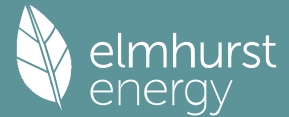


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If cylinder contains dedicated solar storage												
Primary loss	31.6444	28.5820	31.6444	30.6236	31.6444	30.6236	31.6444	31.6444	30.6236	31.6444	30.6236	31.6444 (57)
Combi loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total per year (kWh/year)												
Electric shower(s)	297.4950	263.0513	279.1780	244.5993	236.5661	212.5619	209.2562	217.8421	220.5564	216.6816	263.2388	294.1164 (62)
PV diverter	-34.3207	-30.3535	-31.7844	-26.3188	-24.5281	-20.9889	-19.6737	-20.9211	-21.7159	-25.6007	-29.0025	-33.6851 (63a)
Solar input	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	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)
Total per year (kWh/year) = Sum(64a)m =												
Heat gains from water heating, kWh/month	263.1743	232.6978	247.3936	218.2805	212.0380	191.5730	189.5824	196.9210	198.8405	221.0809	234.2364	260.4313 (64)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												
Heat gains from water heating, kWh/month	124.5860	110.6494	118.4956	106.1701	104.3272	95.5177	95.2466	98.1014	98.1759	107.6905	112.3678	123.4626 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	151.6519	151.6519	151.6519	151.6519	151.6519	151.6519	151.6519	151.6519	151.6519	151.6519	151.6519	151.6519 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	209.8143	232.2944	209.8143	216.8081	209.8143	216.8081	209.8143	209.8143	216.8081	209.8143	216.8081	209.8143 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	393.2554	397.3361	387.0527	365.1606	337.5258	311.5529	294.2015	290.1207	300.4041	322.2962	349.9310	375.9039 (68)
Pumps, fans	38.1652	38.1652	38.1652	38.1652	38.1652	38.1652	38.1652	38.1652	38.1652	38.1652	38.1652	38.1652 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-121.3215	-121.3215	-121.3215	-121.3215	-121.3215	-121.3215	-121.3215	-121.3215	-121.3215	-121.3215	-121.3215	-121.3215 (71)
Total internal gains	167.4543	164.6568	159.2683	147.4585	140.2247	132.6635	128.0196	131.8567	136.3554	144.7454	156.0664	165.9444 (72)
Total internal gains												
	842.0195	865.7829	827.6309	800.9228	759.0603	729.5201	700.5309	700.2873	722.0632	748.3514	794.3011	823.1581 (73)

6. Solar gains

[Jan]	Area		Solar flux		g		FF		Access		Gains	
	m2		Table 6a		Specific data		Specific data		factor		W	
			W/m2		or Table 6b		or Table 6c		Table 6d			
South	26.2360		46.7521		0.6300		0.7000		0.7700		374.8610 (78)	
Northwest	7.2490		11.2829		0.6300		0.7000		0.7700		24.9961 (81)	
Solar gains	399.8571	664.8060	873.7025	1034.4150	1123.4104	1102.1236	1067.8708	1031.9478	928.6267	724.3562	475.7897	344.3275 (83)
Total gains	1241.8766	1530.5889	1701.3334	1835.3379	1882.4707	1831.6436	1768.4018	1702.2351	1650.6898	1472.7076	1270.0908	1167.4856 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												
Utilisation factor for gains for living area, nll,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	61.0468	61.1789	61.3090	61.9277	62.0448	62.5960	62.5960	62.6991	62.3825	62.0448	61.8083	61.5630
alpha	5.0698	5.0786	5.0873	5.1285	5.1363	5.1731	5.1731	5.1799	5.1588	5.1363	5.1206	5.1042
util living area	0.9974	0.9922	0.9809	0.9476	0.8671	0.7035	0.5283	0.5685	0.7947	0.9592	0.9934	0.9981 (86)
MIT	19.6409	19.8722	20.1535	20.4983	20.7797	20.9464	20.9899	20.9854	20.8966	20.5255	20.0142	19.6031 (87)
Th 2	20.0906	20.0924	20.0942	20.1024	20.1040	20.1112	20.1112	20.1125	20.1084	20.1040	20.1008	20.0976 (88)
util rest of house	0.9966	0.9899	0.9752	0.9314	0.8263	0.6247	0.4267	0.4662	0.7262	0.9432	0.9911	0.9975 (89)
MIT 2	18.4887	18.7849	19.1427	19.5767	19.9055	20.0765	20.1072	20.1063	20.0329	19.6173	18.9735	18.4452 (90)
Living area fraction	18.6157	18.9048	19.2542	19.6784	20.0019	20.1725	20.2046	20.2032	20.1281	19.7174	19.0883	18.5729 (91)
MIT	18.6157	18.9048	19.2542	19.6784	20.0019	20.1725	20.2046	20.2032	20.1281	19.7174	19.0883	18.5729 (92)
Temperature adjustment	18.6157	18.9048	19.2542	19.6784	20.0019	20.1725	20.2046	20.2032	20.1281	19.7174	19.0883	18.5729 (93)
adjusted MIT	18.6157	18.9048	19.2542	19.6784	20.0019	20.1725	20.2046	20.2032	20.1281	19.7174	19.0883	18.5729 (93)

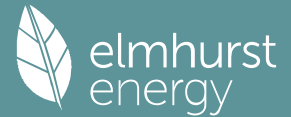
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9948	0.9858	0.9681	0.9219	0.8209	0.6305	0.4376	0.4771	0.7279	0.9344	0.9874	0.9961 (94)
Useful gains	1235.3954	1508.8373	1647.1407	1692.0208	1545.3779	1154.9379	773.9335	812.0606	1201.5522	1376.0843	1254.0591	1162.9307 (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	3177.6638	3101.9273	2818.9332	2358.4413	1813.1233	1206.3083	780.3043	821.9590	1309.4161	1991.2429	2628.2555	3163.6034 (97)
Space heating kWh	1445.0477	1070.5565	871.8136	479.8228	199.2026	0.0000	0.0000	0.0000	0.0000	457.6780	989.4214	1488.5006 (98a)
Space heating requirement - total per year (kWh/year)	1445.0477	1070.5565	871.8136	479.8228	199.2026	0.0000	0.0000	0.0000	0.0000	457.6780	989.4214	1488.5006 (98a)
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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Space heating kWh	1445.0477	1070.5565	871.8136	479.8228	199.2026	0.0000	0.0000	0.0000	0.0000	457.6780	989.4214	1488.5006 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1445.0477	1070.5565	871.8136	479.8228	199.2026	0.0000	0.0000	0.0000	0.0000	457.6780	989.4214	1488.5006 (98c)
Space heating per m2	(98c) / (4) =											
	31.2690 (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)

