

Full SAP Calculation Printout



Plot Reference	Flat 2			Issued on Date	12/05/2026
Assessment Reference	001	Plot Type Ref	3688		
Plot Address	Flat 2, 102 Mannock Road, Tottenham, N22 6AA			SAP Version	10.2
SAP Rating	80 C	DER	21.27	TER	
Environmental	82 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.57	DFEE	70.24	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	117.93	TPER	
Assessor Details	Mr. Nick Gill			Assessor ID	AW10-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	2.3000 (1b)	x 2.6700 (2b)	= 6.1410 (1b) - (3b)
First floor	66.5000 (1c)	x 2.5000 (2c)	= 166.2500 (1c) - (3c)
Second floor	21.6000 (1d)	x 2.3000 (2d)	= 49.6800 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	222.0710 (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	3 * 10 = 30.0000 (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) =	30.0000 / (5) = 0.1351 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8851 (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) = 0.8187 (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	1.0439	1.0234	1.0029	0.9006	0.8801	0.7778	0.7778	0.7573	0.8187	0.8801	0.9210	0.9620 (22b)
Effective ac	1.0439	1.0234	1.0029	0.9055	0.8873	0.8025	0.8025	0.7868	0.8351	0.8873	0.9242	0.9627 (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							
Door			2.0600	1.4000	2.8840		(26)
Window			16.8800	1.3258	22.3788		(27)
Roof window			2.3000	1.2357	2.8422		(27a)
Ground floor			2.3000	0.2500	0.5750		(28a)
Existing walls	67.6000	18.9400	48.6600	0.2900	14.1114		(29a)
Flat roof	15.3600		15.3600	0.1400	2.1504		(30)
Pitched roof	56.2500	2.3000	53.9500	0.3100	16.7245		(30)
Total net area of external elements Aum(A, m ²)			141.5100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	61.6663	(33)
Main dwelling							
Party wall			45.9000	0.0000	0.0000		(32)
Party Floor 1			66.5000				(32a)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							28.3020 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	89.9683 (37)

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Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 76.4973	Feb 74.9973	Mar 73.4974	Apr 66.3598	May 65.0244	Jun 58.8075	Jul 58.8075	Aug 57.6562	Sep 61.2021	Oct 65.0244	Nov 67.7260	Dec 70.5505 (38)
Heat transfer coeff	166.4656	164.9656	163.4657	156.3281	154.9927	148.7758	148.7758	147.6245	151.1704	154.9927	157.6943	160.5188 (39)
Average = Sum(39)m / 12 =												156.3142

HLP	Jan 1.8414	Feb 1.8248	Mar 1.8082	Apr 1.7293	May 1.7145	Jun 1.6457	Jul 1.6457	Aug 1.6330	Sep 1.6722	Oct 1.7145	Nov 1.7444	Dec 1.7756 (40)
HLP (average)												1.7291
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6312 (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	78.8094	77.6390	75.9908	72.9518	70.6762	68.1529	66.7900	68.4267	70.2087	72.9087	76.0103	78.5430 (42b)
Hot water usage for other uses	41.5757	40.0638	38.5520	37.0401	35.5283	34.0165	34.0165	35.5283	37.0401	38.5520	40.0638	41.5757 (42c)
Average daily hot water use (litres/day)												110.8648 (43)
Daily hot water use	120.3851	117.7028	114.5427	109.9919	106.2045	102.1694	100.8065	103.9550	107.2489	111.4607	116.0741	120.1186 (44)
Energy conte	190.6605	167.6072	176.0479	150.5734	142.9716	125.6292	121.9167	128.7180	132.2486	151.2511	165.3688	188.0768 (45)
Energy content (annual)										Total = Sum(45)m =		1841.0698
Distribution loss (46)m = 0.15 x (45)m	28.5991	25.1411	26.4072	22.5860	21.4457	18.8444	18.2875	19.3077	19.8373	22.6877	24.8053	28.2115 (46)
Water storage loss (or HIU 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												
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 (57)
Combi loss	29.3789	26.5300	29.3485	28.3358	29.2397	28.2529	29.1622	29.1826	28.2641	29.2541	28.3723	29.3696 (61)
Total heat required for water heating calculated for each month	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463 (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	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2185.7605 (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)
Heat gains from water heating, kWh/month	70.7394	62.3619	65.8731	57.1496	54.8480	48.8349	47.8278	50.0944	51.0387	57.6045	62.0782	69.8779 (65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)												

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	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	121.0529	134.0229	121.0529	125.0880	121.0529	125.0880	121.0529	121.0529	125.0880	121.0529	125.0880	121.0529 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	239.8117	242.3002	236.0293	222.6792	205.8272	189.9886	179.4075	176.9190	183.1899	196.5400	213.3920	229.2306 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462 (71)
Water heating gains (Table 5)	95.0798	92.8004	88.5391	79.3745	73.7204	67.8263	64.2847	67.3311	70.8871	77.4254	86.2197	93.9219 (72)
Total internal gains	521.4117	534.5908	511.0886	492.6090	466.0678	445.3702	427.2124	427.7704	441.6323	460.4856	490.1671	509.6728 (73)

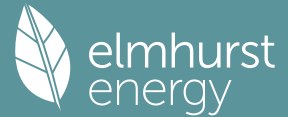
6. Solar gains

[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
Northeast				10.5600	11.2829		0.6300		0.7000		0.7700		36.4131 (75)
Southeast				0.6100	36.7938		0.6300		0.7000		0.7700		6.8593 (77)
South				4.6300	46.7521		0.6300		0.7000		0.7700		66.1536 (78)
Northwest				1.0800	11.2829		0.6300		0.7000		0.7700		3.7241 (81)
Northeast				0.9200	16.8560		0.6300		0.7000		1.0000		6.1549 (82)
East				0.4600	26.2379		0.6300		0.7000		1.0000		4.7904 (82)
Southeast				0.4600	39.2172		0.6300		0.7000		1.0000		7.1600 (82)
West				0.4600	26.2379		0.6300		0.7000		1.0000		4.7904 (82)
Solar gains	136.0458	247.0178	378.3687	536.1832	661.8190	683.9106	648.1823	550.3855	432.4012	283.9166	165.7393	114.6202	(83)
Total gains	657.4575	781.6087	889.4573	1028.7922	1127.8868	1129.2808	1075.3947	978.1559	874.0335	744.4022	655.9064	624.2930	(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)												
tau	Jan 37.7122	Feb 38.0551	Mar 38.4043	Apr 40.1577	May 40.5037	Jun 42.1962	Jul 42.1962	Aug 42.5253	Sep 41.5278	Oct 40.5037	Nov 39.8098	Dec 39.1093
alpha	3.5141	3.5370	3.5603	3.6772	3.7002	3.8131	3.8131	3.8350	3.7685	3.7002	3.6540	3.6073

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util living area	0.9952	0.9906	0.9807	0.9484	0.8717	0.7200	0.5692	0.6310	0.8539	0.9683	0.9914	0.9961 (86)
MIT	18.7613	19.0130	19.4139	20.0176	20.5073	20.8487	20.9538	20.9326	20.6787	20.0418	19.3505	18.7913 (87)
Th 2	19.4411	19.4527	19.4642	19.5199	19.5304	19.5800	19.5800	19.5892	19.5608	19.5304	19.5092	19.4871 (88)
util rest of house												
MIT 2	0.9934	0.9872	0.9731	0.9267	0.8151	0.6040	0.4039	0.4657	0.7672	0.9508	0.9877	0.9946 (89)
Living area fraction	16.9176	17.2451	17.7609	18.5471	19.1244	19.4979	19.5674	19.5679	19.3454	18.5972	17.7119	16.9834 (90)
MIT	17.3459	17.6558	18.1449	18.8887	19.4456	19.8117	19.8894	19.8849	19.6551	18.9328	18.0926	0.2323 (91)
Temperature adjustment												17.4034 (92)
adjusted MIT	17.1959	17.5058	17.9949	18.7387	19.2956	19.6617	19.7394	19.7349	19.5051	18.7828	17.9426	-0.1500
												17.2534 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9891	0.9802	0.9620	0.9110	0.8038	0.6116	0.4239	0.4847	0.7629	0.9374	0.9812	0.9911	(94)
Useful gains	650.2927	766.1102	855.6648	937.1850	906.5693	690.6664	455.8838	474.0850	666.7892	697.7802	643.5667	618.7151	(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	2146.7173	2079.5251	1879.0149	1538.0694	1177.2652	753.0536	467.0740	492.3186	817.0985	1268.2703	1709.8087	2095.3134	(97)
Space heating kWh	1113.3399	882.6148	761.3725	432.6368	201.3977	0.0000	0.0000	0.0000	0.0000	424.4446	767.6942	1098.5892	(98a)
Space heating requirement - total per year (kWh/year)												5682.0898	
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	1113.3399	882.6148	761.3725	432.6368	201.3977	0.0000	0.0000	0.0000	0.0000	424.4446	767.6942	1098.5892	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5682.0898	
Space heating per m2										(98c) / (4) =		62.8550	(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 %)	88.7000	(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	1113.3399	882.6148	761.3725	432.6368	201.3977	0.0000	0.0000	0.0000	0.0000	424.4446	767.6942	1098.5892	(98)
Space heating efficiency (main heating system 1)	88.7000	88.7000	88.7000	88.7000	88.7000	0.0000	0.0000	0.0000	0.0000	88.7000	88.7000	88.7000	(210)
Space heating fuel (main heating system)	1255.1746	995.0561	858.3681	487.7529	227.0549	0.0000	0.0000	0.0000	0.0000	478.5171	865.4952	1238.5447	(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	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463	(64)
Efficiency of water heater (217)m	88.6171	88.6094	88.5933	88.5531	88.4688	88.2000	88.2000	88.2000	88.2000	88.5502	88.5988	88.6170	(216)
Fuel for water heating, kWh/month	248.3036	219.0931	231.8419	202.0360	194.6577	174.4695	171.2912	179.0256	181.9872	203.8450	218.6725	245.3777	(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	40.4326	32.4365	29.2055	21.3972	16.5278	13.5034	15.0772	19.5979	25.4558	33.3993	37.7245	41.5563	(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												6405.9637	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												88.2000	
Water heating fuel used												2470.6010	(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)												326.3139	(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												9288.8786	(238)

