Total internal gains	502.0996	499.8502	486.4074	461.9090	438.0447	382.7426	370.4836	373.4038	386.2541	442.4804	469.0290	491.8898 (73)

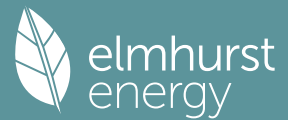
6. Solar gains

[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					2.1300	10.6334	0.6300	0.7000		0.7700	6.9219 (74)		
South					1.0000	46.7521	0.6300	0.7000		0.7700	14.2880 (78)		
Solar gains	21.2099	36.6282	52.2853	69.7940		83.7427	85.8518	81.6210	70.6239	58.1630	40.9855	25.4752	18.1166 (83)
Total gains	523.3095	536.4784	538.6927	531.7030		521.7874	468.5944	452.1046	444.0277	444.4171	483.4659	494.5042	510.0064 (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	37.7800	37.8521	37.9231	38.2602	38.3240	38.6235	38.6235	38.6795	38.5076	38.3240	38.1953	38.0616
alpha	3.5187	3.5235	3.5282	3.5507	3.5549	3.5749	3.5749	3.5786	3.5672	3.5549	3.5464	3.5374
util living area	0.9727	0.9674	0.9557	0.9302	0.8744	0.7832	0.6373	0.6651	0.8308	0.9194	0.9605	0.9750 (86)
Living	19.2611	19.3938	19.6679	20.0560	20.4547	20.7568	20.9167	20.9002	20.6725	20.2366	19.6943	19.2340
Non living	17.7572	17.9260	18.2725	18.7610	19.2376	19.5716	19.7020	19.6935	19.4893	18.9863	18.3135	17.7285
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

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16 / 9	28	0	0	0	0	0	0	0	0	0	0	10
MIT	20.1104	19.3938	19.6679	20.0560	20.4547	20.7568	20.9167	20.9002	20.6725	20.2366	19.6943	19.4810 (87)
Th 2	19.7097	19.7118	19.7139	19.7237	19.7255	19.7340	19.7340	19.7356	19.7307	19.7255	19.7218	19.7179 (88)
util rest of house	0.9656	0.9588	0.9431	0.9079	0.8286	0.6906	0.4863	0.5203	0.7540	0.8897	0.9485	0.9685 (89)
MIT 2	18.9313	17.9260	18.2725	18.7610	19.2376	19.5716	19.7020	19.6935	19.4893	18.9863	18.3135	18.0870 (90)
Living area fraction									fLA = Living area / (4) =			0.1975 (91)
MIT	19.1642	18.2159	18.5481	19.0168	19.4779	19.8057	19.9419	19.9318	19.7230	19.2332	18.5862	18.3623 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1642	18.2159	18.5481	19.0168	19.4779	19.8057	19.9419	19.9318	19.7230	19.2332	18.5862	18.3623 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9620	0.9450	0.9278	0.8919	0.8177	0.6968	0.5138	0.5454	0.7534	0.8749	0.9339	0.9592 (94)
Useful gains	503.3997	506.9595	499.7813	474.2426	426.6548	326.5070	232.2896	242.1893	334.8346	422.9847	461.8295	489.2130 (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	1117.8079	999.4634	902.6136	751.2457	576.6103	382.9232	245.8254	259.4210	414.8665	640.0139	854.3891	1057.1475 (97)
Space heating kWh	457.1197	330.9626	299.7073	199.4422	111.5669	0.0000	0.0000	0.0000	0.0000	161.4697	282.6429	422.5433 (98a)
Space heating requirement - total per year (kWh/year)												2265.4546
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	457.1197	330.9626	299.7073	199.4422	111.5669	0.0000	0.0000	0.0000	0.0000	161.4697	282.6429	422.5433 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2265.4546
Space heating per m2										(98c) / (4) =		44.2991 (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 %)												274.9121 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	457.1197	330.9626	299.7073	199.4422	111.5669	0.0000	0.0000	0.0000	0.0000	161.4697	282.6429	422.5433 (98)
Space heating efficiency (main heating system 1)	274.9121	274.9121	274.9121	274.9121	274.9121	0.0000	0.0000	0.0000	0.0000	274.9121	274.9121	274.9121 (210)
Space heating fuel (main heating system)	166.2785	120.3885	109.0193	72.5476	40.5828	0.0000	0.0000	0.0000	0.0000	58.7350	102.8121	153.7012 (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	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143 (64)
Efficiency of water heater	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840 (216)
Fuel for water heating, kWh/month	132.5406	117.7329	126.1638	113.2771	111.4608	86.2049	85.5167	88.4961	89.0180	115.0086	119.7539	131.3798 (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	21.1632	16.9779	15.2867	11.1997	8.6510	7.0679	7.8917	10.2579	13.3241	17.4819	19.7458	21.7514 (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												824.0651 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												190.9840
Water heating fuel used												1316.5532 (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)												170.7992 (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												2311.4176 (238)