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Efficiency of main space heating system 1 (in %)												92.3000 (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	1445.0477	1070.5565	871.8136	479.8228	199.2026	0.0000	0.0000	0.0000	0.0000	457.6780	989.4214	1488.5006 (98)
Space heating efficiency (main heating system 1)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
Space heating fuel (main heating system)	1565.5988	1159.8662	944.5435	519.8513	215.8208	0.0000	0.0000	0.0000	0.0000	495.8591	1071.9625	1612.6767 (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	263.1743	232.6978	247.3936	218.2805	212.0380	191.5730	189.5824	196.9210	198.8405	221.0809	234.2364	260.4313 (64)
Efficiency of water heater	87.2834	87.0471	86.6401	85.7752	83.9200	79.8000	79.8000	79.8000	79.8000	85.6536	86.9234	79.8000 (216)
Fuel for water heating, kWh/month	301.5170	267.3240	285.5417	254.4797	252.6669	240.0664	237.5720	246.7682	249.1736	258.1106	269.4745	298.2038 (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	43.5953	34.9737	31.4900	23.0709	17.8206	14.5596	16.2566	21.1309	27.4470	36.0119	40.6754	44.8069 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-56.6483	-80.8381	-117.5349	-133.6172	-145.1706	-135.7140	-133.8820	-125.7886	-111.7984	-92.9566	-62.5654	-48.8497 (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)	-29.0892	-61.5142	-122.9189	-185.6318	-246.5306	-248.2572	-245.4957	-207.4993	-151.5036	-88.4895	-38.9915	-22.9915 (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												7586.1789 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												3160.8984 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												351.8387 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-2894.2770 (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												8290.6391 (238)

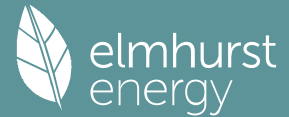
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	7586.1789	0.2100	1593.0976 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3160.8984	0.2100	663.7887 (264)
Space and water heating			2256.8862 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	351.8387	0.1443	50.7812 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1245.3641	0.1344	-167.3467
PV Unit electricity exported	-1648.9129	0.1257	-207.2982
Total			-374.6449 (269)
Total CO2, kg/year			1944.9518 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			8.6900 (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	7586.1789	1.1300	8572.3822 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3160.8984	1.1300	3571.8152 (278)
Space and water heating			12144.1974 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	351.8387	1.5338	539.6620 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1245.3641	1.4966	-1863.8350
PV Unit electricity exported	-1648.9129	0.4615	-760.9107
Total			-2624.7458 (283)
Total Primary energy kWh/year			10189.2144 (286)
Target Primary Energy Rate (TPER)			45.5000 (287)

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Plot Reference	003 3			Issued on Date	16/07/2026
Assessment Reference	003 3 Be Lean	Plot Type Ref	003 3		
Plot Address	003 3, 003 3, 0			SAP Version	10.2
SAP Rating	88 B	DER	10.41	TER	9.29
Environmental	89 B	% DER < TER			-12.06
CO ₂ Emissions (t/year)	1.7	DFEE	31.14	TFEE	35.50
Compliance Check	See BREL	% DFEE < TFEE			12.28
% DPER < TPER	-17.85	DPER	57.36	TPER	48.67
Assessor Details	Mr. Scott Binstead			Assessor ID	U903-0001
Client					

SAP 10 WORKSHEET FOR New Build (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			
Basement floor	49.1450 (1a)	x 2.6250 (2a)	= 129.0056 (1a) - (3a)
Ground floor	49.1450 (1b)	x 3.1330 (2b)	= 153.9713 (1b) - (3b)
First floor	49.1450 (1c)	x 3.0560 (2c)	= 150.1871 (1c) - (3c)
Second floor	40.6780 (1d)	x 3.0000 (2d)	= 122.0340 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	188.1130		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 555.1980 (5)

2. Ventilation rate

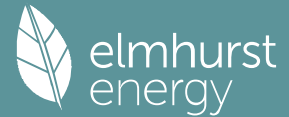
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	5 * 10 =	50.0000 (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) =	50.0000 / (5) = 0.0901 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		4.0100 (17)
Infiltration rate		0.2906 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2470 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	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)
Adj infilt rate	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)
Effective ac	0.3149	0.3087	0.3025	0.2717	0.2655	0.2346	0.2346	0.2285	0.2470	0.2655	0.2778	0.2902 (22b)
	0.5496	0.5477	0.5458	0.5369	0.5352	0.5275	0.5275	0.5261	0.5305	0.5352	0.5386	0.5421 (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							
Solid Door			1.9890	1.2000	2.3880		(26)
Windows			33.4850	1.1450	38.3473		(27)
Flr - Basement			49.1450	0.1100	5.4059	75.0000	3685.8750 (28a)
Ext Wall	90.3450	30.9590	59.3860	0.1600	9.5018	60.0000	3563.1601 (29a)
Top floor	34.2130	3.3790	30.8340	0.1400	4.3168	9.0000	277.5060 (29a)
Below Ground	13.2390		13.2390	0.1600	2.1182	60.0000	794.3400 (29a)
Wl - Dormer	2.9190	1.1360	1.7830	0.1400	0.2496	9.0000	16.0470 (29a)
Rf - Flat Roof	46.3670		46.3670	0.1100	5.1004	9.0000	417.3030 (30)
Total net area of external elements Aum(A, m ²)			236.2340				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	67.4280		(33)
Main dwelling							
Party Wall			214.5040	0.0000	0.0000	150.0000	32175.5997 (32)
Stud			23.4465			9.0000	211.0185 (32c)
Stud			115.1002			9.0000	1035.9014 (32c)
Stud			154.0163			9.0000	1386.1465 (32c)
Stud			81.3960			9.0000	732.5640 (32c)
Internal Floor 1			89.8230			9.0000	808.4070 (32d)

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Internal Ceiling 1	89.8230	9.0000	808.4070 (32e)
Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =		
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	45912.2752 (34)		
List of Thermal Bridges	244.0675 (35)		
K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	15.4270	0.2680	4.1344
E3 Sill	9.9530	0.0220	0.2190
E4 Jamb	43.2120	0.0170	0.7346
E5 Ground floor (normal)	11.7520	0.0760	0.8932
E6 Intermediate floor within a dwelling	22.9620	0.0010	0.0230
E7 Party floor between dwellings (in blocks of flats)	1.4240	0.0370	0.0527
E14 Flat roof	3.8650	0.1600	0.6184
E15 Flat roof with parapet	11.0290	0.0800	0.8823
E16 Corner (normal)	21.9330	0.0460	1.0089
E17 Corner (inverted - internal area greater than external area)	3.8220	-0.0880	-0.3363
E18 Party wall between dwellings	23.7860	0.0400	0.9514
E24 Eaves (insulation at ceiling level - inverted)	16.6660	0.0750	1.2499
E25 Staggered party wall between dwellings	23.6280	0.0290	0.6852
P1 Party wall - Ground floor	19.3130	0.1030	1.9892
P2 Party wall - Intermediate floor within a dwelling	54.0770	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	16.3590	0.0800	1.3087
R1 Head of roof window	1.0320	0.2400	0.2477
R2 Sill of roof window	1.0320	0.2400	0.2477
R3 Jamb of roof window	4.4000	0.2400	1.0560
R9 Roof to wall (flat ceiling)	2.5110	0.1600	0.4018
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	16.3678 (36)		
Point Thermal bridges	0.0000		
Total fabric heat loss	(33) + (36) + (36a) = 83.7958 (37)		