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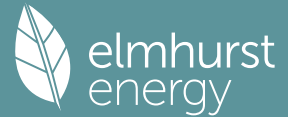
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	6405.9637	0.2100	1345.2524 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2470.6010	0.2100	518.8262 (264)
Space and water heating			1864.0786 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	326.3139	0.1443	47.0972 (268)
Total CO2, kg/year			1923.1050 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			21.2700 (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	6405.9637	1.1300	7238.7390 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2470.6010	1.1300	2791.7791 (278)
Space and water heating			10030.5181 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	326.3139	1.5338	500.5112 (282)
Total Primary energy kWh/year			10661.1300 (286)
Dwelling Primary energy Rate (DPER)			117.9300 (287)

Full SAP Calculation Printout



Plot Reference	Flat 2			Issued on Date	12/05/2026
Assessment Reference	001	Plot Type Ref	3688		
Plot Address	Flat 2, 102 Mannock Road, Tottenham, N22 6AA			SAP Version	10.2
SAP Rating	80 C	DER	21.27	TER	
Environmental	82 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.57	DFEE	70.24	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	117.93	TPER	
Assessor Details	Mr. Nick Gill			Assessor ID	AW10-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	2.3000 (1b)	x 2.6700 (2b)	= 6.1410 (1b) - (3b)
First floor	66.5000 (1c)	x 2.5000 (2c)	= 166.2500 (1c) - (3c)
Second floor	21.6000 (1d)	x 2.3000 (2d)	= 49.6800 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	222.0710 (5)

2. Ventilation rate

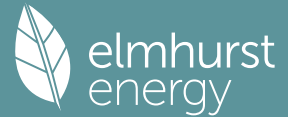
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (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) =	30.0000 / (5) = 0.1351 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8851 (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) = 0.8187 (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	1.0439	1.0234	1.0029	0.9006	0.8801	0.7778	0.7778	0.7573	0.8187	0.8801	0.9210	0.9620 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	1.0439	1.0234	1.0029	0.9055	0.8873	0.8025	0.8025	0.7868	0.8351	0.8873	0.9242	0.9627 (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							
Door			2.0600	1.4000	2.8840		(26)
Window			16.8800	1.3258	22.3788		(27)
Roof window			2.3000	1.2357	2.8422		(27a)
Ground floor			2.3000	0.2500	0.5750		(28a)
Existing walls	67.6000	18.9400	48.6600	0.2900	14.1114		(29a)
Flat roof	15.3600		15.3600	0.1400	2.1504		(30)
Pitched roof	56.2500	2.3000	53.9500	0.3100	16.7245		(30)
Total net area of external elements Aum, (m ²)			141.5100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	61.6663		(33)
Main dwelling							
Party wall			45.9000	0.0000	0.0000		(32)
Party Floor 1			66.5000				(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							28.3020 (36)
Point Thermal bridges						(36a) =	0.0000

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Total fabric heat loss (33) + (36) + (36a) = 89.9683 (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	76.4973	74.9973	73.4974	66.3598	65.0244	58.8075	58.8075	57.6562	61.2021	65.0244	67.7260	70.5505
Heat transfer coeff	166.4656	164.9656	163.4657	156.3281	154.9927	148.7758	148.7758	147.6245	151.1704	154.9927	157.6943	160.5188
Average = Sum(39)m / 12 =												156.3142

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.8414	1.8248	1.8082	1.7293	1.7145	1.6457	1.6457	1.6330	1.6722	1.7145	1.7444	1.7756
HLP (average)												1.7291
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6312 (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 29.5098 29.0715 28.4543 27.3164 26.4643 25.5195 25.0092 25.6220 26.2893 27.3003 28.4616 29.4100 (42b)

Hot water usage for other uses 41.5757 40.0638 38.5520 37.0401 35.5283 34.0165 34.0165 35.5283 37.0401 38.5520 40.0638 41.5757 (42c)

Average daily hot water use (litres/day) 65.1563 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	71.0854	69.1353	67.0063	64.3565	61.9926	59.5360	59.0256	61.1503	63.3294	65.8523	68.5255	70.9857
Energy conte	112.5820	98.4478	102.9862	88.1009	83.4540	73.2064	71.3864	75.7169	78.0915	89.3609	97.6271	111.1464
Energy content (annual)												
Distribution loss (46)m = 0.15 x (45)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
Water storage loss (or HIU 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
If cylinder contains dedicated solar storage												
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
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
Total heat required for water heating calculated for each month												
WWHRS	95.6947	83.6806	87.5383	74.8858	70.9359	62.2255	60.6784	64.3593	66.3778	75.9568	82.9830	94.4744
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
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
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
Output from w/h												
12Total per year (kWh/year)												
Electric shower(s)	54.7254	48.7608	53.2449	50.8110	51.7644	49.3782	51.0242	51.7644	50.8110	53.2449	52.2437	54.7254
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												622.4985
Heat gains from water heating, kWh/month												
	37.6050	33.1104	35.1958	31.4242	30.6751	27.9009	27.9257	29.0309	29.2972	32.3004	33.8067	37.3000

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	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
121.0529	134.0229	121.0529	125.0880	121.0529	125.0880	121.0529	125.0880	121.0529	125.0880	121.0529	125.0880	121.0529
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
239.8117	242.3002	236.0293	222.6792	205.8272	189.9886	179.4075	176.9190	183.1899	196.5400	213.3920	229.2306	229.2306
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558
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
Losses e.g. evaporation (negative values) (Table 5)												
-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462
Water heating gains (Table 5)												
50.5444	49.2714	47.3062	43.6447	41.2299	38.7513	37.5345	39.0201	40.6905	43.4145	46.9537	50.1344	50.1344
Total internal gains	473.8763	488.0618	466.8557	453.8793	430.5773	416.2952	400.4622	399.4593	411.4358	423.4748	447.9011	462.8852

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
Northeast	10.5600	11.2829	0.6300	0.7000	0.7700	36.4131 (75)
Southeast	0.6100	36.7938	0.6300	0.7000	0.7700	6.8593 (77)
South	4.6300	46.7521	0.6300	0.7000	0.7700	66.1536 (78)
Northwest	1.0800	11.2829	0.6300	0.7000	0.7700	3.7241 (81)
Northeast	0.9200	16.8560	0.6300	0.7000	1.0000	6.1549 (82)
East	0.4600	26.2379	0.6300	0.7000	1.0000	4.7904 (82)
Southeast	0.4600	39.2172	0.6300	0.7000	1.0000	7.1600 (82)
West	0.4600	26.2379	0.6300	0.7000	1.0000	4.7904 (82)
Solar gains	136.0458	247.0178	378.3687	536.1832	661.8190	683.9106
Total gains	609.9221	735.0796	845.2244	990.0624	1092.3963	1100.2058

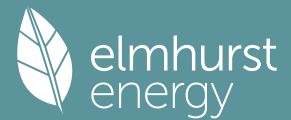
7. Mean internal temperature (heating season)

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

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tau	37.7122	38.0551	38.4043	40.1577	40.5037	42.1962	42.1962	42.5253	41.5278	40.5037	39.8098	39.1093
alpha	3.5141	3.5370	3.5603	3.6772	3.7002	3.8131	3.8131	3.8350	3.7685	3.7002	3.6540	3.6073
util living area	0.9962	0.9923	0.9835	0.9537	0.8808	0.7315	0.5809	0.6448	0.8649	0.9728	0.9931	0.9970 (86)
MIT	18.7121	18.9656	19.3704	19.9838	20.4847	20.8398	20.9505	20.9274	20.6608	20.0067	19.3067	18.7422 (87)
Th 2	19.4411	19.4527	19.4642	19.5199	19.5304	19.5800	19.5800	19.5892	19.5608	19.5304	19.5092	19.4871 (88)
util rest of house	0.9948	0.9894	0.9769	0.9338	0.8266	0.6162	0.4135	0.4781	0.7815	0.9574	0.9900	0.9959 (89)
MIT 2	17.4257	17.6855	18.0946	18.7308	19.1964	19.5115	19.5693	19.5711	19.3810	18.7704	18.0654	17.4872 (90)
Living area fraction	17.7245	17.9829	18.3909	19.0219	19.4957	19.8200	19.8902	19.8861	19.6783	19.0576	18.3538	17.7787 (92)
MIT	17.7245	17.9829	18.3909	19.0219	19.4957	19.8200	19.8902	19.8861	19.6783	19.0576	18.3538	17.7787 (93)
Temperature adjustment												0.0000
adjusted MIT	17.7245	17.9829	18.3909	19.0219	19.4957	19.8200	19.8902	19.8861	19.6783	19.0576	18.3538	17.7787 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9924	0.9853	0.9702	0.9249	0.8250	0.6382	0.4528	0.5169	0.7900	0.9503	0.9864	0.9939 (94)
Useful gains	605.2845	724.2578	820.0279	915.6816	901.2424	702.1658	474.8373	490.9325	666.6555	672.2296	605.2935	573.9733 (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	2234.7184	2158.2271	1943.7611	1582.3316	1208.2688	776.6153	489.5008	514.6406	843.2766	1310.8593	1774.6588	2179.6381 (97)
Space heating kWh	1212.2988	963.6273	836.0575	479.9880	228.4277	0.0000	0.0000	0.0000	0.0000	475.1405	841.9430	1194.6146 (98a)
Space heating requirement - total per year (kWh/year)												6232.0974
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	1212.2988	963.6273	836.0575	479.9880	228.4277	0.0000	0.0000	0.0000	0.0000	475.1405	841.9430	1194.6146 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6232.0974
Space heating per m2										(98c) / (4) =		68.9391 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	1398.4925	1100.9409	1121.9464	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7320	0.8108	0.7646	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1023.6326	892.6498	857.8876	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1211.4757	1155.0780	1046.3444	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	135.2471	195.2465	140.2119	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	33.8118	48.8116	35.0530	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												117.6764 (107)
Energy for space heating												68.9391 (99)
Energy for space cooling												1.3017 (108)
Total												70.2409 (109)
Fabric Energy Efficiency (DFEE)												70.2 (109)