10a. Fuel costs - using Table 12 prices

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	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	824.0651	16.4900	135.8883 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1316.5532	16.4900	217.0996 (247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000 (247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (249)
Energy for lighting	170.7992	16.4900	28.1648 (250)
Additional standing charges			0.0000 (251)
Total energy cost			381.1528 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.4272 (257)
SAP value		76.8644
SAP rating (Section 12)		77 (258)
SAP band		C

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	824.0651	0.1545	127.3426 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1316.5532	0.1416	186.4035 (264)
Space and water heating			313.7462 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	170.7992	0.1443	24.6516 (268)
Total CO2, kg/year			338.3978 (272)
CO2 emissions per m2			6.6200 (273)
EI value			95.2834
EI rating			95 (274)
EI band			A

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	51.1400 (1b)	3.3000 (2b)	168.7620 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.1400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	168.7620 (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	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

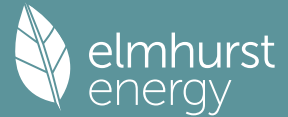
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1185 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3685	(18)
Number of sides sheltered	3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2856 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.4000	4.2000	4.2000	3.9000	3.9000	3.4000	3.5000	3.7000	3.6000	3.8000	3.8000	4.2000 (22)
Wind factor	1.1000	1.0500	1.0500	0.9750	0.9750	0.8500	0.8750	0.9250	0.9000	0.9500	0.9500	1.0500 (22a)
Adj infiltr rate	0.3142	0.2999	0.2999	0.2785	0.2785	0.2428	0.2499	0.2642	0.2570	0.2713	0.2713	0.2999 (22b)
Effective ac	0.5493	0.5450	0.5450	0.5388	0.5388	0.5295	0.5312	0.5349	0.5330	0.5368	0.5368	0.5450 (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
Main dwelling			4.0000	1.4000	5.6000		
HGD							(26a)

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Window				3.1300	1.3258	4.1496	(27)
Heatloss Floor 1				51.1400	0.2000	10.2280	(28a)
upgrade		17.4900	3.0000	14.4900	0.2800	4.0572	(29a)
new		17.4900	4.1300	13.3600	0.1800	2.4048	(29a)
Total net area of external elements Aum(A, m2)				86.1200			(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.4396		(33)
Main dwelling							
Party Wall 1				63.6900	0.0000	0.0000	(32)
Party Ceiling 1				51.1400			(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							200.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							17.2240 (36)
Point Thermal Bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	43.6636 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	30.5939	30.3498	30.3498	30.0048	30.0048	29.4867	29.5846	29.7890	29.6854	29.8955	29.8955	30.3498	(38)
Average = Sum(39)m / 12 =	74.2575	74.0134	74.0134	73.6684	73.6684	73.1503	73.2483	73.4527	73.3490	73.5591	73.5591	74.0134	(39)
												73.6628	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.4520	1.4473	1.4473	1.4405	1.4405	1.4304	1.4323	1.4363	1.4343	1.4384	1.4384	1.4473	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	
												1.4404	
												31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7237 (42)
Hot water usage for mixer showers													
	68.1763	67.1518	65.6588	62.8022	60.6942	58.3433	57.0070	58.4887	60.1129	62.6371	65.5550	67.9151	(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													
	32.2824	31.1085	29.9346	28.7607	27.5868	26.4129	26.4129	27.5868	28.7607	29.9346	31.1085	32.2824	(42c)
Average daily hot water use (litres/day)													92.2039 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	100.4587	98.2603	95.5934	91.5629	88.2810	84.7562	83.4199	86.0755	88.8736	92.5717	96.6635	100.1975	(44)
Energy content (annual)	159.1021	139.9213	146.9235	125.3451	118.8432	104.2176	100.8892	106.5795	109.5901	125.6189	137.7149	156.8851	(45)
Distribution loss (46)m = 0.15 x (45)m													
	23.8653	20.9882	22.0385	18.8018	17.8265	15.6326	15.1334	15.9869	16.4385	18.8428	20.6572	23.5328	(46)
Water storage loss (or HIU loss):													
Store volume													250.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8000 (48)
Temperature factor from Table 2b													0.7020 (49)
Enter (49) or (54) in (55)													1.2636 (55)
Total storage loss													
	39.1716	35.3808	39.1716	37.9080	39.1716	37.9080	39.1716	39.1716	37.9080	39.1716	37.9080	39.1716	(56)
If cylinder contains dedicated solar storage													
	39.1716	35.3808	39.1716	37.9080	39.1716	37.9080	39.1716	39.1716	37.9080	39.1716	37.9080	39.1716	(57)
Primary loss	54.8576	49.5488	54.8576	53.0880	54.8576	22.5120	23.2624	23.2624	22.5120	54.8576	53.0880	54.8576	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143	(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													
	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143	(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													
	128.1248	114.4675	124.0754	114.4740	114.7387	82.9884	83.4928	85.3849	84.7747	116.9916	118.5870	127.3877	(65)

