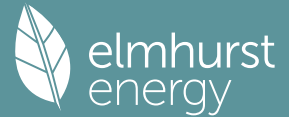


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Plot Reference	Flat 1			Issued on Date	12/05/2026
Assessment Reference	001	Plot Type Ref	3688		
Plot Address	Flat 1, 102 Mannock Road, Tottenham, N22 6AA			SAP Version	10.2
SAP Rating	75 C	DER	29.35	TER	
Environmental	77 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.63	DFEE	98.79	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	161.85	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	66.5000 (1b)	2.6700 (2b)	177.5550 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5000		177.5550 (4)
Dwelling volume			177.5550 (5)

2. Ventilation rate

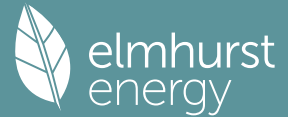
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) = 0.1690 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9190 (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) = 0.8500 (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	1.0838	1.0625	1.0413	0.9350	0.9138	0.8075	0.8075	0.7863	0.8500	0.9138	0.9563	0.9988 (22b)
Effective ac	1.0838	1.0625	1.0413	0.9372	0.9175	0.8261	0.8261	0.8091	0.8613	0.9175	0.9572	0.9988 (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			15.5700	1.3258	20.6420		(27)
Ground floor			65.9000	0.7000	46.1300		(28a)
Existing walls	60.6000	17.6300	42.9700	0.2900	12.4613		(29a)
Total net area of external elements Aum(A, m ²)			126.5000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	82.1173	(33)
Main dwelling							
Party wall			22.8200	0.0000	0.0000		(32)
Party roof			65.9000				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							25.3000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	107.4173 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							
(38)m	63.5033	62.2581	61.0130	54.9108	53.7597	48.4014	48.4014
Heat transfer coeff	170.9206	169.6755	168.4303	162.3281	161.1771	155.8187	155.8187
						154.8264	154.8264
						157.8827	157.8827
						161.1771	161.1771
						163.5056	163.5056
						165.9400	165.9400 (39)

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Average = Sum(39)m / 12 =

162.2917

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	2.5702	2.5515	2.5328	2.4410	2.4237	2.3431	2.3431	2.3282	2.3742	2.4237	2.4587	2.4953	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1583 (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	0.0000 (42a)
Hot water usage for baths												
69.6291	68.5950	67.1388	64.4538	62.4433	60.2140	59.0098	60.4559	62.0303	64.4158	67.1561	69.3937	(42b)
Hot water usage for other uses												
36.7327	35.3969	34.0612	32.7255	31.3897	30.0540	30.0540	31.3897	32.7255	34.0612	35.3969	36.7327	(42c)
Average daily hot water use (litres/day)												97.9505 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	106.3618	103.9920	101.2000	97.1793	93.8331	90.2680	89.0638	91.8456	94.7558	98.4770	102.5530	106.1264 (44)
Energy content (annual)	168.4511	148.0832	155.5407	133.0336	126.3173	110.9950	107.7150	113.7240	116.8434	133.6323	146.1055	166.1683 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1626.6094
25.2677	22.2125	23.3311	19.9550	18.9476	16.6493	16.1572	17.0586	17.5265	20.0448	21.9158	24.9252 (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	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	29.3566	26.5074	29.3211	28.2778	29.1481	28.1382	29.0397	29.0806	28.1887	29.2109	28.3483	29.3471 (61)
Total heat required for water heating calculated for each month												
197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156 (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	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156 (64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 1970.5742 (64)
Electric shower(s)												1971 (64)
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 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
63.3491	55.8645	59.0476	51.3031	49.2875	43.9404	43.0752	45.0834	45.8976	51.7355	55.6672	62.5878 (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	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	95.3260	105.5396	95.3260	98.5036	95.3260	98.5036	95.3260	95.3260	98.5036	95.3260	98.5036	95.3260 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	188.9945	190.9557	186.0136	175.4925	162.2115	149.7292	141.3902	139.4291	144.3712	154.8923	168.1733	180.6556 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913 (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)	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301 (71)
Water heating gains (Table 5)	85.1467	83.1317	79.3650	71.2543	66.2467	61.0283	57.8967	60.5959	63.7467	69.5369	77.3155	84.1234 (72)
Total internal gains	427.8411	438.0008	419.0784	403.6242	382.1580	364.6349	349.9868	350.7248	361.9952	378.1290	402.3662	418.4788 (73)

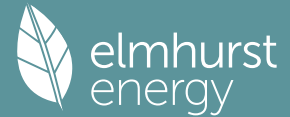
6. Solar gains

[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			8.1900	11.2829	0.6300	0.7000	0.7700	28.2409 (75)				
South			7.3800	46.7521	0.6300	0.7000	0.7700	105.4457 (78)				
Solar gains	133.6866	230.1780	323.5500	418.7168	487.7193	493.0826	471.6363	418.3647	355.9968	256.5169	160.5235	114.1777 (83)
Total gains	561.5277	668.1788	742.6285	822.3410	869.8773	857.7175	821.6230	769.0895	717.9919	634.6459	562.8896	532.6565 (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	27.0187	27.2170	27.4182	28.4489	28.6521	29.6374	29.6374	29.8273	29.2499	28.6521	28.2440	27.8297
alpha	2.8012	2.8145	2.8279	2.8966	2.9101	2.9758	2.9758	2.9885	2.9500	2.9101	2.8829	2.8553
util living area	0.9915	0.9856	0.9757	0.9517	0.9022	0.8018	0.6773	0.7198	0.8766	0.9624	0.9865	0.9928 (86)
MIT	18.0575	18.3376	18.7882	19.4580	20.0656	20.5901	20.8290	20.7895	20.3936	19.6059	18.7644	18.0753 (87)
Th 2	18.9803	18.9910	19.0018	19.0555	19.0658	19.1144	19.1144	19.1235	19.0956	19.0658	19.0450	19.0236 (88)
util rest of house	0.9882	0.9799	0.9654	0.9284	0.8463	0.6702	0.4478	0.5031	0.7808	0.9393	0.9801	0.9900 (89)
MIT 2	15.7687	16.1301	16.7071	17.5733	18.3086	18.8959	19.0738	19.0643	18.7097	17.7758	16.7043	15.8130 (90)
Living area fraction	fLA = Living area / (4) = 0.3158 (91)											
MIT	16.4915	16.8272	17.3643	18.1685	18.8635	19.4309	19.6281	19.6091	19.2415	18.3537	17.3549	16.5274 (92)
Temperature adjustment	-0.1500											

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adjusted MIT 16.3415 16.6772 17.2143 18.0185 18.7135 19.2809 19.4781 19.4591 19.0915 18.2037 17.2049 16.3774 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9807	0.9690	0.9506	0.9099	0.8322	0.6850	0.5009	0.5509	0.7805	0.9231	0.9700	0.9835	(94)
Useful gains	550.7149	647.4874	705.9174	748.2408	723.9528	587.5443	411.5239	423.6682	560.3836	585.8397	545.9842	523.8921	(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	2058.1415	1998.3086	1804.6159	1480.1824	1130.4076	729.3753	448.4599	473.6268	788.0681	1225.5398	1652.2013	2020.7185	(97)
Space heating kWh	1121.5254	907.7518	817.4317	526.9979	302.4024	0.0000	0.0000	0.0000	0.0000	475.9369	796.4763	1113.6388	(98a)
Space heating requirement - total per year (kWh/year)												6062.1612	
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	1121.5254	907.7518	817.4317	526.9979	302.4024	0.0000	0.0000	0.0000	0.0000	475.9369	796.4763	1113.6388	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6062.1612	
Space heating per m2										(98c) / (4) =		91.1603	(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	1121.5254	907.7518	817.4317	526.9979	302.4024	0.0000	0.0000	0.0000	0.0000	475.9369	796.4763	1113.6388	(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)	1264.4029	1023.3955	921.5690	594.1352	340.9272	0.0000	0.0000	0.0000	0.0000	536.5692	897.9440	1255.5116	(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	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156	(64)	
Efficiency of water heater (217)m	88.6247	88.6190	88.6074	88.5823	88.5296	88.2000	88.2000	88.2000	88.2000	88.5720	88.6097	88.2000	(216)	
Fuel for water heating, kWh/month	223.1971	197.0127	208.6303	182.1034	175.6085	157.7475	155.0507	161.9100	164.4355	183.8540	196.8788	220.6100	(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	31.7718	25.4886	22.9496	16.8139	12.9875	10.6109	11.8476	15.4000	20.0031	26.2452	29.6438	32.6549	(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													6834.4546	(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													2227.0385	(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)													256.4170	(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													9403.9101	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6834.4546	0.2100	1435.2355	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2227.0385	0.2100	467.6781	(264)
Space and water heating			1902.9135	(265)