Full SAP Calculation Printout



Plot Reference	Flat 2			Issued on Date	12/05/2026
Assessment Reference	001	Plot Type Ref	3688		
Plot Address	Flat 2, 102 Mannock Road, Tottenham, N22 6AA			SAP Version	10.2
SAP Rating	80 C	DER	21.27	TER	
Environmental	82 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.57	DFEE	70.24	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	117.93	TPER	
Assessor Details	Mr. Nick Gill			Assessor ID	AW10-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	2.3000 (1b)	x 2.6700 (2b)	= 6.1410 (1b) - (3b)
First floor	66.5000 (1c)	x 2.5000 (2c)	= 166.2500 (1c) - (3c)
Second floor	21.6000 (1d)	x 2.3000 (2d)	= 49.6800 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 222.0710 (5)

2. Ventilation rate

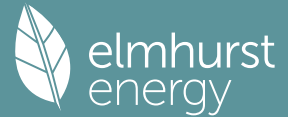
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (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)	30.0000 / (5) = 0.1351 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8851 (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) = 0.8187 (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	1.0439	1.0234	1.0029	0.9006	0.8801	0.7778	0.7778	0.7573	0.8187	0.8801	0.9210	0.9620 (22b)
Effective ac	1.0439	1.0234	1.0029	0.9055	0.8873	0.8025	0.8025	0.7868	0.8351	0.8873	0.9242	0.9627 (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							
Door			2.0600	1.4000	2.8840		(26)
Window			16.8800	1.3258	22.3788		(27)
Roof window			2.3000	1.2357	2.8422		(27a)
Ground floor			2.3000	0.2500	0.5750		(28a)
Existing walls	67.6000	18.9400	48.6600	0.2900	14.1114		(29a)
Flat roof	15.3600		15.3600	0.1400	2.1504		(30)
Pitched roof	56.2500	2.3000	53.9500	0.3100	16.7245		(30)
Total net area of external elements Aum(A, m ²)			141.5100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	61.6663	(33)
Main dwelling							
Party wall			45.9000	0.0000	0.0000		(32)
Party Floor 1			66.5000				(32a)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							28.3020 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	89.9683 (37)

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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	76.4973	74.9973	73.4974	66.3598	65.0244	58.8075	58.8075	57.6562	61.2021	65.0244	67.7260	70.5505	(38)
Heat transfer coeff	166.4656	164.9656	163.4657	156.3281	154.9927	148.7758	148.7758	147.6245	151.1704	154.9927	157.6943	160.5188	(39)
Average = Sum(39)m / 12 =												156.3142	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8414	1.8248	1.8082	1.7293	1.7145	1.6457	1.6457	1.6330	1.6722	1.7145	1.7444	1.7756	(40)
HLP (average)												1.7291	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6312 (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	78.8094	77.6390	75.9908	72.9518	70.6762	68.1529	66.7900	68.4267	70.2087	72.9087	76.0103	78.5430	(42b)
Hot water usage for other uses	41.5757	40.0638	38.5520	37.0401	35.5283	34.0165	34.0165	35.5283	37.0401	38.5520	40.0638	41.5757	(42c)
Average daily hot water use (litres/day)												110.8648	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	120.3851	117.7028	114.5427	109.9919	106.2045	102.1694	100.8065	103.9550	107.2489	111.4607	116.0741	120.1186	(44)
Energy conte	190.6605	167.6072	176.0479	150.5734	142.9716	125.6292	121.9167	128.7180	132.2486	151.2511	165.3688	188.0768	(45)
Energy content (annual)										Total = Sum(45)m =		1841.0698	
Distribution loss (46)m = 0.15 x (45)m	28.5991	25.1411	26.4072	22.5860	21.4457	18.8444	18.2875	19.3077	19.8373	22.6877	24.8053	28.2115	(46)
Water storage loss (or HIU 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													
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	(57)
Combi loss	29.3789	26.5300	29.3485	28.3358	29.2397	28.2529	29.1622	29.1826	28.2641	29.2541	28.3723	29.3696	(61)
Total heat required for water heating calculated for each month													
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	(62)
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	(63a)
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	(63b)
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	(63c)
Output from w/h	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2185.7605	(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)
Heat gains from water heating, kWh/month	70.7394	62.3619	65.8731	57.1496	54.8480	48.8349	47.8278	50.0944	51.0387	57.6045	62.0782	69.8779	(65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	131.5578	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	121.0529	134.0229	121.0529	125.0880	121.0529	125.0880	121.0529	121.0529	125.0880	121.0529	125.0880	121.0529	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	239.8117	242.3002	236.0293	222.6792	205.8272	189.9886	179.4075	176.9190	183.1899	196.5400	213.3920	229.2306	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	36.1558	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	(71)
Water heating gains (Table 5)	95.0798	92.8004	88.5391	79.3745	73.7204	67.8263	64.2847	67.3311	70.8871	77.4254	86.2197	93.9219	(72)
Total internal gains	521.4117	534.5908	511.0886	492.6090	466.0678	445.3702	427.2124	427.7704	441.6323	460.4856	490.1671	509.6728	(73)

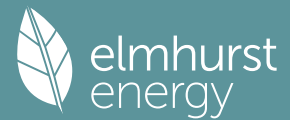
6. Solar gains

[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
Northeast				10.5600	11.2829		0.6300		0.7000		0.7700		36.4131 (75)
Southeast				0.6100	36.7938		0.6300		0.7000		0.7700		6.8593 (77)
South				4.6300	46.7521		0.6300		0.7000		0.7700		66.1536 (78)
Northwest				1.0800	11.2829		0.6300		0.7000		0.7700		3.7241 (81)
Northeast				0.9200	16.8560		0.6300		0.7000		1.0000		6.1549 (82)
East				0.4600	26.2379		0.6300		0.7000		1.0000		4.7904 (82)
Southeast				0.4600	39.2172		0.6300		0.7000		1.0000		7.1600 (82)
West				0.4600	26.2379		0.6300		0.7000		1.0000		4.7904 (82)
Solar gains	136.0458	247.0178	378.3687	536.1832	661.8190	683.9106	648.1823	550.3855	432.4012	283.9166	165.7393	114.6202	(83)
Total gains	657.4575	781.6087	889.4573	1028.7922	1127.8868	1129.2808	1075.3947	978.1559	874.0335	744.4022	655.9064	624.2930	(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	37.7122	38.0551	38.4043	40.1577	40.5037	42.1962	42.1962	42.5253	41.5278	40.5037	39.8098	39.1093	
alpha	3.5141	3.5370	3.5603	3.6772	3.7002	3.8131	3.8131	3.8350	3.7685	3.7002	3.6540	3.6073	