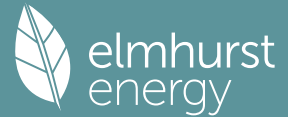
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	24.1784	21.4750	17.4647	13.2219	9.8835	8.3441	9.0161	11.7194	15.7298	19.9726	23.3110	24.8504	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	224.1705	226.4967	220.6348	208.1555	192.4025	177.5970	167.7060	165.3798	171.2418	183.7211	199.4740	214.2795	(68)
Pumps, fans	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	(69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	(71)
Total internal gains	172.2108	170.3386	166.7680	158.9917	154.2187	115.2616	112.2216	114.7646	117.7426	157.2468	164.7042	171.2200	(72)
	502.0996	499.8502	486.4074	461.9090	438.0447	382.7426	370.4836	373.4038	386.2541	442.4804	469.0290	491.8898	(73)

6. Solar gains

[Jan]													
	Area	Solar flux	g	FF	Access	Gains							
	m2	Table 6a	Specific data	Specific data	factor	W							
		W/m2	or Table 6b	or Table 6c	Table 6d								
North	2.1300	11.5821	0.6300	0.7000	0.7700	7.5394	(74)						
South	1.0000	49.2853	0.6300	0.7000	0.7700	15.0622	(78)						
Solar gains	22.6016	35.1317	50.6613	70.8602	83.0697	91.4390	87.1396	76.8030	62.5823	43.0222	28.0498	19.7688	(83)

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Total gains 524.7012 534.9819 537.0687 532.7692 521.1144 474.1816 457.6231 450.2067 448.8364 485.5026 497.0788 511.6586 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)

21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	38.2602	38.3865	38.3865	38.5662	38.5662	38.8394	38.7874	38.6795	38.7341	38.6235	38.6235	38.3865
alpha	3.5507	3.5591	3.5591	3.5711	3.5711	3.5893	3.5858	3.5786	3.5823	3.5749	3.5749	3.5591
util living area	0.9662	0.9608	0.9427	0.9018	0.8084	0.6337	0.3910	0.4271	0.7225	0.8809	0.9469	0.9685 (86)
Living	19.4775	19.5879	19.8989	20.2962	20.6752	20.9155	20.9902	20.9858	20.8488	20.4680	19.9310	19.4582
Non living	18.0399	18.1808	18.5694	19.0566	19.4832	19.7054	19.7380	19.7343	19.6569	19.2636	18.6168	18.0184
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	20.2212	19.5879	19.8989	20.2962	20.6752	20.9155	20.9902	20.9858	20.8488	20.4680	19.9310	19.6739 (87)
Th 2	19.7237	19.7273	19.7273	19.7324	19.7324	19.7401	19.7387	19.7356	19.7372	19.7340	19.7340	19.7273 (88)
util rest of house	0.9571	0.9500	0.9255	0.8684	0.7361	0.4910	0.1978	0.2332	0.6003	0.8344	0.9298	0.9599 (89)
MIT 2	19.0524	18.1808	18.5694	19.0566	19.4832	19.7054	19.7380	19.7343	19.6569	19.2636	18.6168	18.3263 (90)
Living area fraction									fLA = Living area / (4) =			0.1975 (91)
MIT	19.2832	18.4587	18.8320	19.3014	19.7186	19.9444	19.9853	19.9814	19.8923	19.5014	18.8763	18.5925 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2832	18.4587	18.8320	19.3014	19.7186	19.9444	19.9853	19.9814	19.8923	19.5014	18.8763	18.5925 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9532	0.9354	0.9095	0.8543	0.7352	0.5165	0.2367	0.2724	0.6175	0.8238	0.9145	0.9496 (94)
Useful gains	500.1474	500.4066	488.4890	455.1349	383.1141	244.9177	108.3144	122.6285	277.1512	399.9680	454.5548	485.8878 (95)
Ext temp.	5.4000	5.9000	7.8000	10.4000	13.4000	16.4000	18.5000	18.3000	15.7000	12.1000	8.4000	5.4000 (96)
Heat loss rate W	1030.9333	929.5101	816.5123	655.7526	465.4831	259.2761	108.7953	123.5063	307.4981	544.4431	770.6304	976.4190 (97)
Space heating kWh	394.9047	288.3575	244.0493	144.4447	61.2825	0.0000	0.0000	0.0000	0.0000	107.4894	227.5744	364.9552 (98a)
Space heating requirement - total per year (kWh/year)												1833.0580
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	394.9047	288.3575	244.0493	144.4447	61.2825	0.0000	0.0000	0.0000	0.0000	107.4894	227.5744	364.9552 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1833.0580
Space heating per m2										(98c) / (4) =		35.8439 (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 %)

274.6574 (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	394.9047	288.3575	244.0493	144.4447	61.2825	0.0000	0.0000	0.0000	0.0000	107.4894	227.5744	364.9552 (98)
Space heating efficiency (main heating system 1)	274.6574	274.6574	274.6574	274.6574	274.6574	0.0000	0.0000	0.0000	0.0000	274.6574	274.6574	274.6574 (210)
Space heating fuel (main heating system)	143.7808	104.9881	88.8559	52.5909	22.3124	0.0000	0.0000	0.0000	0.0000	39.1358	82.8576	132.8765 (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	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143 (64)
Efficiency of water heater (217)m	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777 (216)
Fuel for water heating, kWh/month	132.5449	117.7367	126.1680	113.2808	111.4645	86.2078	85.5195	88.4990	89.0209	115.0124	119.7579	131.3841 (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	21.1632	16.9779	15.2867	11.1997	8.6510	7.0679	7.8917	10.2579	13.3241	17.4819	19.7458	21.7514 (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												667.3980 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												190.9777
Water heating fuel used												1316.5964 (219)
Space cooling fuel												0.0000 (221)