Ventilation heat loss calculated monthly (38)m - 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	100.6912	100.3385	99.9928	98.3688	98.0650	96.6506	96.6506	96.3887	97.1954	98.0650	98.6796	99.3222 (38)
Heat transfer coeff	184.4870	184.1343	183.7886	182.1646	181.8608	180.4464	180.4464	180.1845	180.9912	181.8608	182.4755	183.1181 (39)
Average = Sum(39)m / 12 =	182.1632											
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9807	0.9788	0.9770	0.9684	0.9668	0.9592	0.9592	0.9579	0.9621	0.9668	0.9700	0.9734 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

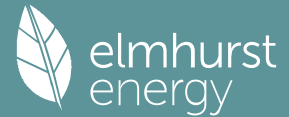
4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.9864 (42)											
Hot water usage for mixer showers	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	74.2925	73.1760	71.5491	68.4363	66.1391	63.5773	62.1212	63.7358	65.5057	68.2563	71.4360	74.0079 (42a)
Hot water usage for baths	32.0714	31.5951	30.9244	29.6877	28.7616	27.7348	27.1801	27.8462	28.5714	29.6701	30.9323	31.9630 (42b)
Hot water usage for other uses	45.2141	43.5699	41.9258	40.2816	38.6375	36.9933	36.9933	38.6375	40.2816	41.9258	43.5699	45.2141 (42c)
Average daily hot water use (litres/day)	139.3342 (43)											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	151.5780	148.3411	144.3993	138.4056	133.5382	128.3054	126.2947	130.2195	134.3587	139.8522	145.9382	151.1849 (44)
Energy conte	240.0625	211.2357	221.9363	189.4703	179.7681	157.7665	152.7425	161.2389	165.6778	189.7781	207.9158	236.7191 (45)
Energy content (annual)	Total = Sum(45)m = 2314.3117											
Distribution loss (46)m = 0.15 x (45)m	36.0094	31.6854	33.2904	28.4206	26.9652	23.6650	22.9114	24.1858	24.8517	28.4667	31.1874	35.5079 (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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589 (61)
Total heat required for water heating calculated for each month	291.0214	257.2631	272.8952	238.7854	230.7270	207.0816	203.7014	212.1978	214.9928	240.7370	257.2308	287.6780 (62)
VWHRs	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	291.0214	257.2631	272.8952	238.7854	230.7270	207.0816	203.7014	212.1978	214.9928	240.7370	257.2308	287.6780 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m = 2914.3117 (64)											
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	92.5605	81.7427	86.5335	75.3277	72.5126	64.7861	63.5266	66.3517	67.4166	75.8410	81.4608	91.4488 (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	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	184.7607	204.5565	184.7607	190.9194	184.7607	190.9194	184.7607	184.7607	190.9194	184.7607	190.9194	184.7607 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	359.6032	363.3347	353.9313	333.9126	308.6425	284.8923	269.0256	265.2941	274.6975	294.7162	319.9862	343.7365 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322 (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)	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573 (71)
Water heating gains (Table 5)	124.4093	121.6410	116.3085	104.6217	97.4632	89.9807	85.3852	89.1823	93.6342	101.9368	113.1399	122.9151 (72)
Total internal gains	739.5696	760.3286	725.7970	700.2502	661.6629	633.5889	606.9680	607.0336	627.0475	652.2101	694.8420	722.2088 (73)

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6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
South					26.2360	46.7521		0.6300	0.7200	0.7700	385.5713 (78)	
Northwest					7.2490	11.2829		0.6300	0.7200	0.7700	25.7103 (81)	
Solar gains	411.2816	683.8004	898.6655	1063.9698	1155.5078	1133.6128	1098.3814	1030.5749	955.1588	745.0521	489.3837	354.1654 (83)
Total gains	1150.8512	1444.1291	1624.4625	1764.2200	1817.1707	1767.2017	1705.3495	1637.6085	1582.2064	1397.2622	1184.2257	1076.3742 (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	69.1290	69.2614	69.3917	70.0103	70.1273	70.6770	70.6770	70.7797	70.4642	70.1273	69.8911	69.6458
alpha	5.6086	5.6174	5.6261	5.6674	5.6752	5.7118	5.7118	5.7186	5.6976	5.6752	5.6594	5.6431
util living area	0.9975	0.9909	0.9750	0.9269	0.8181	0.6323	0.4624	0.5010	0.7350	0.9460	0.9928	0.9983 (86)
MIT	19.8410	20.0802	20.3513	20.6581	20.8769	20.9775	20.9967	20.9949	20.9483	20.6576	20.1825	19.7980 (87)
Th 2	20.0994	20.1010	20.1025	20.1098	20.1111	20.1174	20.1174	20.1186	20.1150	20.1111	20.1084	20.1055 (88)
util rest of house	0.9967	0.9881	0.9671	0.9046	0.7684	0.5539	0.3714	0.4077	0.6603	0.9246	0.9901	0.9977 (89)
MIT 2	19.0395	19.2780	19.5452	19.8417	20.0310	20.1073	20.1166	20.1172	20.0886	19.8479	19.3867	19.0015 (90)
Living area fraction	19.1173	19.3559	19.6234	19.9209	20.1131	20.1918	20.2020	20.2024	20.1720	19.9265	19.4639	19.0788 (92)
Temperature adjustment	18.9673	19.2059	19.4734	19.7709	19.9631	20.0418	20.0520	20.0524	20.0220	19.7765	19.3139	-0.1500
adjusted MIT												18.9288 (93)

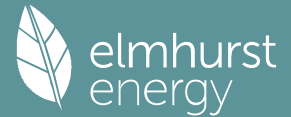
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9952	0.9843	0.9601	0.8945	0.7592	0.5469	0.3645	0.4006	0.6518	0.9145	0.9867	0.9966 (94)
Useful gains	1145.3618	1421.4121	1559.5990	1578.0260	1379.6492	966.4434	621.6490	655.9532	1031.2536	1277.7674	1168.5017	1072.7390 (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	2705.9294	2634.2025	2384.3680	1980.3003	1502.7365	981.9562	622.9057	658.1007	1071.8331	1668.8532	2228.7426	2697.1174 (97)
Space heating kWh	1161.0623	814.9952	613.6281	289.6375	91.5769	0.0000	0.0000	0.0000	0.0000	290.9679	763.3734	1208.5376 (98a)
Space heating requirement - total per year (kWh/year)												5233.7788
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	1161.0623	814.9952	613.6281	289.6375	91.5769	0.0000	0.0000	0.0000	0.0000	290.9679	763.3734	1208.5376 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5233.7788
Space heating per m2										(98c) / (4) =		27.8225 (99)