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util living area	0.9952	0.9906	0.9807	0.9484	0.8717	0.7200	0.5692	0.6310	0.8539	0.9683	0.9914	0.9961 (86)
MIT	18.7613	19.0130	19.4139	20.0176	20.5073	20.8487	20.9538	20.9326	20.6787	20.0418	19.3505	18.7913 (87)
Th 2	19.4411	19.4527	19.4642	19.5199	19.5304	19.5800	19.5800	19.5892	19.5608	19.5304	19.5092	19.4871 (88)
util rest of house												
MIT 2	0.9934	0.9872	0.9731	0.9267	0.8151	0.6040	0.4039	0.4657	0.7672	0.9508	0.9877	0.9946 (89)
Living area fraction	16.9176	17.2451	17.7609	18.5471	19.1244	19.4979	19.5674	19.5679	19.3454	18.5972	17.7119	16.9834 (90)
MIT	17.3459	17.6558	18.1449	18.8887	19.4456	19.8117	19.8894	19.8849	19.6551	18.9328	18.0926	0.2323 (91)
Temperature adjustment												17.4034 (92)
adjusted MIT	17.1959	17.5058	17.9949	18.7387	19.2956	19.6617	19.7394	19.7349	19.5051	18.7828	17.9426	-0.1500
												17.2534 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9891	0.9802	0.9620	0.9110	0.8038	0.6116	0.4239	0.4847	0.7629	0.9374	0.9812	0.9911	(94)
Useful gains	650.2927	766.1102	855.6648	937.1850	906.5693	690.6664	455.8838	474.0850	666.7892	697.7802	643.5667	618.7151	(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													
	2146.7173	2079.5251	1879.0149	1538.0694	1177.2652	753.0536	467.0740	492.3186	817.0985	1268.2703	1709.8087	2095.3134	(97)
Space heating kWh	1113.3399	882.6148	761.3725	432.6368	201.3977	0.0000	0.0000	0.0000	0.0000	424.4446	767.6942	1098.5892	(98a)
Space heating requirement - total per year (kWh/year)												5682.0898	
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	1113.3399	882.6148	761.3725	432.6368	201.3977	0.0000	0.0000	0.0000	0.0000	424.4446	767.6942	1098.5892	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5682.0898	
Space heating per m2											(98c) / (4) =	62.8550	(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 %)													88.7000 (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	1113.3399	882.6148	761.3725	432.6368	201.3977	0.0000	0.0000	0.0000	0.0000	424.4446	767.6942	1098.5892	(98)
Space heating efficiency (main heating system 1)	88.7000	88.7000	88.7000	88.7000	88.7000	0.0000	0.0000	0.0000	0.0000	88.7000	88.7000	88.7000	(210)
Space heating fuel (main heating system)	1255.1746	995.0561	858.3681	487.7529	227.0549	0.0000	0.0000	0.0000	0.0000	478.5171	865.4952	1238.5447	(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	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463	(64)
Efficiency of water heater (217)m	88.6171	88.6094	88.5933	88.5531	88.4688	88.2000	88.2000	88.2000	88.2000	88.5502	88.5988	88.6170	(216)
Fuel for water heating, kWh/month	248.3036	219.0931	231.8419	202.0360	194.6577	174.4695	171.2912	179.0256	181.9872	203.8450	218.6725	245.3777	(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	40.4326	32.4365	29.2055	21.3972	16.5278	13.5034	15.0772	19.5979	25.4558	33.3993	37.7245	41.5563	(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												6405.9637	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												88.2000	
Water heating fuel used												2470.6010	(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)												326.3139	(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												9288.8786	(238)

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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	6405.9637	0.2100	1345.2524 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2470.6010	0.2100	518.8262 (264)
Space and water heating			1864.0786 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	326.3139	0.1443	47.0972 (268)
Total CO2, kg/year			1923.1050 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			21.2700 (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	6405.9637	1.1300	7238.7390 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2470.6010	1.1300	2791.7791 (278)
Space and water heating			10030.5181 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	326.3139	1.5338	500.5112 (282)
Total Primary energy kWh/year			10661.1300 (286)
Dwelling Primary energy Rate (DPER)			117.9300 (287)

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Plot Reference	Flat 2			Issued on Date	12/05/2026
Assessment Reference	001	Plot Type Ref	3688		
Plot Address	Flat 2, 102 Mannock Road, Tottenham, N22 6AA			SAP Version	10.2
SAP Rating	80 C	DER	21.27	TER	
Environmental	82 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.57	DFEE	70.24	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	117.93	TPER	
Assessor Details	Mr. Nick Gill			Assessor ID	AW10-0001
Client					

SAP 10 WORKSHEET FOR Conversion (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	2.3000 (1b)	x 2.6700 (2b)	= 6.1410 (1b) - (3b)
First floor	66.5000 (1c)	x 2.5000 (2c)	= 166.2500 (1c) - (3c)
Second floor	21.6000 (1d)	x 2.3000 (2d)	= 49.6800 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 222.0710 (5)

2. Ventilation rate

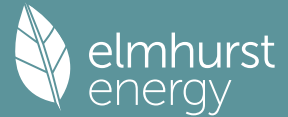
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (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) =	30.0000 / (5) = 0.1351 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8851 (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) = 0.8187 (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	1.0439	1.0234	1.0029	0.9006	0.8801	0.7778	0.7778	0.7573	0.8187	0.8801	0.9210	0.9620 (22b)
Effective ac	1.0439	1.0234	1.0029	0.9055	0.8873	0.8025	0.8025	0.7868	0.8351	0.8873	0.9242	0.9627 (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							
Door			2.0600	1.4000	2.8840		(26)
Window			16.8800	1.3258	22.3788		(27)
Roof window			2.3000	1.2357	2.8422		(27a)
Ground floor			2.3000	0.2500	0.5750		(28a)
Existing walls	67.6000	18.9400	48.6600	0.2900	14.1114		(29a)
Flat roof	15.3600		15.3600	0.1400	2.1504		(30)
Pitched roof	56.2500	2.3000	53.9500	0.3100	16.7245		(30)
Total net area of external elements Aum(A, m ²)			141.5100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	61.6663		(33)
Main dwelling							
Party wall			45.9000	0.0000	0.0000		(32)
Party Floor 1			66.5000				(32a)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							28.3020 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	89.9683 (37)

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Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 76.4973	Feb 74.9973	Mar 73.4974	Apr 66.3598	May 65.0244	Jun 58.8075	Jul 58.8075	Aug 57.6562	Sep 61.2021	Oct 65.0244	Nov 67.7260	Dec 70.5505 (38)
Heat transfer coeff	166.4656	164.9656	163.4657	156.3281	154.9927	148.7758	148.7758	147.6245	151.1704	154.9927	157.6943	160.5188 (39)
Average = Sum(39)m / 12 =												156.3142

HLP	Jan 1.8414	Feb 1.8248	Mar 1.8082	Apr 1.7293	May 1.7145	Jun 1.6457	Jul 1.6457	Aug 1.6330	Sep 1.6722	Oct 1.7145	Nov 1.7444	Dec 1.7756 (40)
HLP (average)												1.7291
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6312 (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	78.8094	77.6390	75.9908	72.9518	70.6762	68.1529	66.7900	68.4267	70.2087	72.9087	76.0103	78.5430 (42b)
Hot water usage for other uses	41.5757	40.0638	38.5520	37.0401	35.5283	34.0165	34.0165	35.5283	37.0401	38.5520	40.0638	41.5757 (42c)
Average daily hot water use (litres/day)												110.8648 (43)
Daily hot water use	120.3851	117.7028	114.5427	109.9919	106.2045	102.1694	100.8065	103.9550	107.2489	111.4607	116.0741	120.1186 (44)
Energy conte	190.6605	167.6072	176.0479	150.5734	142.9716	125.6292	121.9167	128.7180	132.2486	151.2511	165.3688	188.0768 (45)
Energy content (annual)										Total = Sum(45)m =		1841.0698
Distribution loss (46)m = 0.15 x (45)m	28.5991	25.1411	26.4072	22.5860	21.4457	18.8444	18.2875	19.3077	19.8373	22.6877	24.8053	28.2115 (46)
Water storage loss (or HIU 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	29.3789	26.5300	29.3485	28.3358	29.2397	28.2529	29.1622	29.1826	28.2641	29.2541	28.3723	29.3696 (61)
Total heat required for water heating calculated for each month	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463 (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	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463 (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)
Heat gains from water heating, kWh/month	70.7394	62.3619	65.8731	57.1496	54.8480	48.8349	47.8278	50.0944	51.0387	57.6045	62.0782	69.8779 (65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												

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

Metabolic gains (Table 5), Watts												
(66)m	Jan 157.8694	Feb 157.8694	Mar 157.8694	Apr 157.8694	May 157.8694	Jun 157.8694	Jul 157.8694	Aug 157.8694	Sep 157.8694	Oct 157.8694	Nov 157.8694	Dec 157.8694 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	46.1931	41.0283	33.3665	25.2606	18.8826	15.9415	17.2253	22.3901	30.0520	38.1579	44.5359	47.4770 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	357.9279	361.6421	352.2825	332.3570	307.2047	283.5651	267.7724	264.0582	273.4178	293.3432	318.4956	342.1352 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181 (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)	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462 (71)
Water heating gains (Table 5)	95.0798	92.8004	88.5391	79.3745	73.7204	67.8263	64.2847	67.3311	70.8871	77.4254	86.2197	93.9219 (72)
Total internal gains	608.2420	604.5121	583.2292	546.0333	508.8489	473.3740	455.3236	459.8206	480.3980	517.9677	558.2924	592.5753 (73)

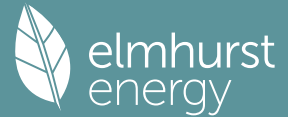
6. Solar gains

[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
Northeast				10.5600	11.2829		0.6300		0.7000		0.7700		36.4131 (75)
Southeast				0.6100	36.7938		0.6300		0.7000		0.7700		6.8593 (77)
South				4.6300	46.7521		0.6300		0.7000		0.7700		66.1536 (78)
Northwest				1.0800	11.2829		0.6300		0.7000		0.7700		3.7241 (81)
Northeast				0.9200	16.8560		0.6300		0.7000		1.0000		6.1549 (82)
East				0.4600	26.2379		0.6300		0.7000		1.0000		4.7904 (82)
Southeast				0.4600	39.2172		0.6300		0.7000		1.0000		7.1600 (82)
West				0.4600	26.2379		0.6300		0.7000		1.0000		4.7904 (82)
Solar gains	136.0458	247.0178	378.3687	536.1832	661.8190	683.9106	648.1823	550.3855	432.4012	283.9166	165.7393	114.6202	(83)
Total gains	744.2878	851.5299	961.5980	1082.2164	1170.6679	1157.2846	1103.5059	1010.2061	912.7992	801.8843	724.0317	707.1956	(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)												
tau	Jan 37.7122	Feb 38.0551	Mar 38.4043	Apr 40.1577	May 40.5037	Jun 42.1962	Jul 42.1962	Aug 42.5253	Sep 41.5278	Oct 40.5037	Nov 39.8098	Dec 39.1093
alpha	3.5141	3.5370	3.5603	3.6772	3.7002	3.8131	3.8131	3.8350	3.7685	3.7002	3.6540	3.6073
util living area												