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Electricity for pumps and fans:	
Total electricity for the above, kWh/year	0.0000 (231)
Electricity for lighting (calculated in Appendix L)	170.7992 (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	2154.7936 (238)

10a. Fuel costs - using BEDF prices (593)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	667.3980	27.6700	184.6690 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1316.5964	27.6700	364.3022 (247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000 (247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (249)
Energy for lighting	170.7992	27.6700	47.2601 (250)
Additional standing charges			0.0000 (251)
Total energy cost			596.2314 (255)

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	667.3980	0.1555	103.7879 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1316.5964	0.1416	186.4096 (264)
Space and water heating			290.1975 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	170.7992	0.1443	24.6516 (268)
Total CO2, kg/year			314.8491 (272)

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	667.3980	1.5757	1051.6378 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1316.5964	1.5236	2005.9400 (278)
Space and water heating			3057.5778 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	170.7992	1.5338	261.9775 (282)
Total Primary energy kWh/year			3319.5554 (286)

SAP 10 EPC IMPROVEMENTS

Green

Current energy efficiency rating:	C 77
Current environmental impact rating:	A 95

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures: (none)	SAP change	Cost change	CO2 change
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Recommended measures (none)	Typical annual savings		Energy efficiency	Environmental impact
	Total Savings	£0	0.00 kg/m²	

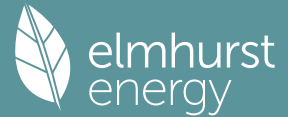
Potential energy efficiency rating:	C 77
Potential environmental impact rating:	A 95

Fuel prices for cost data on this page from database revision number 593 TEST (31 Mar 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current £596	Potential £596	Saving £0
Electricity			
Space heating	£185	£185	£0
Water heating	£364	£364	£0
Lighting	£47	£47	£0
Total cost of fuels	£596	£596	£0
Total cost of uses	£596	£596	£0
Delivered energy	42 kWh/m²	42 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.3 tonnes	0.3 tonnes	0.0 tonnes
CO2 emissions per m²	6 kg/m²	6 kg/m²	0 kg/m²
Primary energy	65 kWh/m²	65 kWh/m²	0 kWh/m²

Full SAP Calculation Printout



SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

Main dwelling	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	51.1400 (1b)	x 3.3000 (2b)	= 168.7620 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.1400		(4)
Dwelling volume		(3a) + (3b) + (3c) + (3d) + (3e) ... (3n) =	168.7620 (5)

2. Ventilation rate

	m ³ 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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	Air changes per hour 20.0000 / (5) = 0.1185 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3685 (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) = 0.2856 (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	0.3641	0.3570	0.3499	0.3142	0.3070	0.2713	0.2713	0.2642	0.2856	0.3070	0.3213	0.3356 (22b)
Effective ac	0.5663	0.5637	0.5612	0.5493	0.5471	0.5368	0.5368	0.5349	0.5408	0.5471	0.5516	0.5563 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
HGD			4.0000	1.4000	5.6000		(26a)
Window			3.1300	1.3258	4.1496		(27)
Heatloss Floor 1			51.1400	0.2000	10.2280		(28a)
upgrade	17.4900	3.0000	14.4900	0.2800	4.0572		(29a)
new	17.4900	4.1300	13.3600	0.1800	2.4048		(29a)
Total net area of external elements Aum(A, m ²)			86.1200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.4396		(33)
Main dwelling							
Party Wall 1			63.6900	0.0000	0.0000		(32)
Party Ceiling 1			51.1400				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							200.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							17.2240 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	43.6636 (37)