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (201)
Fraction of space heat from main system(s)												1.0000 (202)
Efficiency of main space heating system 1 (in %)												89.5000 (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	1161.0623	814.9952	613.6281	289.6375	91.5769	0.0000	0.0000	0.0000	0.0000	290.9679	763.3734	1208.5376 (98)
Space heating efficiency (main heating system 1)	89.5000	89.5000	89.5000	89.5000	89.5000	0.0000	0.0000	0.0000	0.0000	89.5000	89.5000	89.5000 (210)
Space heating fuel (main heating system)	1297.2764	910.6091	685.6180	323.6173	102.3206	0.0000	0.0000	0.0000	0.0000	325.1038	852.9312	1350.3213 (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	291.0214	257.2631	272.8952	238.7854	230.7270	207.0816	203.7014	212.1978	214.9928	240.7370	257.2308	287.6780 (64)
Efficiency of water heater	89.5000	89.5000	89.5000	89.5000	89.5000	89.5000	89.5000	89.5000	89.5000	89.5000	89.5000	89.5000 (216)
Fuel for water heating, kWh/month	325.1636	287.4448	304.9109	266.7993	257.7956	231.3761	227.5993	237.0925	240.2155	268.9799	287.4088	321.4279 (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	3.4822	3.1452	3.4822	3.3699	3.4822	3.3699	3.4822	3.4822	3.3699	3.4822	3.3699	3.4822 (231)
Lighting	35.5900	28.5516	25.7076	18.8345	14.5483	11.8861	13.2714	17.2507	22.4070	29.3992	33.2063	36.5792 (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)

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Annual totals kWh/year		
Space heating fuel - main system 1	5847.7976	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	89.5000	
Water heating fuel used	3256.2142	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	41.0000	(230c)
Total electricity for the above, kWh/year	41.0000	(231)
Electricity for lighting (calculated in Appendix L)	287.2318	(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	9432.2435	(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	5847.7976	0.2100	1228.0375 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3256.2142	0.2100	683.8050 (264)
Space and water heating			1911.8425 (265)
Pumps, fans and electric keep-hot	41.0000	0.1387	5.6872 (267)
Energy for lighting	287.2318	0.1443	41.4564 (268)
Total CO2, kg/year			1958.9861 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			10.4100 (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	5847.7976	1.1300	6608.0112 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3256.2142	1.1300	3679.5220 (278)
Space and water heating			10287.5332 (279)
Pumps, fans and electric keep-hot	41.0000	1.5128	62.0248 (281)
Energy for lighting	287.2318	1.5338	440.5657 (282)
Total Primary energy kWh/year			10790.1238 (286)
Dwelling Primary energy Rate (DPER)			57.3600 (287)

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

1. Overall dwelling characteristics

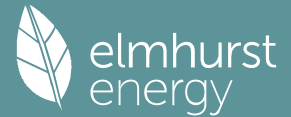
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Basement floor	49.1450 (1a)	x 2.6250 (2a)	= 129.0056 (1a) - (3a)
Ground floor	49.1450 (1b)	x 3.1330 (2b)	= 153.9713 (1b) - (3b)
First floor	49.1450 (1c)	x 3.0560 (2c)	= 150.1871 (1c) - (3c)
Second floor	40.6780 (1d)	x 3.0000 (2d)	= 122.0340 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	188.1130		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	555.1980 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.0720 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3220 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2737 (21)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

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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												
Effective ac	0.3490	0.3422	0.3353	0.3011	0.2943	0.2601	0.2601	0.2532	0.2737	0.2943	0.3080	0.3216 (22b)
	0.5609	0.5585	0.5562	0.5453	0.5433	0.5338	0.5338	0.5321	0.5375	0.5433	0.5474	0.5517 (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							
TER Opaque door			1.9890	1.0000	1.9900		(26)
TER Opening Type			33.4850	1.1450	38.3473		(27)
Flr - Basement			49.1450	0.1300	6.3889		(28a)
Ext Wall	90.3450	30.9590	59.3860	0.1800	10.6895		(29a)
Top floor	34.2130	3.3790	30.8340	0.1800	5.5501		(29a)
Below Ground	13.2390		13.2390	0.1800	2.3830		(29a)
W1 - Dormer	2.9190	1.1360	1.7830	0.1800	0.3209		(29a)
Rf - Flat Roof	46.3670		46.3670	0.1100	5.1004		(30)
Total net area of external elements Aum(A, m2)			236.2340				(31)
Fabric heat loss, W K = Sum (A x U)			(26) ... (30) + (32) =		70.7701		(33)
Main dwelling							
Party Wall			214.5040	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							244.0675 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	15.4270	0.0500	0.7713
E3 Sill	9.9530	0.0500	0.4976
E4 Jamb	43.2120	0.0500	2.1606
E5 Ground floor (normal)	11.7520	0.1600	1.8803
E6 Intermediate floor within a dwelling	22.9620	0.0000	0.0000
E7 Party floor between dwellings (in blocks of flats)	1.4240	0.0700	0.0997
E14 Flat roof	3.8650	0.0800	0.3092
E15 Flat roof with parapet	11.0290	0.5600	6.1762
E16 Corner (normal)	21.9330	0.0900	1.9740
E17 Corner (inverted - internal area greater than external area)	3.8220	-0.0900	-0.3440
E18 Party wall between dwellings	23.7860	0.0600	1.4272
E24 Eaves (insulation at ceiling level - inverted)	16.6660	0.2400	3.9998
E25 Staggered party wall between dwellings	23.6280	0.0600	1.4177
P1 Party wall - Ground floor	19.3130	0.0800	1.5450
P2 Party wall - Intermediate floor within a dwelling	54.0770	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	16.3590	0.1200	1.9631
R1 Head of roof window	1.0320	0.0800	0.0826
R2 Sill of roof window	1.0320	0.0600	0.0619
R3 Jamb of roof window	4.4000	0.0800	0.3520
R9 Roof to wall (flat ceiling)	2.5110	0.0400	0.1004
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			24.4748 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 95.2449 (37)