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	0.9928	0.9878	0.9757	0.9408	0.8606	0.7090	0.5574	0.6159	0.8395	0.9606	0.9882	0.9941 (86)
MIT	18.8505	19.0835	19.4837	20.0631	20.5334	20.8568	20.9570	20.9380	20.7003	20.0950	19.4203	18.8777 (87)
Th 2	19.4411	19.4527	19.4642	19.5199	19.5304	19.5800	19.5800	19.5892	19.5608	19.5304	19.5092	19.4871 (88)
util rest of house												
	0.9903	0.9833	0.9663	0.9166	0.8012	0.5926	0.3942	0.4524	0.7489	0.9395	0.9832	0.9920 (89)
MIT 2	17.0310	17.3342	17.8474	18.6001	19.1500	19.5030	19.5684	19.5699	19.3636	18.6602	17.7998	17.0935 (90)
Living area fraction									FLA = Living area / (4) =			0.2323 (91)
MIT	17.4536	17.7406	18.2275	18.9399	19.4714	19.8175	19.8910	19.8877	19.6741	18.9935	18.1763	17.5079 (92)
Temperature adjustment												-0.1500
adjusted MIT	17.3036	17.5906	18.0775	18.7899	19.3214	19.6675	19.7410	19.7377	19.5241	18.8435	18.0263	17.3579 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9845	0.9749	0.9537	0.9004	0.7908	0.6007	0.4141	0.4713	0.7460	0.9252	0.9752	0.9871	(94)
Useful gains	732.7281	830.1988	917.1091	974.4333	925.7355	695.1788	456.9591	476.1336	680.9276	741.8938	706.0454	698.0502	(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													
Space heating kWh	2164.6590	2093.5140	1892.5186	1546.0770	1181.2579	753.9226	467.2973	492.7311	819.9625	1277.6801	1723.0080	2112.0972	(97)
Space heating requirement - total per year (kWh/year)	1065.3566	848.9478	725.7047	411.5835	190.1086	0.0000	0.0000	0.0000	0.0000	398.6250	732.2131	1052.0509	(98a)
Solar heating kWh												5424.5902	
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	1065.3566	848.9478	725.7047	411.5835	190.1086	0.0000	0.0000	0.0000	0.0000	398.6250	732.2131	1052.0509	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5424.5902	
Space heating per m2										(98c) / (4) =		60.0065	(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 %)													88.7000 (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	1065.3566	848.9478	725.7047	411.5835	190.1086	0.0000	0.0000	0.0000	0.0000	398.6250	732.2131	1052.0509	(98)
Space heating efficiency (main heating system 1)	88.7000	88.7000	88.7000	88.7000	88.7000	0.0000	0.0000	0.0000	0.0000	88.7000	88.7000	88.7000	(210)
Space heating fuel (main heating system)	1201.0785	957.1002	818.1563	464.0174	214.3277	0.0000	0.0000	0.0000	0.0000	449.4081	825.4939	1186.0777	(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	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463	(64)
Efficiency of water heater (217)m	88.6140	88.6065	88.5892	88.5479	88.4616	88.2000	88.2000	88.2000	88.2000	88.5436	88.5949	88.6140	(216)
Fuel for water heating, kWh/month	248.3123	219.1004	231.8526	202.0479	194.6735	174.4695	171.2912	179.0256	181.9872	203.8604	218.6820	245.3861	(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	40.4326	32.4365	29.2055	21.3972	16.5278	13.5034	15.0772	19.5979	25.4558	33.3993	37.7245	41.5563	(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												6115.6597	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												88.2000	
Water heating fuel used												2470.6886	(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)												326.3139	(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												8998.6622	(238)

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10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	6115.6597	3.6400	222.6100 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2470.6886	3.6400	89.9331 (247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000 (247a)
Pumps, fans and electric keep-hot	86.0000	16.4900	14.1814 (249)
Energy for lighting	326.3139	16.4900	53.8092 (250)
Additional standing charges			92.0000 (251)
Total energy cost			472.5336 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2564 (257)
SAP value		79.6343
SAP rating (Section 12)		80 (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	6115.6597	0.2100	1284.2885 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2470.6886	0.2100	518.8446 (264)
Space and water heating			1803.1332 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	326.3139	0.1443	47.0972 (268)
Total CO2, kg/year			1862.1596 (272)
CO2 emissions per m2			20.6000 (273)
EI value			81.5709
EI rating			82 (274)
EI band			B

SAP 10 WORKSHEET FOR Conversion (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			
Ground floor	2.3000 (1b)	x 2.6700 (2b)	= 6.1410 (1b) - (3b)
First floor	66.5000 (1c)	x 2.5000 (2c)	= 166.2500 (1c) - (3c)
Second floor	21.6000 (1d)	x 2.3000 (2d)	= 49.6800 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	222.0710 (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)

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1351 (8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8851	(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) =		0.8187 (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	0.9006	0.8596	0.8596	0.7982	0.7982	0.6959	0.7164	0.7573	0.7368	0.7778	0.7778	0.8596 (22b)
Effective ac	0.9055	0.8695	0.8695	0.8186	0.8186	0.7421	0.7566	0.7868	0.7715	0.8025	0.8025	0.8695 (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						
Main dwelling													
Door			2.0600	1.4000	2.8840			(26)					
Window			16.8800	1.3258	22.3788			(27)					
Roof window			2.3000	1.2357	2.8422			(27a)					
Ground floor			2.3000	0.2500	0.5750			(28a)					
Existing walls	67.6000	18.9400	48.6600	0.2900	14.1114			(29a)					
Flat roof	15.3600		15.3600	0.1400	2.1504			(30)					
Pitched roof	56.2500	2.3000	53.9500	0.3100	16.7245			(30)					
Total net area of external elements Aum(A, m2)			141.5100					(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)... (30) + (32) =	61.6663			(33)					
Main dwelling													
Party wall			45.9000	0.0000	0.0000			(32)					
Party Floor 1			66.5000					(32d)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								250.0000 (35)					
Thermal bridges (Default value 0.200 * total exposed area)								28.3020 (36)					
Point Thermal bridges						(36a) =	0.0000						
Total fabric heat loss						(33) + (36) + (36a) =	89.9683	(37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 66.3598	Feb 63.7196	Mar 63.7196	Apr 59.9895	May 59.9895	Jun 54.3866	Jul 55.4458	Aug 57.6562	Sep 56.5357	Oct 58.8075	Nov 58.8075	Dec 63.7196	(38)
Heat transfer coeff	156.3281	153.6879	153.6879	149.9578	149.9578	144.3549	145.4141	147.6245	146.5040	148.7758	148.7758	153.6879	(39)
Average = Sum(39)m / 12 =												149.8964	
HLP	Jan 1.7293	Feb 1.7001	Mar 1.7001	Apr 1.6588	May 1.6588	Jun 1.5968	Jul 1.6086	Aug 1.6330	Sep 1.6206	Oct 1.6457	Nov 1.6457	Dec 1.7001	(40)
HLP (average)												1.6581	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6312 (42)
Hot water usage for mixer showers													(42a)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Hot water usage for baths													(42b)
78.8094	77.6390	75.9908	72.9518	70.6762	68.1529	66.7900	68.4267	70.2087	72.9087	76.0103	78.5430		
Hot water usage for other uses													(42c)
41.5757	40.0638	38.5520	37.0401	35.5283	34.0165	34.0165	35.5283	37.0401	38.5520	40.0638	41.5757		
Average daily hot water use (litres/day)												110.8648	(43)
Daily hot water use	Jan 120.3851	Feb 117.7028	Mar 114.5427	Apr 109.9919	May 106.2045	Jun 102.1694	Jul 100.8065	Aug 103.9550	Sep 107.2489	Oct 111.4607	Nov 116.0741	Dec 120.1186	(44)
Energy conte	190.6605	167.6072	176.0479	150.5734	142.9716	125.6292	121.9167	128.7180	132.2486	151.2511	165.3688	188.0768	(45)
Energy content (annual)										Total = Sum(45)m =		1841.0698	
Distribution loss (46)m = 0.15 x (45)m													(46)
28.5991	25.1411	26.4072	22.5860	21.4457	18.8444	18.2875	19.3077	19.8373	22.6877	24.8053	28.2115		
Water storage loss (or HIU 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													(57)
0.0000	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	29.3789	26.5300	29.3485	28.3358	29.2397	28.2529	29.1622	29.1826	28.2641	29.2541	28.3723	29.3696	(61)
Total heat required for water heating calculated for each month	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463	(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	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463	(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	70.7394	62.3619	65.8731	57.1496	54.8480	48.8349	47.8278	50.0944	51.0387	57.6045	62.0782	69.8779	(65)

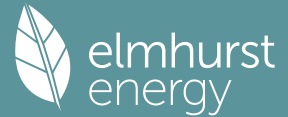
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
(66)m	Jan 157.8694	Feb 157.8694	Mar 157.8694	Apr 157.8694	May 157.8694	Jun 157.8694	Jul 157.8694	Aug 157.8694	Sep 157.8694	Oct 157.8694	Nov 157.8694	Dec 157.8694	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
46.1931	41.0283	33.3665	25.2606	18.8826	15.9415	17.2253	22.3901	30.0520	38.1579	44.5359	47.4770		(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
357.9279	361.6421	352.2825	332.3570	307.2047	283.5651	267.7724	264.0582	273.4178	293.3432	318.4956	342.1352		(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	(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)													
-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	(71)
Water heating gains (Table 5)													
95.0798	92.8004	88.5391	79.3745	73.7204	67.8263	64.2847	67.3311	70.8871	77.4254	86.2197	93.9219		(72)
Total internal gains	608.2420	604.5121	583.2292	546.0333	508.8489	473.3740	455.3236	459.8206	480.3980	517.9677	558.2924	592.5753	(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
Northeast	10.5600	12.4928	0.6300	0.7000	0.7700	40.3176 (75)
Southeast	0.6100	39.1209	0.6300	0.7000	0.7700	7.2931 (77)