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Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	256.4170	0.1443	37.0089 (268)
Total CO2, kg/year			1951.8517 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			29.3500 (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	6834.4546	1.1300	7722.9337 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)			2516.5535 (278)
Space and water heating	2227.0385	1.1300	10239.4872 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	256.4170	1.5338	393.3009 (282)
Total Primary energy kWh/year			10762.8889 (286)
Dwelling Primary energy Rate (DPER)			161.8500 (287)

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Plot Reference	Flat 1			Issued on Date	12/05/2026
Assessment Reference	001	Plot Type Ref	3688		
Plot Address	Flat 1, 102 Mannock Road, Tottenham, N22 6AA			SAP Version	10.2
SAP Rating	75 C	DER	29.35	TER	
Environmental	77 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.63	DFEE	98.79	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	161.85	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	66.5000 (1b)	2.6700 (2b)	177.5550 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	177.5550 (5)

2. Ventilation rate

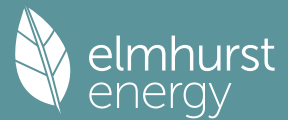
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1126 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8626 (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) = 0.7979 (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	1.0174	0.9974	0.9775	0.8777	0.8578	0.7580	0.7580	0.7381	0.7979	0.8578	0.8977	0.9376 (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	1.0174	0.9974	0.9777	0.8852	0.8679	0.7873	0.7873	0.7724	0.8184	0.8679	0.9029	0.9395 (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			15.5700	1.3258	20.6420		(27)
Ground floor			65.9000	0.7000	46.1300		(28a)
Existing walls	60.6000	17.6300	42.9700	0.2900	12.4613		(29a)
Total net area of external elements Aum(A, m ²)			126.5000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	82.1173		(33)
Main dwelling							
Party wall			22.8200	0.0000	0.0000		(32)
Party roof			65.9000				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							25.3000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	107.4173 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							
(38)m	59.6113	58.4427	57.2885	51.8673	50.8530	46.1314	46.1314
						45.2570	47.9501
							50.8530
							52.9049
							55.0501 (38)

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Heat transfer coeff
167.0287 165.8600 164.7059 159.2847 158.2704 153.5487 153.5487 152.6743 155.3674 158.2704 160.3223 162.4674 (39)
Average = Sum(39)m / 12 = 159.2791

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.5117	2.4941	2.4768	2.3953	2.3800	2.3090	2.3090	2.2959	2.3364	2.3800	2.4109	2.4431	(40)
HLP (average)												2.3952	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.1583 (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 26.1000 25.7123 25.1665 24.1600 23.4064 22.5708 22.1194 22.6614 23.2516 24.1458 25.1729 26.0117 (42b)
Hot water usage for other uses 36.7327 35.3969 34.0612 32.7255 31.3897 30.0540 30.0540 31.3897 32.7255 34.0612 35.3969 36.7327 (42c)
Average daily hot water use (litres/day) 57.5921 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	62.8326	61.1093	59.2277	56.8855	54.7961	52.6248	52.1734	54.0511	55.9771	58.2070	60.5699	62.7444	(44)
Energy conte	99.5115	87.0188	91.0307	77.8734	73.7661	64.7083	63.0992	66.9266	69.0253	78.9863	86.2929	98.2425	(45)
Energy content (annual)										Total = Sum(45)m =		956.4815	
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	(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	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)
Total heat required for water heating calculated for each month	84.5848	73.9659	77.3761	66.1924	62.7012	55.0020	53.6343	56.8876	58.6715	67.1383	73.3489	83.5061	(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	84.5848	73.9659	77.3761	66.1924	62.7012	55.0020	53.6343	56.8876	58.6715	67.1383	73.3489	83.5061	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		813.0093	(64)
Electric shower(s)	48.3755	43.1029	47.0667	44.9152	45.7580	43.6487	45.1037	45.7580	44.9152	47.0667	46.1817	48.3755	(64a)
												550.2680	(64a)
Heat gains from water heating, kWh/month	33.2401	29.2672	31.1107	27.7769	27.1148	24.6627	24.6845	25.6614	25.8967	28.5513	29.8827	32.9704	(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	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	95.3260	105.5396	95.3260	98.5036	95.3260	95.3260	95.3260	95.3260	98.5036	95.3260	98.5036	95.3260	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	188.9945	190.9557	186.0136	175.4925	162.2115	149.7292	141.3902	139.4291	144.3712	154.8923	168.1733	180.6556	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	(71)
Water heating gains (Table 5)	44.6775	43.5524	41.8155	38.5790	36.4446	34.2537	33.1781	34.4911	35.9676	38.3754	41.5037	44.3151	(72)
Total internal gains	384.3719	395.4215	378.5289	367.9489	349.3559	337.8603	325.2681	324.6200	334.2161	343.9675	363.5544	375.6705	(73)

6. Solar gains

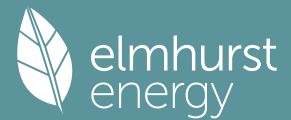
[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W							
Northeast	8.1900	11.2829	0.6300	0.7000	0.7700	28.2409	(75)						
South	7.3800	46.7521	0.6300	0.7000	0.7700	105.4457	(78)						
Solar gains	133.6866	230.1780	323.5500	418.7168	487.7193	493.0826	471.6363	418.3647	355.9968	256.5169	160.5235	114.1777	(83)
Total gains	518.0585	625.5995	702.0790	786.6657	837.0752	830.9429	796.9044	742.9847	690.2129	600.4843	524.0778	489.8482	(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	27.6483	27.8431	28.0382	28.9925	29.1783	30.0755	30.0755	30.2478	29.7234	29.1783	28.8048	28.4245	
alpha	2.8432	2.8562	2.8692	2.9328	2.9452	3.0050	3.0050	3.0165	2.9816	2.9452	2.9203	2.8950	
util living area	0.9932	0.9878	0.9788	0.9560	0.9083	0.8093	0.6854	0.7295	0.8841	0.9668	0.9888	0.9943	(86)
MIT	18.0617	18.3423	18.7916	19.4557	20.0628	20.5871	20.8278	20.7862	20.3878	19.5968	18.7580	18.0744	(87)
Th 2	19.0140	19.0243	19.0344	19.0828	19.0920	19.1353	19.1353	19.1434	19.1185	19.0920	19.0735	19.0543	(88)
util rest of house	0.9905	0.9830	0.9696	0.9345	0.8552	0.6807	0.4577	0.5152	0.7925	0.9462	0.9835	0.9921	(89)
MIT 2	16.5024	16.7870	17.2380	17.9176	18.4941	18.9612	19.1027	19.0953	18.8100	18.0703	17.2327	16.5397	(90)
Living area fraction									fLA = Living area / (4) =			0.3158	(91)

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MIT	16.9948	17.2781	17.7286	18.4033	18.9895	19.4747	19.6474	19.6293	19.3083	18.5523	17.7144	17.0243 (92)
Temperature adjustment												0.0000
adjusted MIT	16.9948	17.2781	17.7286	18.4033	18.9895	19.4747	19.6474	19.6293	19.3083	18.5523	17.7144	17.0243 (93)