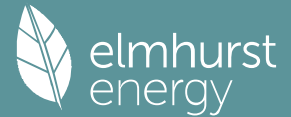
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	102.7667	102.3334	101.9087	99.9137	99.5404	97.8029	97.8029	97.4811	98.4721	99.5404	100.2955	101.0849 (38)
Average = Sum(39)m 12 =	198.0116	197.5783	197.1535	195.1585	194.7853	193.0477	193.0477	192.7259	193.7170	194.7853	195.5404	196.3298 (39)
												195.1567
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0526	1.0503	1.0481	1.0375	1.0355	1.0262	1.0262	1.0245	1.0298	1.0355	1.0395	1.0437 (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												2.9864 (42)
Hot water usage for mixer showers												
	74.2925	73.1760	71.5491	68.4363	66.1391	63.5773	62.1212	63.7358	65.5057	68.2563	71.4360	74.0079 (42a)
Hot water usage for baths												
	32.0714	31.5951	30.9244	29.6877	28.7616	27.7348	27.1801	27.8462	28.5714	29.6701	30.9323	31.9630 (42b)
Hot water usage for other uses												
	45.2141	43.5699	41.9258	40.2816	38.6375	36.9933	36.9933	38.6375	40.2816	41.9258	43.5699	45.2141 (42c)
Average daily hot water use (litres/day)												139.3342 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	151.5780	148.3411	144.3993	138.4056	133.5382	128.3054	126.2947	130.2195	134.3587	139.8522	145.9382	151.1849 (44)
Energy content (annual)	240.0625	211.2357	221.9363	189.4703	179.7681	157.7665	152.7425	161.2389	165.6778	189.7781	207.9158	236.7191 (45)
Distribution loss (46)m = 0.15 x (45)m												
	36.0094	31.6854	33.2904	28.4206	26.9652	23.6650	22.9114	24.1858	24.8517	28.4667	31.1874	35.5079 (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	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589 (61)
Total heat required for water heating calculated for each month												
	291.0214	257.2631	272.8952	238.7854	230.7270	207.0816	203.7014	212.1978	214.9928	240.7370	257.2308	287.6780 (62)
WVHRS	-33.9634	-30.0375	-31.4536	-26.0448	-24.2728	-20.7704	-19.4690	-20.7033	-21.4899	-25.3342	-28.7006	-33.3345 (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	257.0580	227.2256	241.4416	212.7406	206.4542	186.3112	184.2324	191.4945	193.5029	215.4028	228.5303	254.3435 (64)
12Total per year (kWh/year)												2598.7376 (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												
	92.5605	81.7427	86.5335	75.3277	72.5126	64.7861	63.5266	66.3517	67.4166	75.8410	81.4608	91.4488 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	185.5867	205.4710	185.5867	191.7729	185.5867	191.7729	185.5867	185.5867	191.7729	185.5867	191.7729	185.5867	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	359.6032	363.3347	353.9313	333.9126	308.6425	284.8923	269.0256	265.2941	274.6975	294.7162	319.9862	343.7365	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	(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)	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	(71)
Water heating gains (Table 5)	124.4093	121.6410	116.3085	104.6217	97.4632	89.9807	85.3852	89.1823	93.6342	101.9368	113.1399	122.9151	(72)
Total internal gains	740.3957	761.2432	726.6231	701.1038	662.4890	634.4424	607.7940	607.8596	627.9011	653.0362	695.6956	723.0348	(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	
South				26.2360	46.7521		0.6300		0.7000		0.7700		374.8610 (78)	
Northwest				7.2490	11.2829		0.6300		0.7000		0.7700		24.9961 (81)	
Solar gains	399.8571	664.8060	873.7025	1034.4150	1123.4104	1102.1236	1067.8708	1001.9478	928.6267	724.3562	475.7897	344.3275	(83)	
Total gains	1140.2527	1426.0492	1600.3256	1735.5188	1785.8993	1736.5660	1675.6649	1609.8074	1556.5278	1377.3924	1171.4853	1067.3623	(84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)														
tau	64.4074	64.5487	64.6877	65.3490	65.4742	66.0635	66.0635	66.1738	65.8353	65.4742	65.2214	64.9591		
alpha	5.2938	5.3032	5.3125	5.3566	5.3649	5.4042	5.4042	5.4116	5.3890	5.3649	5.3481	5.3306		
util living area	0.9977	0.9921	0.9793	0.9407	0.8488	0.6747	0.5005	0.5407	0.7729	0.9558	0.9937	0.9983	(86)	
MIT	19.7170	19.9549	20.2355	20.5677	20.8246	20.9620	20.9936	20.9904	20.9206	20.5792	20.0786	19.6772	(87)	
Th 2	20.0397	20.0416	20.0435	20.0522	20.0539	20.0615	20.0615	20.0629	20.0586	20.0539	20.0506	20.0471	(88)	
util rest of house	0.9969	0.9896	0.9725	0.9210	0.8012	0.5904	0.3971	0.4357	0.6967	0.9370	0.9912	0.9978	(89)	
MIT 2	18.5371	18.8417	19.1974	19.6123	19.9044	20.0393	20.0594	20.0594	20.0053	19.6345	19.0074	18.4915	(90)	
Living area fraction														
MIT	18.6516	18.9497	19.2982	19.7051	19.9937	20.1289	20.1501	20.1498	20.0942	19.7262	19.1114	18.6066	(92)	
Temperature adjustment												0.0000		
adjusted MIT	18.6516	18.9497	19.2982	19.7051	19.9937	20.1289	20.1501	20.1498	20.0942	19.7262	19.1114	18.6066	(93)	

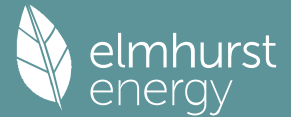
8. Space heating requirement

Utilisation	0.9952	0.9856	0.9655	0.9122	0.7978	0.5968	0.4071	0.4457	0.6998	0.9286	0.9877	0.9965	(94)	
Useful gains	1134.8058	1405.4662	1545.1030	1583.1289	1424.7182	1036.3329	682.0948	717.4324	1089.3182	1279.0915	1157.0830	1063.6696	(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	2841.7902	2775.9236	2523.2123	2108.6989	1615.4904	1067.3400	685.3347	722.6858	1161.1702	1777.6433	2348.7060	2828.4488	(97)	
Space heating kWh	1269.9964	920.9473	727.7133	378.4104	141.9345	0.0000	0.0000	0.0000	0.0000	370.9225	857.9686	1312.9958	(98a)	
Space heating requirement - total per year (kWh/year)												5980.8889		
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	1269.9964	920.9473	727.7133	378.4104	141.9345	0.0000	0.0000	0.0000	0.0000	370.9225	857.9686	1312.9958	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												5980.8889		
Space heating per m2												31.7941	(99)	

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000	(201)
Fraction of space heat from main system(s)													1.0000	(202)
Efficiency of main space heating system 1 (in %)													92.4000	(206)
Efficiency of main space heating system 2 (in %)													0.0000	(207)
Efficiency of secondary/supplementary heating system, %													0.0000	(208)
Space heating requirement	1269.9964	920.9473	727.7133	378.4104	141.9345	0.0000	0.0000	0.0000	0.0000	370.9225	857.9686	1312.9958	(98)	
Space heating efficiency (main heating system 1)	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000	(210)	
Space heating fuel (main heating system)	1374.4550	996.6963	787.5685	409.5350	153.6088	0.0000	0.0000	0.0000	0.0000	401.4313	928.5374	1420.9911	(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	257.0580	227.2256	241.4416	212.7406	206.4542	186.3112	184.2324	191.4945	193.5029	215.4028	228.5303	254.3435	(64)	

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Efficiency of water heater (217)m	87.3256	87.0549	86.5897	85.6008	83.5946	80.3000	80.3000	80.3000	80.3000	85.5346	86.9415	80.3000 (216)
Fuel for water heating, kWh/month	294.3671	261.0142	278.8341	248.5265	246.9708	232.0189	229.4301	238.4739	240.9750	251.8313	262.8552	87.3813 (217)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	38.5613	30.9353	27.8538	20.4069	15.7629	12.8784	14.3794	18.6909	24.2776	31.8536	35.9785	39.6330 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-48.4138	-69.5526	-101.8142	-116.5782	-127.3934	-119.3834	-117.7877	-110.3086	-97.4879	-80.3585	-53.6386	-41.6962 (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	-23.5442	-49.9212	-99.9944	-151.3618	-201.3545	-202.8767	-200.6173	-169.4140	-123.4968	-71.9260	-31.5963	-18.5988 (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												6472.8235 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												80.3000
Water heating fuel used												3076.3701 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												311.2114 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-2429.1148 (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												7517.2903 (238)