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South	4.6300	49.2853	0.6300	0.7000	0.7700	69.7382 (78)
Northwest	1.0800	12.4928	0.6300	0.7000	0.7700	4.1234 (81)
Northeast	0.9200	18.7400	0.6300	0.7000	1.0000	6.8429 (82)
East	0.4600	29.0118	0.6300	0.7000	1.0000	5.2968 (82)
Southeast	0.4600	42.5510	0.6300	0.7000	1.0000	7.7687 (82)
West	0.4600	29.0118	0.6300	0.7000	1.0000	5.2968 (82)

Solar gains	146.6774	239.8893	370.7688	548.4041	659.0786	730.2747	694.1692	602.0386	469.8965	301.7226	184.6945	126.4956 (83)
Total gains	754.9194	844.4013	953.9981	1094.4373	1167.9275	1203.6488	1149.4928	1061.8592	950.2945	819.6904	742.9869	719.0709 (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	40.1577	40.8476	40.8476	41.8636	41.8636	43.4885	43.1717	42.5253	42.8506	42.1962	42.1962	40.8476
alpha	3.6772	3.7232	3.7232	3.7909	3.7909	3.8992	3.8781	3.8350	3.8567	3.8131	3.8131	3.7232
util living area	0.9907	0.9851	0.9671	0.9091	0.7815	0.5260	0.3138	0.3698	0.7074	0.9320	0.9821	0.9921 (86)
MIT	19.1864	19.3953	19.8079	20.3547	20.7537	20.9661	20.9969	20.9936	20.8861	20.3908	19.7548	19.1848 (87)
Th 2	19.5199	19.5408	19.5408	19.5705	19.5705	19.6156	19.6071	19.5892	19.5982	19.5800	19.5800	19.5408 (88)
util rest of house	0.9872	0.9795	0.9538	0.8708	0.6910	0.3798	0.1400	0.1790	0.5642	0.8934	0.9738	0.9890 (89)
MIT 2	17.5075	17.7852	18.3036	18.9827	19.4058	19.6058	19.6070	19.5889	19.5493	19.0489	18.2684	17.5187 (90)
Living area fraction	17.8975	18.1593	18.6531	19.3014	19.7189	19.9218	19.9298	19.9152	19.8599	19.3607	18.6137	17.9057 (91)
MIT	17.8975	18.1593	18.6531	19.3014	19.7189	19.9218	19.9298	19.9152	19.8599	19.3607	18.6137	17.9057 (92)
Temperature adjustment												-0.1500
adjusted MIT	17.7475	18.0093	18.5031	19.1514	19.5689	19.7718	19.7798	19.7652	19.7099	19.2107	18.4637	17.7557 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9805	0.9705	0.9402	0.8564	0.6909	0.3972	0.1618	0.2033	0.5773	0.8796	0.9639	0.9831 (94)
Useful gains	740.1753	819.4750	896.9295	937.2953	806.9048	478.1378	185.9727	215.9176	548.6070	721.0109	716.1948	706.9273 (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	1930.2631	1861.0458	1644.9345	1312.3430	925.0750	486.7323	186.1065	216.3034	587.4595	1057.8940	1497.2392	1898.9225 (97)
Space heating kWh	885.4253	699.9355	556.5157	270.0343	87.9186	0.0000	0.0000	0.0000	0.0000	250.6410	562.3519	886.8444 (98a)
Space heating requirement - total per year (kWh/year)												4199.6668
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	885.4253	699.9355	556.5157	270.0343	87.9186	0.0000	0.0000	0.0000	0.0000	250.6410	562.3519	886.8444 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4199.6668
Space heating per m2										(98c) / (4) =		46.4565 (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 %)												88.7000 (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	885.4253	699.9355	556.5157	270.0343	87.9186	0.0000	0.0000	0.0000	0.0000	250.6410	562.3519	886.8444 (98)
Space heating efficiency (main heating system 1)	88.7000	88.7000	88.7000	88.7000	88.7000	0.0000	0.0000	0.0000	0.0000	88.7000	88.7000	88.7000 (210)
Space heating fuel (main heating system)	998.2247	789.1043	627.4134	304.4356	99.1191	0.0000	0.0000	0.0000	0.0000	282.5716	633.9932	999.8246 (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	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463 (64)
Efficiency of water heater (217)m	88.6000	88.5909	88.5647	88.5001	88.3684	88.2000	88.2000	88.2000	88.2000	88.4900	88.5713	88.2000 (216)
Fuel for water heating, kWh/month	248.3514	219.1389	231.9169	202.1572	194.8790	174.4695	171.2912	179.0256	181.9872	203.9838	218.7402	245.4217 (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	40.4326	32.4365	29.2055	21.3972	16.5278	13.5034	15.0772	19.5979	25.4558	33.3993	37.7245	41.5563 (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												4734.6864 (211)
Space heating fuel - main system 2												0.0000 (213)

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Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	88.2000
Water heating fuel used	2471.3625 (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)	326.3139 (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	7618.3628 (238)

10a. Fuel costs - using BEDF prices (594)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	4734.6864	7.3200	346.5790 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2471.3625	7.3200	180.9037 (247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000 (247a)
Pumps, fans and electric keep-hot	86.0000	27.6700	23.7962 (249)
Energy for lighting	326.3139	27.6700	90.2911 (250)
Additional standing charges			108.0000 (251)
Total energy cost			749.5700 (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	4734.6864	0.2100	994.2841 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2471.3625	0.2100	518.9861 (264)
Space and water heating			1513.2703 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	326.3139	0.1443	47.0972 (268)
Total CO2, kg/year			1572.2967 (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	4734.6864	1.1300	5350.1956 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2471.3625	1.1300	2792.6397 (278)
Space and water heating			8142.8353 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	326.3139	1.5338	500.5112 (282)
Total Primary energy kWh/year			8773.4472 (286)

SAP 10 EPC IMPROVEMENTS

001

Current energy efficiency rating:	C 80
Current environmental impact rating:	B 82

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

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

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

Potential energy efficiency rating:	C 80
Potential environmental impact rating:	B 82

Fuel prices for cost data on this page from database revision number 594 TEST (30 Apr 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, Thames Valley):			
	Current	Potential	Saving
Electricity	£114	£114	£0
Mains gas	£635	£635	£0
Space heating	£478	£478	£0
Water heating	£181	£181	£0
Lighting	£90	£90	£0
Total cost of fuels	£749	£749	£0

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Total cost of uses	£749	£749	£0
Delivered energy	84 kWh/m²	84 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.6 tonnes	1.6 tonnes	0.0 tonnes
CO2 emissions per m²	17 kg/m²	17 kg/m²	0 kg/m²
Primary energy	97 kWh/m²	97 kWh/m²	0 kWh/m²

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

1. Overall dwelling characteristics

	Area (m²)	Storey height (m)	Volume (m³)
Main dwelling			
Ground floor	2.3000 (1b)	x 2.6700 (2b)	= 6.1410 (1b) - (3b)
First floor	66.5000 (1c)	x 2.5000 (2c)	= 166.2500 (1c) - (3c)
Second floor	21.6000 (1d)	x 2.3000 (2d)	= 49.6800 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	222.0710 (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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1351 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8851 (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) = 0.8187 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	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	1.0439	1.0234	1.0029	0.9006	0.8801	0.7778	0.7778	0.7573	0.8187	0.8801	0.9210	0.9620 (22b)
Effective ac	1.0439	1.0234	1.0029	0.9055	0.8873	0.8025	0.8025	0.7868	0.8351	0.8873	0.9242	0.9627 (25)

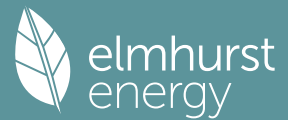
3. Heat losses and heat loss parameter

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							
Door			2.0600	1.4000	2.8840		(26)
Window			16.8800	1.3258	22.3788		(27)
Roof window			2.3000	1.2357	2.8422		(27a)
Ground floor			2.3000	0.2500	0.5750		(28a)
Existing walls	67.6000	18.9400	48.6600	0.2900	14.1114		(29a)
Flat roof	15.3600		15.3600	0.1400	2.1504		(30)
Pitched roof	56.2500	2.3000	53.9500	0.3100	16.7245		(30)
Total net area of external elements Aum(A, m²)			141.5100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	61.6663	(33)
Main dwelling							
Party wall			45.9000	0.0000	0.0000		(32)
Party Floor 1			66.5000				(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							28.3020 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	89.9683 (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
	76.4973	74.9973	73.4974	66.3598	65.0244	58.8075	58.8075	57.6562	61.2021	65.0244	67.7260	70.5505 (38)
Heat transfer coeff	166.4656	164.9656	163.4657	156.3281	154.9927	148.7758	148.7758	147.6245	151.1704	154.9927	157.6943	160.5188 (39)
Average = Sum(39)m / 12 =												156.3142
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.8414	1.8248	1.8082	1.7293	1.7145	1.6457	1.6457	1.6330	1.6722	1.7145	1.7444	1.7756 (40)
HLP (average)												1.7291
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Full SAP Calculation Printout