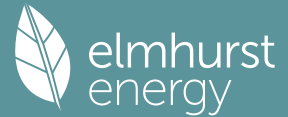
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	31.5379	31.3945	31.2540	30.5939	30.4704	29.8955	29.8955	29.7890	30.1170	30.4704	30.7203	30.9814 (38)
Heat transfer coeff	75.2015	75.0581	74.9176	74.2575	74.1340	73.5591	73.5591	73.4527	73.7806	74.1340	74.3839	74.6451 (39)
Average = Sum(39)m / 12 =												74.2569
HLP	1.4705	1.4677	1.4650	1.4520	1.4496	1.4384	1.4384	1.4363	1.4427	1.4496	1.4545	1.4596 (40)
HLP (average)												1.4520
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7237 (42)
Hot water usage for mixer showers	68.1763	67.1518	65.6588	62.8022	60.6942	58.3433	57.0070	58.4887	60.1129	62.6371	65.5550	67.9151 (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	32.2824	31.1085	29.9346	28.7607	27.5868	26.4129	26.4129	27.5868	28.7607	29.9346	31.1085	32.2824 (42c)
Average daily hot water use (litres/day)												92.2039 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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Daily hot water use	100.4587	98.2603	95.5934	91.5629	88.2810	84.7562	83.4199	86.0755	88.8736	92.5717	96.6635	100.1975 (44)
Energy conte	159.1021	139.9213	146.9235	125.3451	118.8432	104.2176	100.8892	106.5795	109.5901	125.6189	137.7149	156.8851 (45)
Energy content (annual)	23.8653	20.9882								Total = Sum(45)m =		1531.6303
Distribution loss (46)m = 0.15 x (45)m	23.8653	20.9882	22.0385	18.8018	17.8265	15.6326	15.1334	15.9869	16.4385	18.8428	20.6572	23.5328 (46)
Water storage loss (or HIU loss):												
Store volume												250.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8000 (48)
Temperature factor from Table 2b												0.7020 (49)
Enter (49) or (54) in (55)												1.2636 (55)
Total storage loss												
	39.1716	35.3808	39.1716	37.9080	39.1716	37.9080	39.1716	39.1716	37.9080	39.1716	37.9080	39.1716 (56)
If cylinder contains dedicated solar storage												
	39.1716	35.3808	39.1716	37.9080	39.1716	37.9080	39.1716	39.1716	37.9080	39.1716	37.9080	39.1716 (57)
Primary loss	54.8576	49.5488	54.8576	53.0880	54.8576	22.5120	23.2624	23.2624	22.5120	54.8576	53.0880	54.8576 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143 (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												
	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143 (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												
	128.1248	114.4675	124.0754	114.4740	114.7387	82.9884	83.4928	85.3849	84.7747	116.9916	118.5870	127.3877 (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	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	24.1784	21.4750	17.4647	13.2219	9.8835	8.3441	9.0161	11.7194	15.7298	19.9726	23.3110	24.8504 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	224.1705	226.4967	220.6348	208.1555	192.4025	177.5970	167.7060	165.3798	171.2418	183.7211	199.4740	214.2795 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659 (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)												
	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480 (71)
Water heating gains (Table 5)												
	172.2108	170.3386	166.7680	158.9917	154.2187	115.2616	112.2216	114.7646	117.7426	157.2468	164.7042	171.2200 (72)
Total internal gains												
	502.0996	499.8502	486.4074	461.9090	438.0447	382.7426	370.4836	373.4038	386.2541	442.4804	469.0290	491.8898 (73)

6. Solar gains

[Jan]												
	Area											
	m2											
	Solar flux											
	Table 6a											
	W/m2											
	Specific data											
	or Table 6b											
	Specific data											
	or Table 6c											
	Access											
	factor											
	Table 6d											
	Gains											
	W											
North	2.1300											6.9219 (74)
South	1.0000											14.2880 (78)
Solar gains	21.2099	36.6282	52.2853	69.7940	83.7427	85.8518	81.6210	70.6239	58.1630	40.9855	25.4752	18.1166 (83)
Total gains	523.3095	536.4784	538.6927	531.7030	521.7874	468.5944	452.1046	444.0277	444.4171	483.4659	494.5042	510.0064 (84)

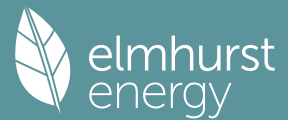
7. Mean internal temperature (heating season)

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	37.7800	37.8521	37.9231	38.2602	38.3240	38.6235	38.6235	38.6795	38.5076	38.3240	38.1953	38.0616
alpha	3.5187	3.5235	3.5282	3.5507	3.5549	3.5749	3.5749	3.5786	3.5672	3.5549	3.5464	3.5374
util living area												
	0.9727	0.9674	0.9557	0.9302	0.8744	0.7832	0.6373	0.6651	0.8308	0.9194	0.9605	0.9750 (86)
Living	19.2611	19.3938	19.6679	20.0560	20.4547	20.7568	20.9167	20.9002	20.6725	20.2366	19.6943	19.2340
Non living	17.7572	17.9260	18.2725	18.7610	19.2376	19.5716	19.7020	19.6935	19.4893	18.9863	18.3135	17.7285
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	20.1104	19.3938	19.6679	20.0560	20.4547	20.7568	20.9167	20.9002	20.6725	20.2366	19.6943	19.4810 (87)
Th 2	19.7097	19.7118	19.7139	19.7237	19.7255	19.7340	19.7340	19.7356	19.7307	19.7255	19.7218	19.7179 (88)
util rest of house												
	0.9656	0.9588	0.9431	0.9079	0.8286	0.6906	0.4863	0.5203	0.7540	0.8897	0.9485	0.9685 (89)
MIT 2	18.9313	17.9260	18.2725	18.7610	19.2376	19.5716	19.7020	19.6935	19.4893	18.9863	18.3135	18.0870 (90)
Living area fraction												
	19.1642	18.2159	18.5481	19.0168	19.4779	19.8057	19.9419	19.9318	19.7230	19.2332	18.5862	18.3623 (92)
MIT												
Temperature adjustment												0.0000
adjusted MIT	19.1642	18.2159	18.5481	19.0168	19.4779	19.8057	19.9419	19.9318	19.7230	19.2332	18.5862	18.3623 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9620	0.9450	0.9278	0.8919	0.8177	0.6968	0.5138	0.5454	0.7534	0.8749	0.9339	0.9592 (94)
Useful gains	503.3997	506.9595	499.7813	474.2426	426.6548	326.5070	232.2896	242.1893	334.8346	422.9847	461.8295	489.2130 (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												
	1117.8079	999.4634	902.6136	751.2457	576.6103	382.9232	245.8254	259.4210	414.8665	640.0139	854.3891	1057.1475 (97)
Space heating kWh												