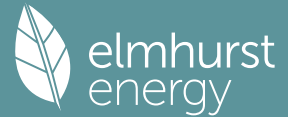
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9862	0.9764	0.9605	0.9237	0.8514	0.7099	0.5317	0.5833	0.8049	0.9375	0.9776	0.9884 (94)
Useful gains	510.9055	610.8481	674.3795	726.6778	712.6918	589.8510	423.6794	433.4099	555.5699	562.9491	512.3258	484.1592 (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	2120.4028	2053.0389	1849.4174	1513.7306	1153.7067	748.4984	467.9277	493.0313	809.1984	1258.6195	1701.7185	2083.5334 (97)
Space heating kWh	1197.4660	969.1522	874.2282	566.6780	328.1150	0.0000	0.0000	0.0000	0.0000	517.5788	856.3627	1189.9344 (98a)
Space heating requirement - total per year (kWh/year)												6499.5154
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	1197.4660	969.1522	874.2282	566.6780	328.1150	0.0000	0.0000	0.0000	0.0000	517.5788	856.3627	1189.9344 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6499.5154
Space heating per m2										(98c) / (4) =		97.7371 (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	1443.3579	1136.2605	1160.3249	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.5730	0.6563	0.6184	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	827.0723	745.7626	717.5903	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	935.6739	897.7566	836.5794	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	78.1932	113.0835	88.5278	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	19.5483	28.2709	22.1320	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												69.9511 (107)
Energy for space heating												97.7371 (99)
Energy for space cooling												1.0519 (108)
Total												98.7890 (109)
Fabric Energy Efficiency (DFEE)												98.8 (109)

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Plot Reference	Flat 1			Issued on Date	12/05/2026
Assessment Reference	001	Plot Type Ref	3688		
Plot Address	Flat 1, 102 Mannock Road, Tottenham, N22 6AA			SAP Version	10.2
SAP Rating	75 C	DER	29.35	TER	
Environmental	77 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.63	DFEE	98.79	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	161.85	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	66.5000	2.6700	177.5550
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5000		
Dwelling volume			177.5550

2. Ventilation rate

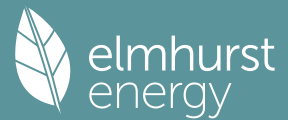
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) = 0.1690 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9190 (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) = 0.8500 (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	1.0838	1.0625	1.0413	0.9350	0.9138	0.8075	0.8075	0.7863	0.8500	0.9138	0.9563	0.9988 (22b)
Effective ac	1.0838	1.0625	1.0413	0.9372	0.9175	0.8261	0.8261	0.8091	0.8613	0.9175	0.9572	0.9988 (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			15.5700	1.3258	20.6420		(27)
Ground floor			65.9000	0.7000	46.1300		(28a)
Existing walls	60.6000	17.6300	42.9700	0.2900	12.4613		(29a)
Total net area of external elements Aum(A, m ²)			126.5000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	82.1173	(33)
Main dwelling							
Party wall			22.8200	0.0000	0.0000		(32)
Party roof			65.9000				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							25.3000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	107.4173 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							
(38)m	63.5033	62.2581	61.0130	54.9108	53.7597	48.4014	48.4014
Heat transfer coeff	170.9206	169.6755	168.4303	162.3281	161.1771	155.8187	155.8187

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Average = Sum(39)m / 12 =

162.2917

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	2.5702	2.5515	2.5328	2.4410	2.4237	2.3431	2.3431	2.3282	2.3742	2.4237	2.4587	2.4953	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1583 (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	0.0000 (42a)
Hot water usage for baths												
69.6291	68.5950	67.1388	64.4538	62.4433	60.2140	59.0098	60.4559	62.0303	64.4158	67.1561	69.3937	(42b)
Hot water usage for other uses												
36.7327	35.3969	34.0612	32.7255	31.3897	30.0540	30.0540	31.3897	32.7255	34.0612	35.3969	36.7327	(42c)
Average daily hot water use (litres/day)												97.9505 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	106.3618	103.9920	101.2000	97.1793	93.8331	90.2680	89.0638	91.8456	94.7558	98.4770	102.5530	106.1264 (44)
Energy content (annual)	168.4511	148.0832	155.5407	133.0336	126.3173	110.9950	107.7150	113.7240	116.8434	133.6323	146.1055	166.1683 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1626.6094
25.2677	22.2125	23.3311	19.9550	18.9476	16.6493	16.1572	17.0586	17.5265	20.0448	21.9158	24.9252 (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	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	29.3566	26.5074	29.3211	28.2778	29.1481	28.1382	29.0397	29.0806	28.1887	29.2109	28.3483	29.3471 (61)
Total heat required for water heating calculated for each month												
197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156 (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	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156 (64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 1970.5742 (64)
Electric shower(s)												1971 (64)
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 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
63.3491	55.8645	59.0476	51.3031	49.2875	43.9404	43.0752	45.0834	45.8976	51.7355	55.6672	62.5878 (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	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	107.9126	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	95.3260	105.5396	95.3260	98.5036	95.3260	98.5036	95.3260	95.3260	98.5036	95.3260	98.5036	95.3260	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	188.9945	190.9557	186.0136	175.4925	162.2115	149.7292	141.3902	139.4291	144.3712	154.8923	168.1733	180.6556	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	33.7913	(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)	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	(71)
Water heating gains (Table 5)	85.1467	83.1317	79.3650	71.2543	66.2467	61.0283	57.8967	60.5959	63.7467	69.5369	77.3155	84.1234	(72)
Total internal gains	427.8411	438.0008	419.0784	403.6242	382.1580	364.6349	349.9868	350.7248	361.9952	378.1290	402.3662	418.4788	(73)

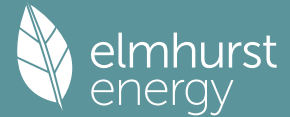
6. Solar gains

[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			8.1900	11.2829	0.6300	0.7000	0.7700	28.2409 (75)				
South			7.3800	46.7521	0.6300	0.7000	0.7700	105.4457 (78)				
Solar gains	133.6866	230.1780	323.5500	418.7168	487.7193	493.0826	471.6363	418.3647	355.9968	256.5169	160.5235	114.1777 (83)
Total gains	561.5277	668.1788	742.6285	822.3410	869.8773	857.7175	821.6230	769.0895	717.9919	634.6459	562.8896	532.6565 (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	27.0187	27.2170	27.4182	28.4489	28.6521	29.6374	29.6374	29.8273	29.2499	28.6521	28.2440	27.8297
alpha	2.8012	2.8145	2.8279	2.8966	2.9101	2.9758	2.9758	2.9885	2.9500	2.9101	2.8829	2.8553
util living area	0.9915	0.9856	0.9757	0.9517	0.9022	0.8018	0.6773	0.7198	0.8766	0.9624	0.9865	0.9928 (86)
MIT	18.0575	18.3376	18.7882	19.4580	20.0656	20.5901	20.8290	20.7895	20.3936	19.6059	18.7644	18.0753 (87)
Th 2	18.9803	18.9910	19.0018	19.0555	19.0658	19.1144	19.1144	19.1235	19.0956	19.0658	19.0450	19.0236 (88)
util rest of house	0.9882	0.9799	0.9654	0.9284	0.8463	0.6702	0.4478	0.5031	0.7808	0.9393	0.9801	0.9900 (89)
MIT 2	15.7687	16.1301	16.7071	17.5733	18.3086	18.8959	19.0738	19.0643	18.7097	17.7758	16.7043	15.8130 (90)
Living area fraction	fLA = Living area / (4) = 0.3158 (91)											
MIT	16.4915	16.8272	17.3643	18.1685	18.8635	19.4309	19.6281	19.6091	19.2415	18.3537	17.3549	16.5274 (92)
Temperature adjustment	-0.1500											