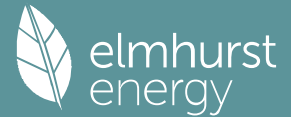
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6472.8235	0.2100	1359.2929	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3076.3701	0.2100	646.0377	(264)
Space and water heating			2005.3307	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	311.2114	0.1443	44.9174	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.4129	0.1342	-145.5572	
PV Unit electricity exported	-1344.7018	0.1257	-168.9632	
Total			-314.5204	(269)
Total CO2, kg/year			1747.6570	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.2900	(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	6472.8235	1.1300	7314.2906	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3076.3701	1.1300	3476.2983	(278)
Space and water heating			10790.5888	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	311.2114	1.5338	477.3465	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1084.4129	1.4961	-1622.3462	
PV Unit electricity exported	-1344.7018	0.4612	-620.1936	
Total			-2242.5398	(283)
Total Primary energy kWh/year			9155.4962	(286)
Target Primary Energy Rate (TPER)			48.6700	(287)

Full SAP Calculation Printout



Plot Reference	003 3			Issued on Date	16/07/2026
Assessment Reference	003 3	Plot Type Ref	003 3		
Plot Address	003 3, 003 3, 0			SAP Version	10.2
SAP Rating	88 B	DER	2.46	TER	9.18
Environmental	97 A	% DER < TER			73.20
CO ₂ Emissions (t/year)	0.41	DFEE	31.14	TFEE	35.50
Compliance Check	See BREL	% DFEE < TFEE			12.28
% DPER < TPER	46.92	DPER	25.51	TPER	48.06
Assessor Details	Mr. Scott Binstead			Assessor ID	U903-0001
Client					

SAP 10 WORKSHEET FOR New Build (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						
Basement floor	49.1450 (1a)	x	2.6250 (2a)	=	129.0056 (1a) - (3a)	
Ground floor	49.1450 (1b)	x	3.1330 (2b)	=	153.9713 (1b) - (3b)	
First floor	49.1450 (1c)	x	3.0560 (2c)	=	150.1871 (1c) - (3c)	
Second floor	40.6780 (1d)	x	3.0000 (2d)	=	122.0340 (1d) - (3d)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	188.1130				(4)	
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	555.1980 (5)	

2. Ventilation rate

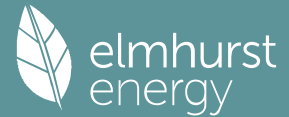
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	5 * 10 =	50.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	50.0000 / (5) =	0.0901 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		4.0100 (17)
Infiltration rate		0.2906 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2470 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	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)
Adj infilt rate	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)
Effective ac	0.3149	0.3087	0.3025	0.2717	0.2655	0.2346	0.2346	0.2285	0.2470	0.2655	0.2778	0.2902 (22b)
	0.5496	0.5477	0.5458	0.5369	0.5352	0.5275	0.5275	0.5261	0.5305	0.5352	0.5386	0.5421 (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							
Solid Door			1.9890	1.2000	2.3880		(26)
Windows			33.4850	1.1450	38.3473		(27)
Flr - Basement			49.1450	0.1100	5.4059	75.0000	3685.8750 (28a)
Ext Wall	90.3450	30.9590	59.3860	0.1600	9.5018	60.0000	3563.1601 (29a)
Top floor	34.2130	3.3790	30.8340	0.1400	4.3168	9.0000	277.5060 (29a)
Below Ground	13.2390		13.2390	0.1600	2.1182	60.0000	794.3400 (29a)
Wl - Dormer	2.9190	1.1360	1.7830	0.1400	0.2496	9.0000	16.0470 (29a)
Rf - Flat Roof	46.3670		46.3670	0.1100	5.1004	9.0000	417.3030 (30)
Total net area of external elements Aum(A, m ²)			236.2340				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	67.4280		(33)
Main dwelling							
Party Wall			214.5040	0.0000	0.0000	150.0000	32175.5997 (32)
Stud			23.4465			9.0000	211.0185 (32c)
Stud			115.1002			9.0000	1035.9014 (32c)
Stud			154.0163			9.0000	1386.1465 (32c)
Stud			81.3960			9.0000	732.5640 (32c)
Internal Floor 1			89.8230			9.0000	808.4070 (32d)

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Internal Ceiling 1	89.8230	9.0000	808.4070 (32e)
Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =		
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	45912.2752 (34)		
List of Thermal Bridges	244.0675 (35)		
K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	15.4270	0.2680	4.1344
E3 Sill	9.9530	0.0220	0.2190
E4 Jamb	43.2120	0.0170	0.7346
E5 Ground floor (normal)	11.7520	0.0760	0.8932
E6 Intermediate floor within a dwelling	22.9620	0.0010	0.0230
E7 Party floor between dwellings (in blocks of flats)	1.4240	0.0370	0.0527
E14 Flat roof	3.8650	0.1600	0.6184
E15 Flat roof with parapet	11.0290	0.0800	0.8823
E16 Corner (normal)	21.9330	0.0460	1.0089
E17 Corner (inverted - internal area greater than external area)	3.8220	-0.0880	-0.3363
E18 Party wall between dwellings	23.7860	0.0400	0.9514
E24 Eaves (insulation at ceiling level - inverted)	16.6660	0.0750	1.2499
E25 Staggered party wall between dwellings	23.6280	0.0290	0.6852
P1 Party wall - Ground floor	19.3130	0.1030	1.9892
P2 Party wall - Intermediate floor within a dwelling	54.0770	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	16.3590	0.0800	1.3087
R1 Head of roof window	1.0320	0.2400	0.2477
R2 Sill of roof window	1.0320	0.2400	0.2477
R3 Jamb of roof window	4.4000	0.2400	1.0560
R9 Roof to wall (flat ceiling)	2.5110	0.1600	0.4018
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	16.3678 (36)		
Point Thermal bridges	0.0000		
Total fabric heat loss	(33) + (36) + (36a) = 83.7958 (37)		

Ventilation heat loss calculated monthly (38)m - 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	100.6912	100.3385	99.9928	98.3688	98.0650	96.6506	96.6506	96.3887	97.1954	98.0650	98.6796	99.3222	(38)
Heat transfer coeff	184.4870	184.1343	183.7886	182.1646	181.8608	180.4464	180.4464	180.1845	180.9912	181.8608	182.4755	183.1181	(39)
Average = Sum(39)m / 12 =	182.1632												
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.9807	0.9788	0.9770	0.9684	0.9668	0.9592	0.9592	0.9579	0.9621	0.9668	0.9700	0.9734	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