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Space heating requirement - total per year (kWh/year)	457.1197	330.9626	299.7073	199.4422	111.5669	0.0000	0.0000	0.0000	0.0000	161.4697	282.6429	422.5433 (98a)
Solar heating kWh												2265.4546
Solar heating contribution - total per year (kWh/year)	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)
Space heating kWh	457.1197	330.9626	299.7073	199.4422	111.5669	0.0000	0.0000	0.0000	0.0000	161.4697	282.6429	422.5433 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2265.4546
Space heating per m2										(98c) / (4) =		44.2991 (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 %)												274.9121 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
457.1197	330.9626	299.7073	199.4422	111.5669	0.0000	0.0000	0.0000	0.0000	0.0000	161.4697	282.6429	422.5433 (98)
Space heating efficiency (main heating system 1)	274.9121	274.9121	274.9121	274.9121	274.9121	0.0000	0.0000	0.0000	0.0000	274.9121	274.9121	274.9121 (210)
Space heating fuel (main heating system)	166.2785	120.3885	109.0193	72.5476	40.5828	0.0000	0.0000	0.0000	0.0000	58.7350	102.8121	153.7012 (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 requirement	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143 (64)
Efficiency of water heater	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840	190.9840 (216)
Fuel for water heating, kWh/month	132.5406	117.7329	126.1638	113.2771	111.4608	86.2049	85.5167	88.4961	89.0180	115.0086	119.7539	131.3798 (219)
Space cooling fuel requirement	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)
(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	21.1632	16.9779	15.2867	11.1997	8.6510	7.0679	7.8917	10.2579	13.3241	17.4819	19.7458	21.7514 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)
(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)	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)
(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)	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)
(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)	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)
(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)	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)
(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)	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)
(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)	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)
(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)	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)
(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												824.0651 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												190.9840
Water heating fuel used												1316.5532 (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)												170.7992 (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												2311.4176 (238)

10a. Fuel costs - using Table 12 prices

Space heating - main system 1	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Total CO2 associated with community systems	824.0651	16.4900	135.8883 (240)
Water heating (other fuel)	1316.5532	16.4900	0.0000 (473)
Energy for instantaneous electric shower(s)	0.0000	16.4900	217.0996 (247)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (247a)
Energy for lighting	170.7992	16.4900	0.0000 (249)
Additional standing charges			28.1648 (250)
Total energy cost			0.0000 (251)
			381.1528 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)		1.4272 (257)
SAP value		76.8644
SAP rating (Section 12)		77 (258)
SAP band		C

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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	824.0651	0.1545	127.3426 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1316.5532	0.1416	186.4035 (264)
Space and water heating			313.7462 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	170.7992	0.1443	24.6516 (268)
Total CO2, kg/year			338.3978 (272)
CO2 emissions per m2			6.6200 (273)
EI value			95.2834
EI rating			95 (274)
EI band			A

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	51.1400 (1b)	x 3.3000 (2b)	= 168.7620 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.1400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 168.7620 (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	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	Air changes per hour 20.0000 / (5) = 0.1185 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3685 (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) = 0.2856 (21)

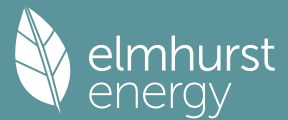
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.4000	4.2000	4.2000	3.9000	3.9000	3.4000	3.5000	3.7000	3.6000	3.8000	3.8000	4.2000 (22)
Wind factor	1.1000	1.0500	1.0500	0.9750	0.9750	0.8500	0.8750	0.9250	0.9000	0.9500	0.9500	1.0500 (22a)
Adj infilt rate	0.3142	0.2999	0.2999	0.2785	0.2785	0.2428	0.2499	0.2642	0.2570	0.2713	0.2713	0.2999 (22b)
Effective ac	0.5493	0.5450	0.5450	0.5388	0.5388	0.5295	0.5312	0.5349	0.5330	0.5368	0.5368	0.5450 (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
Main dwelling							
HGD			4.0000	1.4000	5.6000		(26a)
Window			3.1300	1.3258	4.1496		(27)
Heatloss Floor 1			51.1400	0.2000	10.2280		(28a)
upgrade	17.4900	3.0000	14.4900	0.2800	4.0572		(29a)
new	17.4900	4.1300	13.3600	0.1800	2.4048		(29a)
Total net area of external elements Aum(A, m2)			86.1200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.4396		(33)
Main dwelling							
Party Wall 1			63.6900	0.0000	0.0000		(32)
Party Ceiling 1			51.1400				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							200.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							17.2240 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	43.6636 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	30.5939	30.3498	30.3498	30.0048	30.0048	29.4867	29.5846	29.7890	29.6854	29.8955	29.8955	30.3498 (38)
Heat transfer coeff	74.2575	74.0134	74.0134	73.6684	73.6684	73.1503	73.2483	73.4527	73.3490	73.5591	73.5591	74.0134 (39)
Average = Sum(39)m / 12 =												73.6628
HLP	1.4520	1.4473	1.4473	1.4405	1.4405	1.4304	1.4323	1.4363	1.4343	1.4384	1.4384	1.4473 (40)