Assumed occupancy												2.6312 (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	(42a)
Hot water usage for baths	78.8094	77.6390	75.9908	72.9518	70.6762	68.1529	66.7900	68.4267	70.2087	72.9087	76.0103	(42b)
Hot water usage for other uses	41.5757	40.0638	38.5520	37.0401	35.5283	34.0165	34.0165	35.5283	37.0401	38.5520	40.0638	(42c)
Average daily hot water use (litres/day)												110.8648 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	120.3851	117.7028	114.5427	109.9919	106.2045	102.1694	100.8065	103.9550	107.2489	111.4607	116.0741	120.1186 (44)
Energy content (annual)	190.6605	167.6072	176.0479	150.5734	142.9716	125.6292	121.9167	128.7180	132.2486	151.2511	165.3688	188.0768 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1841.0698
Water storage loss (or HIU loss):	28.5991	25.1411	26.4072	22.5860	21.4457	18.8444	18.2875	19.3077	19.8373	22.6877	24.8053	28.2115 (46)
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	29.3789	26.5300	29.3485	28.3358	29.2397	28.2529	29.1622	29.1826	28.2641	29.2541	28.3723	29.3696 (61)
Total heat required for water heating calculated for each month	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463 (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	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463 (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)
Heat gains from water heating, kWh/month	70.7394	62.3619	65.8731	57.1496	54.8480	48.8349	47.8278	50.0944	51.0387	57.6045	62.0782	69.8779 (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	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	46.1931	41.0283	33.3665	25.2606	18.8826	15.9415	17.2253	22.3901	30.0520	38.1579	44.5359	47.4770 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	357.9279	361.6421	352.2825	332.3570	307.2047	283.5651	267.7724	264.0582	273.4178	293.3432	318.4956	342.1352 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181 (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)	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462 (71)
Water heating gains (Table 5)	95.0798	92.8004	88.5391	79.3745	73.7204	67.8263	64.2847	67.3311	70.8871	77.4254	86.2197	93.9219 (72)
Total internal gains	608.2420	604.5121	583.2292	546.0333	508.8489	473.3740	455.3236	459.8206	480.3980	517.9677	558.2924	592.5753 (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			
Northeast				10.5600	11.2829	0.6300	0.7000	0.7700	36.4131 (75)			
Southeast				0.6100	36.7938	0.6300	0.7000	0.7700	6.8593 (77)			
South				4.6300	46.7521	0.6300	0.7000	0.7700	66.1536 (78)			
Northwest				1.0800	11.2829	0.6300	0.7000	0.7700	3.7241 (81)			
Northeast				0.9200	16.8560	0.6300	0.7000	1.0000	6.1549 (82)			
East				0.4600	26.2379	0.6300	0.7000	1.0000	4.7904 (82)			
Southeast				0.4600	39.2172	0.6300	0.7000	1.0000	7.1600 (82)			
West				0.4600	26.2379	0.6300	0.7000	1.0000	4.7904 (82)			
Solar gains	136.0458	247.0178	378.3687	536.1832	661.8190	683.9106	648.1823	550.3855	432.4012	283.9166	165.7393	114.6202 (83)
Total gains	744.2878	851.5299	961.5980	1082.2164	1170.6679	1157.2846	1103.5059	1010.2061	912.7992	801.8843	724.0317	707.1956 (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	37.7122	38.0551	38.4043	40.1577	40.5037	42.1962	42.1962	42.5253	41.5278	40.5037	39.8098	39.1093
alpha	3.5141	3.5370	3.5603	3.6772	3.7002	3.8131	3.8131	3.8350	3.7685	3.7002	3.6540	3.6073
util living area	0.9928	0.9878	0.9757	0.9408	0.8606	0.7090	0.5574	0.6159	0.8395	0.9606	0.9882	0.9941 (86)
MIT	18.8505	19.0835	19.4837	20.0631	20.5334	20.8568	20.9570	20.9380	20.7003	20.0950	19.4203	18.8777 (87)
Th 2	19.4411	19.4527	19.4642	19.5199	19.5304	19.5800	19.5800	19.5892	19.5608	19.5304	19.5092	19.4871 (88)
util rest of house	0.9903	0.9833	0.9663	0.9166	0.8012	0.5926	0.3942	0.4524	0.7489	0.9395	0.9832	0.9920 (89)
MIT 2	17.0310	17.3342	17.8474	18.6001	19.1500	19.5030	19.5684	19.5699	19.3636	18.6602	17.7998	17.0935 (90)
Living area fraction	17.4536	17.7406	18.2275	18.9399	19.4714	19.8175	19.8910	19.8877	19.6741	18.9935	18.1763	17.5079 (92)
Temperature adjustment	17.3036	17.5906	18.0775	18.7899	19.3214	19.6675	19.7410	19.7377	19.5241	18.8435	18.0263	-0.1500
adjusted MIT	17.3036	17.5906	18.0775	18.7899	19.3214	19.6675	19.7410	19.7377	19.5241	18.8435	18.0263	17.3579 (93)

8. Space heating requirement

Full SAP Calculation Printout



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9845	0.9749	0.9537	0.9004	0.7908	0.6007	0.4141	0.4713	0.7460	0.9252	0.9752	0.9871	(94)
Useful gains	732.7281	830.1988	917.1091	974.4333	925.7355	695.1788	456.9591	476.1336	680.9276	741.8938	706.0454	698.0502	(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	2164.6590	2093.5140	1892.5186	1546.0770	1181.2579	753.9226	467.2973	492.7311	819.9625	1277.6801	1723.0080	2112.0972	(97)
Space heating kWh	1065.3566	848.9478	725.7047	411.5835	190.1086	0.0000	0.0000	0.0000	0.0000	398.6250	732.2131	1052.0509	(98a)
Space heating requirement - total per year (kWh/year)												5424.5902	
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	1065.3566	848.9478	725.7047	411.5835	190.1086	0.0000	0.0000	0.0000	0.0000	398.6250	732.2131	1052.0509	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5424.5902	
Space heating per m2											(98c) / (4) =	60.0065	(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 %)													88.7000	(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	1065.3566	848.9478	725.7047	411.5835	190.1086	0.0000	0.0000	0.0000	0.0000	398.6250	732.2131	1052.0509	(98)	
Space heating efficiency (main heating system 1)	88.7000	88.7000	88.7000	88.7000	88.7000	0.0000	0.0000	0.0000	0.0000	88.7000	88.7000	88.7000	(210)	
Space heating fuel (main heating system)	1201.0785	957.1002	818.1563	464.0174	214.3277	0.0000	0.0000	0.0000	0.0000	449.4081	825.4939	1186.0777	(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	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463	(64)	
Efficiency of water heater (217)m	88.6140	88.6065	88.5892	88.5479	88.4616	88.2000	88.2000	88.2000	88.2000	88.5436	88.5949	88.6140	(216)	
Fuel for water heating, kWh/month	248.3123	219.1004	231.8526	202.0479	194.6735	174.4695	171.2912	179.0256	181.9872	203.8604	218.6820	245.3861	(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	40.4326	32.4365	29.2055	21.3972	16.5278	13.5034	15.0772	19.5979	25.4558	33.3993	37.7245	41.5563	(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													6115.6597	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													88.2000	
Water heating fuel used													2470.6886	(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)													326.3139	(232)

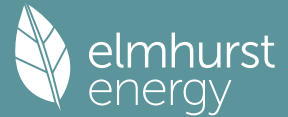
Energy saving/generation technologies (Appendices M ,N and Q)

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													8998.6622	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6115.6597	3.6400	222.6100	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2470.6886	3.6400	89.9331	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	86.0000	16.4900	14.1814	(249)
Energy for lighting	326.3139	16.4900	53.8092	(250)
Additional standing charges			92.0000	(251)
Total energy cost			472.5336	(255)

Full SAP Calculation Printout



11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):

Energy cost factor (ECF)

SAP value

SAP rating (Section 12)

SAP band

$$\begin{aligned} & [(255) \times (256)] / [(4) + 45.0] = 0.3600 \quad (256) \\ & 1.2564 \quad (257) \\ & 79.6343 \\ & 80 \quad (258) \\ & C \end{aligned}$$

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	6115.6597	0.2100	1284.2885 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2470.6886	0.2100	518.8446 (264)
Space and water heating			1803.1332 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	326.3139	0.1443	47.0972 (268)
Total CO2, kg/year			1862.1596 (272)
CO2 emissions per m2			20.6000 (273)
EI value			81.5709
EI rating			82 (274)
EI band			B

SAP 10 WORKSHEET FOR Conversion (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			
Ground floor	2.3000 (1b)	x 2.6700 (2b)	= 6.1410 (1b) - (3b)
First floor	66.5000 (1c)	x 2.5000 (2c)	= 166.2500 (1c) - (3c)
Second floor	21.6000 (1d)	x 2.3000 (2d)	= 49.6800 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 222.0710 (5)

2. Ventilation rate

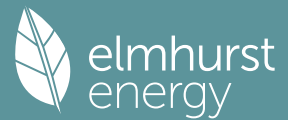
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number 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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1351 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8851 (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) = 0.8187 (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	0.9006	0.8596	0.8596	0.7982	0.7982	0.6959	0.7164	0.7573	0.7368	0.7778	0.7778	0.8596 (22b)
Effective ac	0.9055	0.8695	0.8695	0.8186	0.8186	0.7421	0.7566	0.7868	0.7715	0.8025	0.8025	0.8695 (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							
Door			2.0600	1.4000	2.8840		(26)
Window			16.8800	1.3258	22.3788		(27)
Roof window			2.3000	1.2357	2.8422		(27a)
Ground floor			2.3000	0.2500	0.5750		(28a)
Existing walls	67.6000	18.9400	48.6600	0.2900	14.1114		(29a)
Flat roof	15.3600		15.3600	0.1400	2.1504		(30)
Pitched roof	56.2500	2.3000	53.9500	0.3100	16.7245		(30)
Total net area of external elements Aum(A, m2)			141.5100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	61.6663		(33)
Main dwelling							
Party wall			45.9000	0.0000	0.0000		(32)
Party Floor 1			66.5000				(32d)