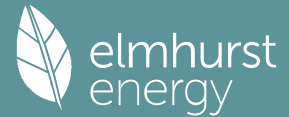
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9864 (42)
Hot water usage for mixer showers	74.2925	73.1760	71.5491	68.4363	66.1391	63.5773	62.1212	63.7358	65.5057	68.2563	71.4360	74.0079	(42a)
Hot water usage for baths	32.0714	31.5951	30.9244	29.6877	28.7616	27.7348	27.1801	27.8462	28.5714	29.6701	30.9323	31.9630	(42b)
Hot water usage for other uses	45.2141	43.5699	41.9258	40.2816	38.6375	36.9933	36.9933	38.6375	40.2816	41.9258	43.5699	45.2141	(42c)
Average daily hot water use (litres/day)													139.3342 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	151.5780	148.3411	144.3993	138.4056	133.5382	128.3054	126.2947	130.2195	134.3587	139.8522	145.9382	151.1849	(44)
Energy content (annual)	240.0625	211.2357	221.9363	189.4703	179.7681	157.7665	152.7425	161.2389	165.6778	189.7781	207.9158	236.7191	(45)
Distribution loss (46)m = 0.15 x (45)m	36.0094	31.6854	33.2904	28.4206	26.9652	23.6650	22.9114	24.1858	24.8517	28.4667	31.1874	35.5079	(46)
Water storage loss (or HIU loss):													
Store volume													250.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.5800 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8532 (55)
Total storage loss	26.4492	23.8896	26.4492	25.5960	26.4492	25.5960	26.4492	26.4492	25.5960	26.4492	25.5960	26.4492	(56)
If cylinder contains dedicated solar storage	26.4492	23.8896	26.4492	25.5960	26.4492	25.5960	26.4492	26.4492	25.5960	26.4492	25.5960	26.4492	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	289.7741	256.1365	271.6479	237.5783	229.4797	205.8745	202.4541	210.9505	213.7858	239.4897	256.0238	286.4307	(62)
WVHRS	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	289.7741	256.1365	271.6479	237.5783	229.4797	205.8745	202.4541	210.9505	213.7858	239.4897	256.0238	286.4307	(64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =												2899.6257 (64)
Electric shower(s)													2900 (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	(64a)
	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month	119.5901	106.1565	113.5631	101.4853	99.5422	90.9438	90.5562	93.3812	93.5743	102.8705	107.6184	118.4784	(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	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	149.3216	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	184.7607	204.5565	184.7607	190.9194	184.7607	190.9194	184.7607	184.7607	190.9194	184.7607	190.9194	184.7607	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	359.6032	363.3347	353.9313	333.9126	308.6425	284.8923	269.0256	265.2941	274.6975	294.7162	319.9862	343.7365	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	37.9322	(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)	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	-119.4573	(71)
Water heating gains (Table 5)	160.7393	157.9710	152.6386	140.9518	133.7933	126.3108	121.7153	125.5124	129.9642	138.2668	149.4700	159.2451	(72)
Total internal gains	772.8997	793.6587	759.1271	733.5802	694.9930	669.9189	643.2981	643.3636	663.3776	685.5402	728.1721	755.5388	(73)

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6. Solar gains

[Jan]	Area m2		Solar flux Table 6a W/m2		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
South	26.2360		46.7521		0.6300		0.7200		0.7700		385.5713 (78)	
Northwest	7.2490		11.2829		0.6300		0.7200		0.7700		25.7103 (81)	
Solar gains	411.2816	683.8004	898.6655	1063.9698	1155.5078	1133.6128	1098.3814	1030.5749	955.1588	745.0521	489.3837	354.1654 (83)
Total gains	1184.1812	1477.4591	1657.7925	1797.5500	1850.5008	1803.5317	1741.6795	1673.9385	1618.5364	1430.5923	1217.5557	1109.7042 (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	69.1290	69.2614	69.3917	70.0103	70.1273	70.6770	70.6770	70.7797	70.4642	70.1273	69.8911	69.6458
alpha	5.6086	5.6174	5.6261	5.6674	5.6752	5.7118	5.7118	5.7186	5.6976	5.6752	5.6594	5.6431
util living area	0.9971	0.9899	0.9727	0.9219	0.8094	0.6213	0.4531	0.4906	0.7228	0.9409	0.9918	0.9980 (86)
Living	19.8607	20.0990	20.3685	20.6712	20.8837	20.9794	20.9971	20.9954	20.9525	20.6721	20.2016	19.8178
Non living	18.7645	19.0688	19.4085	19.7805	20.0146	20.1056	20.1165	20.1169	20.0841	19.7899	19.2065	18.7142
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10
MIT	20.4172	20.0990	20.3685	20.6712	20.8837	20.9794	20.9971	20.9954	20.9525	20.6721	20.2016	19.9832 (87)
Th 2	20.0994	20.1010	20.1025	20.1098	20.1111	20.1174	20.1174	20.1186	20.1150	20.1111	20.1084	20.1055 (88)
util rest of house	0.9962	0.9868	0.9643	0.8985	0.7590	0.5436	0.3637	0.3990	0.6479	0.9181	0.9887	0.9973 (89)
MIT 2	19.5672	19.0688	19.4085	19.7805	20.0146	20.1056	20.1165	20.1169	20.0841	19.7899	19.2065	18.9649 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.6497	19.1688	19.5017	19.8670	20.0990	20.1905	20.2019	20.2022	20.1684	19.8756	19.3031	19.0638 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.6497	19.1688	19.5017	19.8670	20.0990	20.1905	20.2019	20.2022	20.1684	19.8756	19.3031	19.0638 (93)

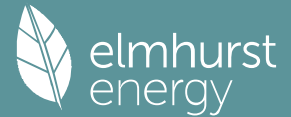
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9956	0.9824	0.9570	0.8910	0.7583	0.5502	0.3723	0.4078	0.6527	0.9106	0.9849	0.9962 (94)
Useful gains	1178.9825	1451.3978	1586.5793	1601.6616	1403.1513	992.3521	648.4935	682.6506	1056.4486	1302.7131	1199.1118	1105.5352 (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	2831.8260	2627.3762	2389.5576	1997.7991	1527.4447	1008.7784	649.9573	685.1024	1098.3266	1686.8639	2226.7579	2721.8211 (97)
Space heating kWh	1229.7156	790.2575	597.4159	285.2190	92.4742	0.0000	0.0000	0.0000	0.0000	285.8082	739.9052	1202.5167 (98a)
Space heating requirement - total per year (kWh/year)												5223.3123
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	1229.7156	790.2575	597.4159	285.2190	92.4742	0.0000	0.0000	0.0000	0.0000	285.8082	739.9052	1202.5167 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5223.3123
Space heating per m2												(98c) / (4) = 27.7669 (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 %)												291.3233 (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	1229.7156	790.2575	597.4159	285.2190	92.4742	0.0000	0.0000	0.0000	0.0000	285.8082	739.9052	1202.5167 (98)
Space heating efficiency (main heating system 1)	291.3233	291.3233	291.3233	291.3233	291.3233	0.0000	0.0000	0.0000	0.0000	291.3233	291.3233	291.3233 (210)
Space heating fuel (main heating system)	422.1137	271.2648	205.0697	97.9046	31.7428	0.0000	0.0000	0.0000	0.0000	98.1069	253.9808	412.7774 (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	289.7741	256.1365	271.6479	237.5783	229.4797	205.8745	202.4541	210.9505	213.7858	239.4897	256.0238	286.4307 (64)
Efficiency of water heater (217)m	289.1100	289.1100	289.1100	289.1100	289.1100	289.1100	289.1100	289.1100	289.1100	289.1100	289.1100	289.1100 (217)
Fuel for water heating, kWh/month	100.2297	88.5948	93.9600	82.1757	79.3745	71.2097	70.0266	72.9655	73.9462	82.8369	88.5558	99.0732 (219)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)
Lighting	35.5900	28.5516	25.7076	18.8345	14.5483	11.8861	13.2714	17.2507	22.4070	29.3992	33.2063	36.5792 (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)												