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adjusted MIT 16.3415 16.6772 17.2143 18.0185 18.7135 19.2809 19.4781 19.4591 19.0915 18.2037 17.2049 16.3774 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9807	0.9690	0.9506	0.9099	0.8322	0.6850	0.5009	0.5509	0.7805	0.9231	0.9700	0.9835	(94)
Useful gains	550.7149	647.4874	705.9174	748.2408	723.9528	587.5443	411.5239	423.6682	560.3836	585.8397	545.9842	523.8921	(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	2058.1415	1998.3086	1804.6159	1480.1824	1130.4076	729.3753	448.4599	473.6268	788.0681	1225.5398	1652.2013	2020.7185	(97)
Space heating kWh	1121.5254	907.7518	817.4317	526.9979	302.4024	0.0000	0.0000	0.0000	0.0000	475.9369	796.4763	1113.6388	(98a)
Space heating requirement - total per year (kWh/year)												6062.1612	
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	1121.5254	907.7518	817.4317	526.9979	302.4024	0.0000	0.0000	0.0000	0.0000	475.9369	796.4763	1113.6388	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6062.1612	
Space heating per m2										(98c) / (4) =		91.1603	(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	1121.5254	907.7518	817.4317	526.9979	302.4024	0.0000	0.0000	0.0000	0.0000	475.9369	796.4763	1113.6388	(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)	1264.4029	1023.3955	921.5690	594.1352	340.9272	0.0000	0.0000	0.0000	0.0000	536.5692	897.9440	1255.5116	(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	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156	(64)	
Efficiency of water heater (217)m	88.6247	88.6190	88.6074	88.5823	88.5296	88.2000	88.2000	88.2000	88.2000	88.5720	88.6097	88.2000	(216)	
Fuel for water heating, kWh/month	223.1971	197.0127	208.6303	182.1034	175.6085	157.7475	155.0507	161.9100	164.4355	183.8540	196.8788	220.6100	(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	31.7718	25.4886	22.9496	16.8139	12.9875	10.6109	11.8476	15.4000	20.0031	26.2452	29.6438	32.6549	(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													6834.4546	(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													2227.0385	(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)													256.4170	(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													9403.9101	(238)

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6834.4546	0.2100	1435.2355	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2227.0385	0.2100	467.6781	(264)
Space and water heating			1902.9135	(265)

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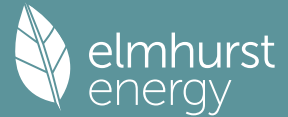


Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	256.4170	0.1443	37.0089 (268)
Total CO2, kg/year			1951.8517 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			29.3500 (273)

----- 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	6834.4546	1.1300	7722.9337 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)			2516.5535 (278)
Space and water heating	2227.0385	1.1300	10239.4872 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	256.4170	1.5338	393.3009 (282)
Total Primary energy kWh/year			10762.8889 (286)
Dwelling Primary energy Rate (DPER)			161.8500 (287)

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Plot Reference	Flat 1			Issued on Date	12/05/2026
Assessment Reference	001	Plot Type Ref	3688		
Plot Address	Flat 1, 102 Mannock Road, Tottenham, N22 6AA			SAP Version	10.2
SAP Rating	75 C	DER	29.35	TER	
Environmental	77 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.63	DFEE	98.79	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	161.85	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	66.5000 (1b)	2.6700 (2b)	177.5550 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	177.5550 (5)

2. Ventilation rate

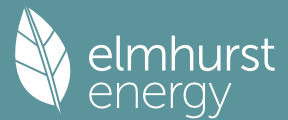
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) = 0.1690 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9190 (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) = 0.8500 (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)
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	1.0838	1.0625	1.0413	0.9350	0.9138	0.8075	0.8075	0.7863	0.8500	0.9138	0.9563	0.9988 (22b)
Effective ac	1.0838	1.0625	1.0413	0.9372	0.9175	0.8261	0.8261	0.8091	0.8613	0.9175	0.9572	0.9988 (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			15.5700	1.3258	20.6420		(27)
Ground floor			65.9000	0.7000	46.1300		(28a)
Existing walls	60.6000	17.6300	42.9700	0.2900	12.4613		(29a)
Total net area of external elements Aum(A, m ²)			126.5000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	82.1173		(33)
Main dwelling							
Party wall			22.8200	0.0000	0.0000		(32)
Party roof			65.9000				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							25.3000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	107.4173 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							
(38)m	63.5033	62.2581	61.0130	54.9108	53.7597	48.4014	48.4014
Heat transfer coeff	170.9206	169.6755	168.4303	162.3281	161.1771	155.8187	155.8187
						154.8264	154.8264
						157.8827	157.8827
						161.1771	161.1771
						163.5056	163.5056
						165.9400	165.9400 (39)

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Average = Sum(39)m / 12 =

162.2917

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.5702	2.5515	2.5328	2.4410	2.4237	2.3431	2.3431	2.3282	2.3742	2.4237	2.4587	2.4953	(40)
HLP (average)												2.4405	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.1583 (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	0.0000	(42a)
Hot water usage for baths													
69.6291	68.5950	67.1388	64.4538	62.4433	60.2140	59.0098	60.4559	62.0303	64.4158	67.1561	69.3937	69.3937	(42b)
Hot water usage for other uses													
36.7327	35.3969	34.0612	32.7255	31.3897	30.0540	30.0540	31.3897	32.7255	34.0612	35.3969	36.7327	36.7327	(42c)
Average daily hot water use (litres/day)												97.9505	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	106.3618	103.9920	101.2000	97.1793	93.8331	90.2680	89.0638	91.8456	94.7558	98.4770	102.5530	106.1264	(44)
Energy conte	168.4511	148.0832	155.5407	133.0336	126.3173	110.9950	107.7150	113.7240	116.8434	133.6323	146.1055	166.1683	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m													
25.2677	22.2125	23.3311	19.9550	18.9476	16.6493	16.1572	17.0586	17.5265	20.0448	21.9158	24.9252	24.9252	(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	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	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	29.3566	26.5074	29.3211	28.2778	29.1481	28.1382	29.0397	29.0806	28.1887	29.2109	28.3483	29.3473	(61)
Total heat required for water heating calculated for each month													
197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156	195.5156	(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	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156	(64)
												1970.5742	(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	0.0000	(64a)
												0.0000	(64a)
Heat gains from water heating, kWh/month													
63.3491	55.8645	59.0476	51.3031	49.2875	43.9404	43.0752	45.0834	45.8976	51.7355	55.6672	62.5878	62.5878	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
36.2985	32.2400	26.2193	19.8497	14.8379	12.5268	13.5356	17.5941	23.6148	29.9844	34.9962	37.3073	37.3073	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
282.0814	285.0085	277.6323	261.9291	242.1067	223.4764	211.0302	208.1031	215.4793	231.1825	251.0049	269.6352	269.6352	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	(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)													
-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	(71)
Water heating gains (Table 5)													
85.1467	83.1317	79.3650	71.2543	66.2467	61.0283	57.8967	60.5959	63.7467	69.5369	77.3155	84.1234	84.1234	(72)
Total internal gains													
499.7994	496.6530	479.4894	449.3060	419.4641	390.3043	375.7353	379.5659	396.1136	426.9766	459.5894	487.3387	487.3387	(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					8.1900	11.2829	0.6300	0.7000	0.7700		28.2409 (75)	
South					7.3800	46.7521	0.6300	0.7000	0.7700		105.4457 (78)	
Solar gains	133.6866	230.1780	323.5500	418.7168	487.7193	493.0826	471.6363	418.3647	355.9968	256.5169	160.5235	114.1777 (83)
Total gains	633.4860	726.8311	803.0394	868.0228	907.1834	883.3869	847.3716	797.9306	752.1103	683.4935	620.1129	601.5164 (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	27.0187	27.2170	27.4182	28.4489	28.6521	29.6374	29.6374	29.8273	29.2499	28.6521	28.2440	27.8297
alpha	2.8012	2.8145	2.8279	2.8966	2.9101	2.9758	2.9758	2.9885	2.9500	2.9101	2.8829	2.8553
util living area	0.9885	0.9822	0.9707	0.9453	0.8935	0.7919	0.6646	0.7052	0.8650	0.9551	0.9827	0.9901 (86)
MIT	18.1464	18.4087	18.8589	19.5075	20.0993	20.6058	20.8379	20.8016	20.4216	19.6609	18.8348	18.1617 (87)
Th 2	18.9803	18.9910	19.0018	19.0555	19.0658	19.1144	19.1144	19.1235	19.0956	19.0658	19.0450	19.0236 (88)
util rest of house												
	0.9841	0.9753	0.9585	0.9195	0.8343	0.6580	0.4361	0.4882	0.7643	0.9285	0.9747	0.9864 (89)
MIT 2	15.8813	16.2194	16.7943	17.6315	18.3433	18.9069	19.0766	19.0689	18.7338	17.8403	16.7924	15.9226 (90)
Living area fraction									fLA = Living area / (4) =			0.3158 (91)
MIT	16.5966	16.9107	17.4463	18.2239	18.8978	19.4434	19.6328	19.6161	19.2668	18.4153	17.4374	16.6297 (92)
Temperature adjustment												-0.1500
adjusted MIT	16.4466	16.7607	17.2963	18.0739	18.7478	19.2934	19.4828	19.4661	19.1168	18.2653	17.2874	16.4797 (93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9747	0.9629	0.9421	0.9005	0.8211	0.6741	0.4891	0.5365	0.7658	0.9115	0.9628	0.9782	(94)
Useful gains	617.4773	699.8529	756.5520	781.6627	744.8501	595.4579	414.4809	428.1005	575.9849	622.9858	597.0685	588.3864	(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	2076.1023	2012.4773	1818.4214	1489.1796	1135.9497	731.3158	449.1928	474.7061	792.0632	1235.4645	1665.6910	2037.6930	(97)
Space heating kWh	1085.2170	882.0836	790.0309	509.4122	290.9781	0.0000	0.0000	0.0000	0.0000	455.6841	769.4082	1078.2841	(98a)
Space heating requirement - total per year (kWh/year)												5861.0982	
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	1085.2170	882.0836	790.0309	509.4122	290.9781	0.0000	0.0000	0.0000	0.0000	455.6841	769.4082	1078.2841	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5861.0982	
Space heating per m2											(98c) / (4) =	88.1368	(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	1085.2170	882.0836	790.0309	509.4122	290.9781	0.0000	0.0000	0.0000	0.0000	455.6841	769.4082	1078.2841	(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)	1223.4690	994.4572	890.6775	574.3091	328.0475	0.0000	0.0000	0.0000	0.0000	513.7364	867.4275	1215.6528	(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	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156	(64)	
Efficiency of water heater (217)m	88.6225	88.6170	88.6048	88.5792	88.5252	88.2000	88.2000	88.2000	88.2000	88.5678	88.6072	88.6229	(216)	
Fuel for water heating, kWh/month	223.2025	197.0171	208.6364	182.1098	175.6171	157.7475	155.0507	161.9100	164.4355	183.8627	196.8846	220.6152	(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	31.7718	25.4886	22.9496	16.8139	12.9875	10.6109	11.8476	15.4000	20.0031	26.2452	29.6438	32.6549	(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													6607.7770	(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													2227.0889	(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)													256.4170	(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													9177.2829	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6607.7770	3.6400	240.5231	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2227.0889	3.6400	81.0660	(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)