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HLP (average)	31	28	31	30	31	30	31	31	30	31	30	1.4404
Days in mont												31

4. Water heating energy requirements (kWh/year)												

Assumed occupancy												1.7237 (42)
Hot water usage for mixer showers												
68.1763 67.1518	65.6588	62.8022	60.6942	58.3433	57.0070	58.4887	60.1129	62.6371	65.5550	67.9151	(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												
32.2824 31.1085	29.9346	28.7607	27.5868	26.4129	26.4129	27.5868	28.7607	29.9346	31.1085	32.2824	(42c)	
Average daily hot water use (litres/day)												92.2039 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	100.4587	98.2603	95.5934	91.5629	88.2810	84.7562	83.4199	86.0755	88.8736	92.5717	96.6635	100.1975 (44)
Energy conte	159.1021	139.9213	146.9235	125.3451	118.8432	104.2176	100.8892	106.5795	109.5901	125.6189	137.7149	156.8851 (45)
Energy content (annual)										Total = Sum(45)m =		1531.6303
Distribution loss (46)m = 0.15 x (45)m			22.0385	18.8018	17.8265	15.6326	15.1334	15.9869	16.4385	18.8428	20.6572	23.5328 (46)
Water storage loss (or HIU loss):												
Store volume												250.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8000 (48)
Temperature factor from Table 2b												0.7020 (49)
Enter (49) or (54) in (55)												1.2636 (55)
Total storage loss												
39.1716 35.3808	39.1716	37.9080	39.1716	37.9080	39.1716	37.9080	39.1716	39.1716	37.9080	39.1716	37.9080	39.1716 (56)
If cylinder contains dedicated solar storage												
39.1716 35.3808	39.1716	37.9080	39.1716	37.9080	39.1716	37.9080	39.1716	39.1716	37.9080	39.1716	37.9080	39.1716 (57)
Primary loss	54.8576	49.5488	54.8576	53.0880	54.8576	22.5120	23.2624	23.2624	22.5120	54.8576	53.0880	54.8576 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
253.1313 224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143	(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	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143 (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	128.1248	114.4675	124.0754	114.4740	114.7387	82.9884	83.4928	85.3849	84.7747	116.9916	118.5870	127.3877 (65)

5. Internal gains (see Table 5 and 5a)												

Metabolic gains (Table 5), Watts												
(66)m	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220	103.4220 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	24.1784	21.4750	17.4647	13.2219	9.8835	8.3441	9.0161	11.7194	15.7298	19.9726	23.3110	24.8504 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	224.1705	226.4967	220.6348	208.1555	192.4025	177.5970	167.7060	165.3798	171.2418	183.7211	199.4740	214.2795 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659	47.0659 (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)	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480	-68.9480 (71)
Water heating gains (Table 5)	172.2108	170.3386	166.7680	158.9917	154.2187	115.2616	112.2216	114.7646	117.7426	157.2468	164.7042	171.2200 (72)
Total internal gains	502.0996	499.8502	486.4074	461.9090	438.0447	382.7426	370.4836	373.4038	386.2541	442.4804	469.0290	491.8898 (73)

6. Solar gains												

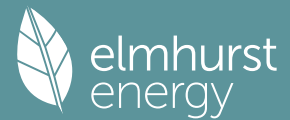
[Jan]												
	Area											
	m2											
	Solar flux											
	Table 6a											
	W/m2											
	Specific data											
	or Table 6b											
	Specific data											
	or Table 6c											
	Access											
	factor											
	Table 6d											
	Gains											
	W											
North	2.1300											7.5394 (74)
South	1.0000											15.0622 (78)

Solar gains	22.6016	35.1317	50.6613	70.8602	83.0697	91.4390	87.1396	76.8030	62.5823	43.0222	28.0498	19.7688 (83)
Total gains	524.7012	534.9819	537.0687	532.7692	521.1144	474.1816	457.6231	450.2067	448.8364	485.5026	497.0788	511.6586 (84)