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(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												1792.9607	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												289.1100	
Water heating fuel used												1002.9488	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												287.2318	(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												3083.1413	(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	1792.9607	0.1566	280.7493	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1002.9488	0.1410	141.4154	(264)
Space and water heating			422.1648	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	287.2318	0.1443	41.4564	(268)
Total CO2, kg/year			463.6212	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			2.4600	(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	1792.9607	1.5796	2832.2457	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1002.9488	1.5214	1525.8568	(278)
Space and water heating			4358.1025	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	287.2318	1.5338	440.5657	(282)
Total Primary energy kWh/year			4798.6682	(286)
Dwelling Primary energy Rate (DPER)			25.5100	(287)

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

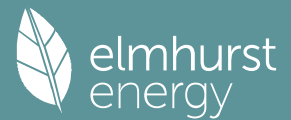
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Basement floor	49.1450 (1a)	x 2.6250 (2a)	= 129.0056 (1a)	= (3a)
Ground floor	49.1450 (1b)	x 3.1330 (2b)	= 153.9713 (1b)	= (3b)
First floor	49.1450 (1c)	x 3.0560 (2c)	= 150.1871 (1c)	= (3c)
Second floor	40.6780 (1d)	x 3.0000 (2d)	= 122.0340 (1d)	= (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	188.1130			(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	555.1980 (5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)	
Number of open flues	0 * 20 =	0.0000 (6b)	
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)	
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)	
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)	
Number of blocked chimneys	0 * 20 =	0.0000 (6f)	
Number of intermittent extract fans	4 * 10 =	40.0000 (7a)	
Number of passive vents	0 * 10 =	0.0000 (7b)	
Number of flueless gas fires	0 * 40 =	0.0000 (7c)	
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.0720 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)

Full SAP Calculation Printout



Infiltration rate													0.3220 (18)
Number of sides sheltered													2 (19)
Shelter factor													(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor													(21) = (18) x (20) = 0.2737 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infiltr rate													
Effective ac	0.3490	0.3422	0.3353	0.3011	0.2943	0.2601	0.2601	0.2532	0.2737	0.2943	0.3080	0.3216	(22b)
	0.5609	0.5585	0.5562	0.5453	0.5433	0.5338	0.5338	0.5321	0.5375	0.5433	0.5474	0.5517	(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								
TER Opaque door			1.9890	1.0000	1.9900			(26)
TER Opening Type			33.4850	1.1450	38.3473			(27)
Flr - Basement			49.1450	0.1300	6.3889			(28a)
Ext Wall	90.3450	30.9590	59.3860	0.1800	10.6895			(29a)
Top floor	34.2130	3.3790	30.8340	0.1800	5.5501			(29a)
Below Ground	13.2390		13.2390	0.1800	2.3830			(29a)
Wl - Dormer	2.9190	1.1360	1.7830	0.1800	0.3209			(29a)
Rf - Flat Roof	46.3670		46.3670	0.1100	5.1004			(30)
Total net area of external elements Aum(A, m2)			236.2340					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 70.7701			(33)
Main dwelling								
Party Wall			214.5040	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 244.0675 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)	15.4270	0.0500	0.7713	
E3 Sill	9.9530	0.0500	0.4976	
E4 Jamb	43.2120	0.0500	2.1606	
E5 Ground floor (normal)	11.7520	0.1600	1.8803	
E6 Intermediate floor within a dwelling	22.9620	0.0000	0.0000	
E7 Party floor between dwellings (in blocks of flats)	1.4240	0.0700	0.0997	
E14 Flat roof	3.8650	0.0800	0.3092	
E15 Flat roof with parapet	11.0290	0.5600	6.1762	
E16 Corner (normal)	21.9330	0.0900	1.9740	
E17 Corner (inverted - internal area greater than external area)	3.8220	-0.0900	-0.3440	
E18 Party wall between dwellings	23.7860	0.0600	1.4272	
E24 Eaves (insulation at ceiling level - inverted)	16.6660	0.2400	3.9998	
E25 Staggered party wall between dwellings	23.6280	0.0600	1.4177	
P1 Party wall - Ground floor	19.3130	0.0800	1.5450	
P2 Party wall - Intermediate floor within a dwelling	54.0770	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	16.3590	0.1200	1.9631	
R1 Head of roof window	1.0320	0.0800	0.0826	
R2 Sill of roof window	1.0320	0.0600	0.0619	
R3 Jamb of roof window	4.4000	0.0800	0.3520	
R9 Roof to wall (flat ceiling)	2.5110	0.0400	0.1004	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			24.4748	(36)
Point Thermal bridges			(36a) = 0.0000	
Total fabric heat loss			(33) + (36) + (36a) = 95.2449	(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	102.7667	102.3334	101.9087	99.9137	99.5404	97.8029	97.8029	97.4811	98.4721	99.5404	100.2955	101.0849	(38)
Average = Sum(39)m / 12 =	198.0116	197.5783	197.1535	195.1585	194.7853	193.0477	193.0477	192.7259	193.7170	194.7853	195.5404	196.3298	(39)
													195.1567

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0526	1.0503	1.0481	1.0375	1.0355	1.0262	1.0262	1.0245	1.0298	1.0355	1.0395	1.0437	(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													2.9864 (42)
Hot water usage for mixer showers													
	74.2925	73.1760	71.5491	68.4363	66.1391	63.5773	62.1212	63.7358	65.5057	68.2563	71.4360	74.0079	(42a)
Hot water usage for baths													
	32.0714	31.5951	30.9244	29.6877	28.7616	27.7348	27.1801	27.8462	28.5714	29.6701	30.9323	31.9630	(42b)
Hot water usage for other uses													
	45.2141	43.5699	41.9258	40.2816	38.6375	36.9933	36.9933	38.6375	40.2816	41.9258	43.5699	45.2141	(42c)
Average daily hot water use (litres/day)													139.3342 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	151.5780	148.3411	144.3993	138.4056	133.5382	128.3054	126.2947	130.2195	134.3587	139.8522	145.9382	151.1849	(44)
Energy conte	240.0625	211.2357	221.9363	189.4703	179.7681	157.7665	152.7425	161.2389	165.6778	189.7781	207.9158	236.7191	(45)
Energy content (annual)													Total = Sum(45)m = 2314.3117
Distribution loss (46)m = 0.15 x (45)m													
	36.0094	31.6854	33.2904	28.4206	26.9652	23.6650	22.9114	24.1858	24.8517	28.4667	31.1874	35.5079	(46)
Water storage loss (or HIU loss):													
Store volume													250.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8903 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													1.0208 (55)
Total storage loss													
	31.6444	28.5820	31.6444	30.6236	31.6444	30.6236	31.6444	31.6444	30.6236	31.6444	30.6236	31.6444	(56)
If cylinder contains dedicated solar storage													
	31.6444	28.5820	31.6444	30.6236	31.6444	30.6236	31.6444	31.6444	30.6236	31.6444	30.6236	31.6444	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	294.9693	260.8290	276.8431	242.6059	234.6749	210.9021	207.6493	216.1457	218.8134	244.6849	261.0514	291.6259	(62)
VVWHS	-33.9634	-30.0375	-31.4536	-26.0448	-24.2728	-20.7704	-19.4690	-20.7033	-21.4899	-25.3342	-28.7006	-33.3345	(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)