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Energy for lighting	256.4170	16.4900	42.2832 (250)
Additional standing charges			92.0000 (251)
Total energy cost			470.0537 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.5177 (257)
SAP value		75.3987
SAP rating (Section 12)		75 (258)
SAP band		C

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

	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1	6607.7770	0.2100	1387.6332 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	2227.0889	0.2100	467.6887 (264)
Space and water heating			1855.3219 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	256.4170	0.1443	37.0089 (268)
Total CO ₂ , kg/year			1904.2600 (272)
CO ₂ emissions per m ²			28.6400 (273)
EI value			77.1147
EI rating			77 (274)
EI band			C

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 (m ²)	Storey height (m)	Volume (m ³)
Main dwelling	66.5000 (1b)	x 2.6700 (2b)	= 177.5550 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	177.5550 (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)

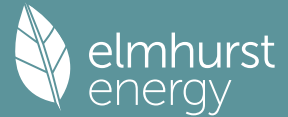
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1690 (8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9190	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =		0.8500 (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	0.9350	0.8925	0.8925	0.8288	0.8288	0.7225	0.7438	0.7863	0.7650	0.8075	0.8075	0.8925 (22b)
Effective ac	0.9372	0.8983	0.8983	0.8434	0.8434	0.7610	0.7766	0.8091	0.7926	0.8261	0.8261	0.8983 (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			15.5700	1.3258	20.6420		(27)
Ground floor			65.9000	0.7000	46.1300		(28a)
Existing walls	60.6000	17.6300	42.9700	0.2900	12.4613		(29a)
Total net area of external elements Aum (A, m ²)			126.5000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		82.1173		(33)
Main dwelling							
Party wall			22.8200	0.0000	0.0000		(32)
Party roof			65.9000				(32b)

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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) 25.3000 (36)
 Point Thermal bridges 0.0000
 Total fabric heat loss (33) + (36) + (36a) = 107.4173 (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	54.9108	52.6351	52.6351	49.4201	49.4201	44.5910	45.5039	47.4091	46.4433	48.4014	48.4014	52.6351 (38)
Average = Sum(39)m / 12 =	162.3281	160.0525	160.0525	156.8375	156.8375	152.0083	152.9212	154.8264	153.8606	155.8187	155.8187	160.0525 (39)
												156.7845
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.4410	2.4068	2.4068	2.3585	2.3585	2.2858	2.2996	2.3282	2.3137	2.3431	2.3431	2.4068 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.1583 (42)											
Hot water usage for mixer showers	0.0000 (42a)											
Hot water usage for baths	69.6291 (42b)											
Hot water usage for other uses	36.7327 (42c)											
Average daily hot water use (litres/day)	97.9505 (43)											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	106.3618	103.9920	101.2000	97.1793	93.8331	90.2680	89.0638	91.8456	94.7558	98.4770	102.5530	106.1264 (44)
Energy content (annual)	168.4511	148.0832	155.5407	133.0336	126.3173	110.9950	107.7150	113.7240	116.8434	133.6323	146.1055	166.1683 (45)
Distribution loss (46)m = 0.15 x (45)m	25.2677 (46)											
Water storage loss (or HIU loss):	0.0000 (56)											
Total storage loss	0.0000 (57)											
If cylinder contains dedicated solar storage	0.0000 (59)											
Primary loss	29.3566 (62)											
Combi loss	197.8077 (63a)											
Total heat required for water heating calculated for each month	174.5906 (63b)											
WWHRS	184.8618 (63c)											
PV diverter	161.3114 (64)											
Solar input	155.4655 (64a)											
FGHRS	139.1333 (64b)											
Output from w/h	136.7547 (64c)											
Electric shower(s)	142.8046 (64)											
Heat gains from water heating, kWh/month	145.0321 (64a)											
	162.8432 (64b)											
	174.4538 (64c)											
	195.5156 (64)											
	1970.5742 (64)											
	0.0000 (64a)											
	0.0000 (64a)											
	63.3491 (65)											
	55.8645 (65)											
	59.0476 (65)											
	51.3031 (65)											
	49.2875 (65)											
	43.9404 (65)											
	43.0752 (65)											
	45.0834 (65)											
	45.8976 (65)											
	51.7355 (65)											
	55.6672 (65)											
	62.5878 (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	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	36.2985	32.2400	26.2193	19.8497	14.8379	12.5268	13.5356	17.5941	23.6148	29.9844	34.9962	37.3073 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	282.0814	285.0085	277.6323	261.9291	242.1067	223.4764	211.0302	208.1031	215.4793	231.1825	251.0049	269.6352 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078 (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)	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301 (71)
Water heating gains (Table 5)	85.1467	83.1317	79.3650	71.2543	66.2467	61.0283	57.8967	60.5959	63.7467	69.5369	77.3155	84.1234 (72)
Total internal gains	499.7994	496.6530	479.4894	449.3060	419.4641	390.3043	375.7353	379.5659	396.1136	426.9766	459.5894	487.3387 (73)