7. Mean internal temperature (heating season)												

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.2602	38.3865	38.3865	38.5662	38.5662	38.8394	38.7874	38.6795	38.7341	38.6235	38.6235	38.3865
alpha	3.5507	3.5591	3.5591	3.5711	3.5711	3.5893	3.5858	3.5786	3.5823	3.5749	3.5749	3.5591
util living area	0.9662	0.9608	0.9427	0.9018	0.8084	0.6337	0.3910	0.4271	0.7225	0.8809	0.9469	0.9685 (86)
Living	19.4775	19.5879	19.8989	20.2962	20.6752	20.9155	20.9902	20.9858	20.8488	20.4680	19.9310	19.4582
Non living	18.0399	18.1808	18.5694	19.0566	19.4832	19.7054	19.7380	19.7343	19.6569	19.2636	18.6168	18.0184
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	20.2212	19.5879	19.8989	20.2962	20.6752	20.9155	20.9902	20.9858	20.8488	20.4680	19.9310	19.6739 (87)
Th 2	19.7237	19.7273	19.7273	19.7324	19.7324	19.7401	19.7387	19.7356	19.7372	19.7340	19.7340	19.7273 (88)
util rest of house	0.9571	0.9500	0.9255	0.8684	0.7361	0.4910	0.1978	0.2332	0.6003	0.8344	0.9298	0.9599 (89)

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MIT 2	19.0524	18.1808	18.5694	19.0566	19.4832	19.7054	19.7380	19.7343	19.6569	19.2636	18.6168	18.3263 (90)
Living area fraction									FLA = Living area / (4) =			0.1975 (91)
MIT	19.2832	18.4587	18.8320	19.3014	19.7186	19.9444	19.9853	19.9814	19.8923	19.5014	18.8763	18.5925 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2832	18.4587	18.8320	19.3014	19.7186	19.9444	19.9853	19.9814	19.8923	19.5014	18.8763	18.5925 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9532	0.9354	0.9095	0.8543	0.7352	0.5165	0.2367	0.2724	0.6175	0.8238	0.9145	0.9496	(94)
Useful gains	500.1474	500.4066	488.4890	455.1349	383.1141	244.9177	108.3144	122.6285	277.1512	399.9680	454.5548	485.8878	(95)
Ext temp.	5.4000	5.9000	7.8000	10.4000	13.4000	16.4000	18.5000	18.3000	15.7000	12.1000	8.4000	5.4000	(96)
Heat loss rate W	1030.9333	929.5101	816.5123	655.7526	465.4831	259.2761	108.7953	123.5063	307.4981	544.4431	770.6304	976.4190	(97)
Space heating kWh	394.9047	288.3575	244.0493	144.4447	61.2825	0.0000	0.0000	0.0000	0.0000	107.4894	227.5744	364.9552	(98a)
Space heating requirement - total per year (kWh/year)												1833.0580	
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	394.9047	288.3575	244.0493	144.4447	61.2825	0.0000	0.0000	0.0000	0.0000	107.4894	227.5744	364.9552	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1833.0580	
Space heating per m2											(98c) / (4) =	35.8439	(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 %)													274.6574 (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	394.9047	288.3575	244.0493	144.4447	61.2825	0.0000	0.0000	0.0000	0.0000	107.4894	227.5744	364.9552	(98)
Space heating efficiency (main heating system 1)	274.6574	274.6574	274.6574	274.6574	274.6574	0.0000	0.0000	0.0000	0.0000	274.6574	274.6574	274.6574	(210)
Space heating fuel (main heating system)	143.7808	104.9881	88.8559	52.5909	22.3124	0.0000	0.0000	0.0000	0.0000	39.1358	82.8576	132.8765	(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	253.1313	224.8509	240.9527	216.3411	212.8724	164.6376	163.3232	169.0135	170.0101	219.6481	228.7109	250.9143	(64)
Efficiency of water heater	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	190.9777	(216)
Fuel for water heating, kWh/month	132.5449	117.7367	126.1680	113.2808	111.4645	86.2078	85.5195	88.4990	89.0209	115.0124	119.7579	131.3841	(217)
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	21.1632	16.9779	15.2867	11.1997	8.6510	7.0679	7.8917	10.2579	13.3241	17.4819	19.7458	21.7514	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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													667.3980 (211)
Space heating fuel - main system 2													0.0000 (213)
Space heating fuel - secondary													0.0000 (215)
Efficiency of water heater													190.9777
Water heating fuel used													1316.5964 (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)													170.7992 (232)

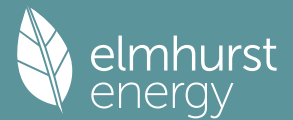
Energy saving/generation technologies (Appendices M ,N and Q)

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													2154.7936 (238)

10a. Fuel costs - using BEDF prices (593)

	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	667.3980	184.6690 (240)
Total CO2 associated with community systems		0.0000 (473)

Full SAP Calculation Printout



Water heating (other fuel)	1316.5964	27.6700	364.3022 (247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000 (247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (249)
Energy for lighting	170.7992	27.6700	47.2601 (250)
Additional standing charges			0.0000 (251)
Total energy cost			596.2314 (255)

----- 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	667.3980	0.1555	103.7879 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1316.5964	0.1416	186.4096 (264)
Space and water heating			290.1975 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	170.7992	0.1443	24.6516 (268)
Total CO2, kg/year			314.8491 (272)

----- 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	667.3980	1.5757	1051.6378 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1316.5964	1.5236	2005.9400 (278)
Space and water heating			3057.5778 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	170.7992	1.5338	261.9775 (282)
Total Primary energy kWh/year			3319.5554 (286)