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Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area) 28.3020 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 89.9683 (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	66.3598	63.7196	63.7196	59.9895	59.9895	54.3866	55.4458	57.6562	56.5357	58.8075	58.8075	63.7196
Average = Sum(39)m / 12 =	156.3281	153.6879	153.6879	149.9578	149.9578	144.3549	145.4141	147.6245	146.5040	148.7758	148.7758	153.6879
												149.8964
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.7293	1.7001	1.7001	1.6588	1.6588	1.5968	1.6086	1.6330	1.6206	1.6457	1.6457	1.7001
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.6312 (42)											
Hot water usage for mixer showers	0.0000 (42a)											
Hot water usage for baths	78.8094 (42b)											
Hot water usage for other uses	41.5757 (42c)											
Average daily hot water use (litres/day)	110.8648 (43)											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	120.3851	117.7028	114.5427	109.9919	106.2045	102.1694	100.8065	103.9550	107.2489	111.4607	116.0741	120.1186
Energy content (annual)	190.6605	167.6072	176.0479	150.5734	142.9716	125.6292	121.9167	128.7180	132.2486	151.2511	165.3688	188.0768
Distribution loss (46)m = 0.15 x (45)m	28.5991	25.1411	26.4072	22.5860	21.4457	18.8444	18.2875	19.3077	19.8373	22.6877	24.8053	28.2115
Water storage loss (or HIU loss):	0.0000 (56)											
If cylinder contains dedicated solar storage	0.0000 (57)											
Primary loss	0.0000 (59)											
Combi loss	29.3789 (61)											
Total heat required for water heating calculated for each month	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463
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
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
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
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
Output from w/h	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463
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
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000 (64a)											
Heat gains from water heating, kWh/month	70.7394	62.3619	65.8731	57.1496	54.8480	48.8349	47.8278	50.0944	51.0387	57.6045	62.0782	69.8779

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	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694	157.8694
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	46.1931	41.0283	33.3665	25.2606	18.8826	15.9415	17.2253	22.3901	30.0520	38.1579	44.5359	47.4770
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	357.9279	361.6421	352.2825	332.3570	307.2047	283.5651	267.7724	264.0582	273.4178	293.3432	318.4956	342.1352
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181	53.4181
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
Losses e.g. evaporation (negative values) (Table 5)	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462	-105.2462
Water heating gains (Table 5)	95.0798	92.8004	88.5391	79.3745	73.7204	67.8263	64.2847	67.3311	70.8871	77.4254	86.2197	93.9219
Total internal gains	608.2420	604.5121	583.2292	546.0333	508.8489	473.3740	455.3236	459.8206	480.3980	517.9677	558.2924	592.5753

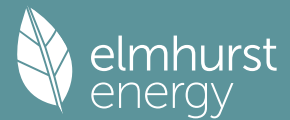
6. Solar gains

[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
Northeast				10.5600	12.4928		0.6300		0.7000		0.7700		40.3176 (75)
Southeast				0.6100	39.1209		0.6300		0.7000		0.7700		7.2931 (77)
South				4.6300	49.2853		0.6300		0.7000		0.7700		69.7382 (78)
Northwest				1.0800	12.4928		0.6300		0.7000		0.7700		4.1234 (81)
Northeast				0.9200	18.7400		0.6300		0.7000		1.0000		6.8429 (82)
East				0.4600	29.0118		0.6300		0.7000		1.0000		5.2968 (82)
Southeast				0.4600	42.5510		0.6300		0.7000		1.0000		7.7687 (82)
West				0.4600	29.0118		0.6300		0.7000		1.0000		5.2968 (82)
Solar gains	146.6774	239.8893	370.7688	548.4041	659.0786	730.2747	694.1692	602.0386	469.8965	301.7226	184.6945	126.4956	(83)
Total gains	754.9194	844.4013	953.9981	1094.4373	1167.9275	1203.6488	1149.4928	1061.8592	950.2945	819.6904	742.9869	719.0709	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

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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	40.1577	40.8476	40.8476	41.8636	41.8636	43.4885	43.1717	42.5253	42.8506	42.1962	42.1962	40.8476
alpha	3.6772	3.7232	3.7232	3.7909	3.7909	3.8992	3.8781	3.8350	3.8567	3.8131	3.8131	3.7232
util living area	0.9907	0.9851	0.9671	0.9091	0.7815	0.5260	0.3138	0.3698	0.7074	0.9320	0.9821	0.9921 (86)
MIT	19.1864	19.3953	19.8079	20.3547	20.7537	20.9661	20.9969	20.9936	20.8861	20.3908	19.7548	19.1848 (87)
Th 2	19.5199	19.5408	19.5408	19.5705	19.5705	19.6156	19.6071	19.5892	19.5982	19.5800	19.5800	19.5408 (88)
util rest of house	0.9872	0.9795	0.9538	0.8708	0.6910	0.3798	0.1400	0.1790	0.5642	0.8934	0.9738	0.9890 (89)
MIT 2	17.5075	17.7852	18.3036	18.9827	19.4058	19.6058	19.6070	19.5889	19.5493	19.0489	18.2684	17.5187 (90)
Living area fraction	17.8975	18.1593	18.6531	19.3014	19.7189	19.9218	19.9298	19.9152	19.8599	19.3607	18.6137	0.2323 (91)
MIT	17.8975	18.1593	18.6531	19.3014	19.7189	19.9218	19.9298	19.9152	19.8599	19.3607	18.6137	17.9057 (92)
Temperature adjustment												-0.1500
adjusted MIT	17.7475	18.0093	18.5031	19.1514	19.5689	19.7718	19.7798	19.7652	19.7099	19.2107	18.4637	17.7557 (93)

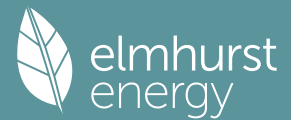
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9805	0.9705	0.9402	0.8564	0.6909	0.3972	0.1618	0.2033	0.5773	0.8796	0.9639	0.9831 (94)
Useful gains	740.1753	819.4750	896.9295	937.2953	806.9048	478.1378	185.9727	215.9176	548.6070	721.0109	716.1948	706.9273 (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	1930.2631	1861.0458	1644.9345	1312.3430	925.0750	486.7323	186.1065	216.3034	587.4595	1057.8940	1497.2392	1898.9225 (97)
Space heating kWh	885.4253	699.9355	556.5157	270.0343	87.9186	0.0000	0.0000	0.0000	0.0000	250.6410	562.3519	886.8444 (98a)
Space heating requirement - total per year (kWh/year)												4199.6668
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	885.4253	699.9355	556.5157	270.0343	87.9186	0.0000	0.0000	0.0000	0.0000	250.6410	562.3519	886.8444 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4199.6668
Space heating per m2										(98c) / (4) =		46.4565 (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 %)												88.7000 (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	885.4253	699.9355	556.5157	270.0343	87.9186	0.0000	0.0000	0.0000	0.0000	250.6410	562.3519	886.8444 (98)
Space heating efficiency (main heating system 1)	88.7000	88.7000	88.7000	88.7000	88.7000	0.0000	0.0000	0.0000	0.0000	88.7000	88.7000	88.7000 (210)
Space heating fuel (main heating system)	998.2247	789.1043	627.4134	304.4356	99.1191	0.0000	0.0000	0.0000	0.0000	282.5716	633.9932	999.8246 (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	220.0394	194.1372	205.3964	178.9092	172.2114	153.8821	151.0789	157.9005	160.5127	180.5052	193.7412	217.4463 (64)
Efficiency of water heater (217)m	88.6000	88.5909	88.5647	88.5001	88.3684	88.2000	88.2000	88.2000	88.2000	88.4900	88.5713	88.2000 (216)
Fuel for water heating, kWh/month	248.3514	219.1389	231.9169	202.1572	194.8790	174.4695	171.2912	179.0256	181.9872	203.9838	218.7402	245.4217 (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	40.4326	32.4365	29.2055	21.3972	16.5278	13.5034	15.0772	19.5979	25.4558	33.3993	37.7245	41.5563 (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												4734.6864 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												88.2000
Water heating fuel used												2471.3625 (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)												326.3139 (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												

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Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	7618.3628 (238)

10a. Fuel costs - using BEDF prices (594)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	4734.6864	7.3200	346.5790 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2471.3625	7.3200	180.9037 (247)
Energy for instantaneous electric shower(s)	0.0000	27.6700	0.0000 (247a)
Pumps, fans and electric keep-hot	86.0000	27.6700	23.7962 (249)
Energy for lighting	326.3139	27.6700	90.2911 (250)
Additional standing charges			108.0000 (251)
Total energy cost			749.5700 (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	4734.6864	0.2100	994.2841 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2471.3625	0.2100	518.9861 (264)
Space and water heating			1513.2703 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	326.3139	0.1443	47.0972 (268)
Total CO2, kg/year			1572.2967 (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	4734.6864	1.1300	5350.1956 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2471.3625	1.1300	2792.6397 (278)
Space and water heating			8142.8353 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	326.3139	1.5338	500.5112 (282)
Total Primary energy kWh/year			8773.4472 (286)