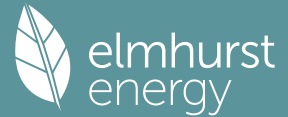
6. Solar gains

[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				8.1900	12.4928	0.6300	0.7000	0.7700	31.2690 (75)			
South				7.3800	49.2853	0.6300	0.7000	0.7700	111.1593 (78)			
Solar gains	142.4284	220.4112	312.2080	422.5313	480.7876	522.0989	500.4789	452.0998	381.0947	268.5796	176.6439	124.6046 (83)
Total gains	642.2277	717.0642	791.6974	871.8372	900.2516	912.4032	876.2142	831.6657	777.2083	695.5562	636.2334	611.9433 (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	28.4489	28.8534	28.8534	29.4449	29.4449	30.3803	30.1989	29.8273	30.0145	29.6374	29.6374	28.8534
alpha	2.8966	2.9236	2.9236	2.9630	2.9630	3.0254	3.0133	2.9885	3.0010	2.9758	2.9758	2.9236
util living area												

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	0.9859	0.9797	0.9638	0.9239	0.8413	0.6446	0.4154	0.4684	0.7678	0.9317	0.9761	0.9876 (86)
MIT	18.5214	18.7513	19.2296	19.8677	20.4258	20.8516	20.9755	20.9623	20.7091	20.0217	19.2225	18.5176 (87)
Th 2	19.0555	19.0759	19.0759	19.1051	19.1051	19.1496	19.1411	19.1235	19.1324	19.1144	19.1144	19.0759 (88)
util rest of house												
	0.9802	0.9714	0.9475	0.8848	0.7454	0.4336	0.1118	0.1528	0.5927	0.8864	0.9642	0.9825 (89)
MIT 2	16.3975	16.6988	17.3008	18.0983	18.7258	19.1113	19.1409	19.1228	19.0173	18.3049	17.3199	16.4037 (90)
Living area fraction									fLA = Living area / (4) =			0.3158 (91)
MIT	17.0682	17.3470	17.9099	18.6571	19.2626	19.6609	19.7203	19.7037	19.5515	18.8470	17.9207	17.0712 (92)
Temperature adjustment												-0.1500
adjusted MIT	16.9182	17.1970	17.7599	18.5071	19.1126	19.5109	19.5703	19.5537	19.4015	18.6970	17.7707	16.9212 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9698	0.9585	0.9305	0.8676	0.7459	0.4815	0.1858	0.2311	0.6246	0.8717	0.9506	0.9731	(94)
Useful gains	622.8432	687.3088	736.6664	756.3688	671.4731	439.3110	162.8152	192.1754	485.4116	606.3358	604.7729	595.4686	(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	1869.7346	1808.1084	1594.1040	1271.4922	895.9518	472.8830	163.6645	194.1050	569.5183	1027.9396	1460.1353	1844.0035	(97)
Space heating kWh	927.6872	753.1773	637.9336	370.8888	167.0121	0.0000	0.0000	0.0000	0.0000	313.6732	615.8609	928.9100	(98a)
Space heating requirement - total per year (kWh/year)												4715.1432	
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	927.6872	753.1773	637.9336	370.8888	167.0121	0.0000	0.0000	0.0000	0.0000	313.6732	615.8609	928.9100	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4715.1432	
Space heating per m2										(98c) / (4) =		70.9044	(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	927.6872	753.1773	637.9336	370.8888	167.0121	0.0000	0.0000	0.0000	0.0000	313.6732	615.8609	928.9100	(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)	1045.8706	849.1289	719.2036	418.1385	188.2888	0.0000	0.0000	0.0000	0.0000	353.6338	694.3190	1047.2491	(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	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156	(64)
Efficiency of water heater (217)m	88.6117	88.6055	88.5872	88.5479	88.4582	88.2000	88.2000	88.2000	88.2000	88.5285	88.5891	88.6127	(216)
Fuel for water heating, kWh/month	223.2298	197.0427	208.6778	182.1743	175.7501	157.7475	155.0507	161.9100	164.4355	183.9444	196.9246	220.6407	(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	31.7718	25.4886	22.9496	16.8139	12.9875	10.6109	11.8476	15.4000	20.0031	26.2452	29.6438	32.6549	(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												5315.8323	(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												2227.5280	(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)												256.4170	(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												7885.7772	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	5315.8323	7.3200	389.1189 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2227.5280	7.3200	163.0550 (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	256.4170	27.6700	70.9506 (250)
Additional standing charges			108.0000 (251)
Total energy cost			754.9208 (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	5315.8323	0.2100	1116.3248 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2227.5280	0.2100	467.7809 (264)
Space and water heating			1584.1056 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	256.4170	0.1443	37.0089 (268)
Total CO2, kg/year			1633.0438 (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	5315.8323	1.1300	6006.8905 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2227.5280	1.1300	2517.1066 (278)
Space and water heating			8523.9971 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	256.4170	1.5338	393.3009 (282)
Total Primary energy kWh/year			9047.3988 (286)

SAP 10 EPC IMPROVEMENTS

001

Current energy efficiency rating: C 75
Current environmental impact rating: C 77

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 Environmental
(none) efficiency impact

Total Savings £0 0.00 kg/m²

Potential energy efficiency rating: C 75
Potential environmental impact rating: C 77

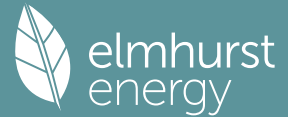
Fuel prices for cost data on this page from database revision number 594 TEST (30 Apr 2026)
Recommendation texts revision number 6.1 (11 Jun 2019)

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

	Current	Potential	Saving
Electricity	£95	£95	£0
Mains gas	£660	£660	£0
Space heating	£521	£521	£0
Water heating	£163	£163	£0
Lighting	£71	£71	£0
Total cost of fuels	£755	£755	£0
Total cost of uses	£755	£755	£0
Delivered energy	119 kWh/m²	119 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.6 tonnes	1.6 tonnes	0.0 tonnes
CO2 emissions per m²	25 kg/m²	25 kg/m²	0 kg/m²
Primary energy	136 kWh/m²	136 kWh/m²	0 kWh/m²

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

Full SAP Calculation Printout



1. Overall dwelling characteristics

Main dwelling	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	66.5000 (1b)	x 2.6700 (2b)	= 177.5550 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 177.5550 (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) =	Air changes per hour 30.0000 / (5) = 0.1690 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9190 (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) = 0.8500 (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	1.0838	1.0625	1.0413	0.9350	0.9138	0.8075	0.8075	0.7863	0.8500	0.9138	0.9563	0.9988 (22b)
Effective ac	1.0838	1.0625	1.0413	0.9372	0.9175	0.8261	0.8261	0.8091	0.8613	0.9175	0.9572	0.9988 (25)

3. Heat losses and heat loss parameter

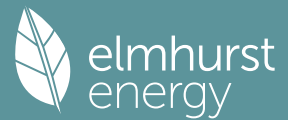
Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			2.0600	1.4000	2.8840		(26)
Window			15.5700	1.3258	20.6420		(27)
Ground floor			65.9000	0.7000	46.1300		(28a)
Existing walls	60.6000	17.6300	42.9700	0.2900	12.4613		(29a)
Total net area of external elements Aum(A, m ²)			126.5000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	82.1173		(33)
Main dwelling							
Party wall			22.8200	0.0000	0.0000		(32)
Party roof			65.9000				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							25.3000 (36)
Point Thermal Bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	107.4173 (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	63.5033	62.2581	61.0130	54.9108	53.7597	48.4014	48.4014	47.4091	50.4653	53.7597	56.0883	58.5227 (38)
Average = Sum(39)m / 12 =	170.9206	169.6755	168.4303	162.3281	161.1771	155.8187	155.8187	154.8264	157.8827	161.1771	163.5056	165.9400 (39)
												162.2917
HLP (average)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Days in month	2.5702	2.5515	2.5328	2.4410	2.4237	2.3431	2.3431	2.3282	2.3742	2.4237	2.4587	2.4953 (40)
	31	28	31	30	31	30	31	31	30	31	30	2.4405
												31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1583 (42)
Hot water usage for mixer showers												0.0000 (42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses	69.6291	68.5950	67.1388	64.4538	62.4433	60.2140	59.0098	60.4559	62.0303	64.4158	67.1561	69.3937 (42c)
Average daily hot water use (litres/day)	36.7327	35.3969	34.0612	32.7255	31.3897	30.0540	30.0540	31.3897	32.7255	34.0612	35.3969	36.7327 (42c)
												97.9505 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	106.3618	103.9920	101.2000	97.1793	93.8331	90.2680	89.0638	91.8456	94.7558	98.4770	102.5530	106.1264 (44)
Energy content (annual)	168.4511	148.0832	155.5407	133.0336	126.3173	110.9950	107.7150	113.7240	116.8434	133.6323	146.1055	166.1683 (45)
Distribution loss (46)m = 0.15 x (45)m	25.2677	22.2125	23.3311	19.9550	18.9476	16.6493	16.1572	17.0586	17.5265	20.0448	21.9158	24.9252 (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	29.3566	26.5074	29.3211	28.2778	29.1481	28.1382	29.0397	29.0806	28.1887	29.2109	28.3483	29.3473 (61)
Total heat required for water heating calculated for each month	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156 (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)

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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	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156 (64)
Total per year (kWh/year) = Sum(64)m =												1970.5742 (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	63.3491	55.8645	59.0476	51.3031	49.2875	43.9404	43.0752	45.0834	45.8976	51.7355	55.6672	62.5878 (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	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	36.2985	32.2400	26.2193	19.8497	14.8379	12.5268	13.5356	17.5941	23.6148	29.9844	34.9962	37.3073	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	282.0814	285.0085	277.6323	261.9291	242.1067	223.4764	211.0302	208.1031	215.4793	231.1825	251.0049	269.6352	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	(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)	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	(71)
Water heating gains (Table 5)	85.1467	83.1317	79.3650	71.2543	66.2467	61.0283	57.8967	60.5959	63.7467	69.5369	77.3155	84.1234	(72)
Total internal gains	499.7994	496.6530	479.4894	449.3060	419.4641	390.3043	375.7353	379.5659	396.1136	426.9766	459.5894	487.3387	(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				8.1900	11.2829		0.6300	0.7000	0.7700		28.2409 (75)	
South				7.3800	46.7521		0.6300	0.7000	0.7700		105.4457 (78)	
Solar gains	133.6866	230.1780	323.5500	418.7168	487.7193	493.0826	471.6363	418.3647	355.9968	256.5169	160.5235	114.1777 (83)
Total gains	633.4860	726.8311	803.0394	868.0228	907.1834	883.3869	847.3716	797.9306	752.1103	683.4935	620.1129	601.5164 (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	27.0187	27.2170	27.4182	28.4489	28.6521	29.6374	29.6374	29.8273	29.2499	28.6521	28.2440	27.8297	
alpha	2.8012	2.8145	2.8279	2.8966	2.9101	2.9758	2.9758	2.9885	2.9500	2.9101	2.8829	2.8553	
util living area	0.9885	0.9822	0.9707	0.9453	0.8935	0.7919	0.6646	0.7052	0.8650	0.9551	0.9827	0.9901	(86)
MIT	18.1464	18.4087	18.8589	19.5075	20.0993	20.6058	20.8379	20.8016	20.4216	19.6609	18.8348	18.1617	(87)
Th 2	18.9803	18.9910	19.0018	19.0555	19.0658	19.1144	19.1144	19.1235	19.0956	19.0658	19.0450	19.0236	(88)
util rest of house	0.9841	0.9753	0.9585	0.9195	0.8343	0.6580	0.4361	0.4882	0.7643	0.9285	0.9747	0.9864	(89)
MIT 2	15.8813	16.2194	16.7943	17.6315	18.3433	18.9069	19.0766	19.0689	18.7338	17.8403	16.7924	15.9226	(90)
Living area fraction	fLA = Living area / (4) =												0.3158 (91)
MIT	16.5966	16.9107	17.4463	18.2239	18.8978	19.4434	19.6328	19.6161	19.2668	18.4153	17.4374	16.6297	(92)
Temperature adjustment													-0.1500
adjusted MIT	16.4466	16.7607	17.2963	18.0739	18.7478	19.2934	19.4828	19.4661	19.1168	18.2653	17.2874	16.4797	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	617.4773	699.8529	756.5520	781.6627	744.8501	595.4579	414.4809	428.1005	575.9849	622.9858	597.0685	588.3864	(94)
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	2076.1023	2012.4773	1818.4214	1489.1796	1135.9497	731.3158	449.1928	474.7061	792.0632	1235.4645	1665.6910	2037.6930	(97)
Space heating kWh	1085.2170	882.0836	790.0309	509.4122	290.9781	0.0000	0.0000	0.0000	0.0000	455.6841	769.4082	1078.2841	(98a)
Space heating requirement - total per year (kWh/year)													5861.0982
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	1085.2170	882.0836	790.0309	509.4122	290.9781	0.0000	0.0000	0.0000	0.0000	455.6841	769.4082	1078.2841	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)													5861.0982
Space heating per m2													(98c) / (4) = 88.1368 (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	1085.2170	882.0836	790.0309	509.4122	290.9781	0.0000	0.0000	0.0000	0.0000	455.6841	769.4082	1078.2841	(98)
Space heating efficiency (main heating system 1)													

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Space heating fuel (main heating system)	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)
1223.4690	994.4572	890.6775	574.3091	328.0475	0.0000	0.0000	0.0000	0.0000	0.0000	513.7364	867.4275	1215.6528	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156	(64)
Efficiency of water heater (217)m	88.6225	88.6170	88.6048	88.5792	88.5252	88.2000	88.2000	88.2000	88.2000	88.5678	88.6072	88.2000	(216)
Fuel for water heating, kWh/month	223.2025	197.0171	208.6364	182.1098	175.6171	157.7475	155.0507	161.9100	164.4355	183.8627	196.8846	220.6152	(219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
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	31.7718	25.4886	22.9496	16.8139	12.9875	10.6109	11.8476	15.4000	20.0031	26.2452	29.6438	32.6549	(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												6607.7770	(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												2227.0889	(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)												256.4170	(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												9177.2829	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6607.7770	3.6400	240.5231	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2227.0889	3.6400	81.0660	(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	256.4170	16.4900	42.2832	(250)
Additional standing charges			92.0000	(251)
Total energy cost			470.0537	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)		1.5177	(257)
SAP value		75.3987	
SAP rating (Section 12)		75	(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	6607.7770	0.2100	1387.6332	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2227.0889	0.2100	467.6887	(264)
Space and water heating			1855.3219	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	256.4170	0.1443	37.0089	(268)
Total CO2, kg/year			1904.2600	(272)
CO2 emissions per m2			28.6400	(273)
EI value			77.1147	
EI rating			77	(274)
EI band			C	

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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

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	66.5000 (1b)	x 2.6700 (2b)	= 177.5550 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	66.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 177.5550 (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) = 0.1690 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9190 (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) = 0.8500 (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	0.9350	0.8925	0.8925	0.8288	0.8288	0.7225	0.7438	0.7863	0.7650	0.8075	0.8075	0.8925 (22b)
Effective ac	0.9372	0.8983	0.8983	0.8434	0.8434	0.7610	0.7766	0.8091	0.7926	0.8261	0.8261	0.8983 (25)

3. Heat losses and heat loss parameter

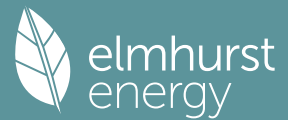
Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Main dwelling							
Door			2.0600	1.4000	2.8840		(26)
Window			15.5700	1.3258	20.6420		(27)
Ground floor			65.9000	0.7000	46.1300		(28a)
Existing walls	60.6000	17.6300	42.9700	0.2900	12.4613		(29a)
Total net area of external elements Aum(A, m2)			126.5000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	82.1173		(33)
Main dwelling							
Party wall			22.8200	0.0000	0.0000		(32)
Party roof			65.9000				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							25.3000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	107.4173 (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	54.9108	52.6351	52.6351	49.4201	49.4201	44.5910	45.5039	47.4091	46.4433	48.4014	48.4014	52.6351 (38)
Average = Sum(39)m / 12 =	162.3281	160.0525	160.0525	156.8375	156.8375	152.0083	152.9212	154.8264	153.8606	155.8187	155.8187	160.0525 (39)
												156.7845
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.4410	2.4068	2.4068	2.3585	2.3585	2.2858	2.2996	2.3282	2.3137	2.3431	2.3431	2.4068 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1583 (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	69.6291	68.5950	67.1388	64.4538	62.4433	60.2140	59.0098	60.4559	62.0303	64.4158	67.1561	69.3937 (42b)
Hot water usage for other uses	36.7327	35.3969	34.0612	32.7255	31.3897	30.0540	30.0540	31.3897	32.7255	34.0612	35.3969	36.7327 (42c)
Average daily hot water use (litres/day)												97.9505 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	106.3618	103.9920	101.2000	97.1793	93.8331	90.2680	89.0638	91.8456	94.7558	98.4770	102.5530	106.1264 (44)
Energy content (annual)	168.4511	148.0832	155.5407	133.0336	126.3173	110.9950	107.7150	113.7240	116.8434	133.6323	146.1055	166.1683 (45)
Distribution loss (46)m = 0.15 x (45)m												1626.6094

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	25.2677	22.2125	23.3311	19.9550	18.9476	16.6493	16.1572	17.0586	17.5265	20.0448	21.9158	24.9252 (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	29.3566	26.5074	29.3211	28.2778	29.1481	28.1382	29.0397	29.0806	28.1887	29.2109	28.3483	29.3473 (61)
Total heat required for water heating calculated for each month	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156 (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	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156 (64)
	Total per year (kWh/year) = Sum(64)m =											1970.5742 (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	63.3491	55.8645	59.0476	51.3031	49.2875	43.9404	43.0752	45.0834	45.8976	51.7355	55.6672	62.5878 (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	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951	129.4951 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	36.2985	32.2400	26.2193	19.8497	14.8379	12.5268	13.5356	17.5941	23.6148	29.9844	34.9962	37.3073 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	282.0814	285.0085	277.6323	261.9291	242.1067	223.4764	211.0302	208.1031	215.4793	231.1825	251.0049	269.6352 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078	50.1078 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301	-86.3301 (71)
Water heating gains (Table 5)	85.1467	83.1317	79.3650	71.2543	66.2467	61.0283	57.8967	60.5959	63.7467	69.5369	77.3155	84.1234 (72)
Total internal gains	499.7994	496.6530	479.4894	449.3060	419.4641	390.3043	375.7353	379.5659	396.1136	426.9766	459.5894	487.3387 (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					8.1900	12.4928	0.6300	0.7000			0.7700			31.2690 (75)
South					7.3800	49.2853	0.6300	0.7000			0.7700			111.1593 (78)
Solar gains	142.4284	220.4112	312.2080	422.5313	480.7876	522.0989	500.4789	452.0998	381.0947	268.5796	176.6439			124.6046 (83)
Total gains	642.2277	717.0642	791.6974	871.8372	900.2516	912.4032	876.2142	831.6657	777.2083	695.5562	636.2334			611.9433 (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	28.4489	28.8534	28.8534	29.4449	29.4449	30.3803	30.1989	29.8273	30.0145	29.6374	29.6374	28.8534
alpha	2.8966	2.9236	2.9236	2.9630	2.9630	3.0254	3.0133	2.9885	3.0010	2.9758	2.9758	2.9236
util living area	0.9859	0.9797	0.9638	0.9239	0.8413	0.6446	0.4154	0.4684	0.7678	0.9317	0.9761	0.9876 (86)
MIT	18.5214	18.7513	19.2296	19.8677	20.4258	20.8516	20.9755	20.9623	20.7091	20.0217	19.2225	18.5176 (87)
Th 2	19.0555	19.0759	19.0759	19.1051	19.1051	19.1496	19.1411	19.1235	19.1324	19.1144	19.1144	19.0759 (88)
util rest of house	0.9802	0.9714	0.9475	0.8848	0.7454	0.4336	0.1118	0.1528	0.5927	0.8864	0.9642	0.9825 (89)
MIT 2	16.3975	16.6988	17.3008	18.0983	18.7258	19.1113	19.1409	19.1228	19.0173	18.3049	17.3199	16.4037 (90)
Living area fraction	17.0682	17.3470	17.9099	18.6571	19.2626	19.6609	19.7203	19.7037	19.5515	18.8470	17.9207	0.3158 (91)
MIT	17.0682	17.3470	17.9099	18.6571	19.2626	19.6609	19.7203	19.7037	19.5515	18.8470	17.9207	17.0712 (92)
Temperature adjustment												-0.1500
adjusted MIT	16.9182	17.1970	17.7599	18.5071	19.1126	19.5109	19.5703	19.5537	19.4015	18.6970	17.7707	16.9212 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9698	0.9585	0.9305	0.8676	0.7459	0.4815	0.1858	0.2311	0.6246	0.8717	0.9506	0.9731 (94)
Useful gains	622.8432	687.3088	736.6664	756.3688	671.4731	439.3110	162.8152	192.1754	485.4116	606.3358	604.7729	595.4686 (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	1869.7346	1808.1084	1594.1040	1271.4922	895.9518	472.8830	163.6645	194.1050	569.5183	1027.9396	1460.1353	1844.0035 (97)
Space heating kWh	927.6872	753.1773	637.9336	370.8888	167.0121	0.0000	0.0000	0.0000	0.0000	313.6732	615.8609	928.9100 (98a)
Space heating requirement - total per year (kWh/year)												4715.1432
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	927.6872	753.1773	637.9336	370.8888	167.0121	0.0000	0.0000	0.0000	0.0000	313.6732	615.8609	928.9100 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4715.1432
Space heating per m ²												(98c) / (4) = 70.9044 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

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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	927.6872	753.1773	637.9336	370.8888	167.0121	0.0000	0.0000	0.0000	0.0000	313.6732	615.8609	928.9100	(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)	1045.8706	849.1289	719.2036	418.1385	188.2888	0.0000	0.0000	0.0000	0.0000	353.6338	694.3190	1047.2491	(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	197.8077	174.5906	184.8618	161.3114	155.4655	139.1333	136.7547	142.8046	145.0321	162.8432	174.4538	195.5156	(64)	
Efficiency of water heater	88.6117	88.6055	88.5872	88.5479	88.4582	88.2000	88.2000	88.2000	88.2000	88.5285	88.5891	88.6127	(216)	
Fuel for water heating, kWh/month	223.2298	197.0427	208.6778	182.1743	175.7501	157.7475	155.0507	161.9100	164.4355	183.9444	196.9246	220.6407	(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	31.7718	25.4886	22.9496	16.8139	12.9875	10.6109	11.8476	15.4000	20.0031	26.2452	29.6438	32.6549	(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													5315.8323	(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													2227.5280	(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)													256.4170	(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													7885.7772	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	5315.8323	7.3200	389.1189	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2227.5280	7.3200	163.0550	(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	256.4170	27.6700	70.9506	(250)
Additional standing charges			108.0000	(251)
Total energy cost			754.9208	(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	5315.8323	0.2100	1116.3248	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2227.5280	0.2100	467.7809	(264)
Space and water heating			1584.1056	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	256.4170	0.1443	37.0089	(268)
Total CO2, kg/year			1633.0438	(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	5315.8323	1.1300	6006.8905	(275)

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Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2227.5280	1.1300	2517.1066 (278)
Space and water heating			8523.9971 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	256.4170	1.5338	393.3009 (282)
Total Primary energy kWh/year			9047.3988 (286)