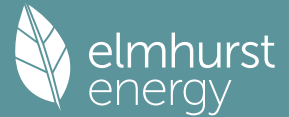


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Property Reference	Foxham				Issued on Date	28/08/2025	
Assessment Reference	Proposed			Prop Type Ref			
Property							
SAP Rating	86 B	DER	3.17	TER	11.01		
Environmental	97 A	% DER < TER				71.21	
CO ₂ Emissions (t/year)	0.33	DFEE	38.56	TFEE	41.13		
Compliance Check	See BREL	% DFEE < TFEE				6.26	
% DPER < TPER	42.27	DPER	33.19	TPER	57.49		
Assessor Details	Mr. Michael Woodbridge				Assessor ID	M818-0001	
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			
Ground floor	53.5000 (1b)	x 2.4000 (2b)	= 128.4000 (1b) - (3b)
First floor	53.5000 (1c)	x 2.7000 (2c)	= 144.4500 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	107.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 272.8500 (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	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) =	Air changes per hour 50.0000 / (5) = 0.1833 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	4.0000 (17)
Infiltration rate	0.3833 (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) = 0.3258 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.4153	0.4072	0.3991	0.3583	0.3502	0.3095	0.3095	0.3013	0.3258	0.3502	0.3665	0.3828 (22b)
Effective ac	0.5863	0.5829	0.5796	0.5642	0.5613	0.5479	0.5479	0.5454	0.5531	0.5613	0.5672	0.5733 (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							
Front Door			4.4600	1.2000	5.3520		(26)
Window			13.9800	1.0536	14.7299		(27)
Patio Door			5.0400	1.0536	5.3103		(27)
Ground Floor			53.5000	0.1200	6.4200	75.0000	4012.5000 (28a)
External Wall Stone	151.9800	23.4800	128.5000	0.1800	23.1300	9.0000	1156.5000 (29a)
Plane Ceiling	53.5000		53.5000	0.0800	4.2800	9.0000	481.5000 (30)
Total net area of external elements Aum(A, m ²)			258.9800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	59.2222		(33)
Main dwelling							
Int W T			210.0000			9.0000	1890.0000 (32c)
Int F			53.5000			18.0000	963.0000 (32d)
Int C			53.5000			9.0000	481.5000 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	8985.0000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							83.9720 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				16.7200	0.1830	3.0598	
E3 Sill				11.8300	0.0330	0.3904	

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E4 Jamb						34.6000	0.0330	1.1418				
E5 Ground floor (normal)						29.8000	0.1710	5.0958				
E6 Intermediate floor within a dwelling						29.8000	0.0670	1.9966				
E10 Eaves (insulation at ceiling level)						17.7000	0.0350	0.6195				
E12 Gable (insulation at ceiling level)						12.1200	0.1080	1.3090				
E16 Corner (normal)						20.4000	0.0460	0.9384				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)											14.5512	(36)
Point Thermal bridges											0.0000	
Total fabric heat loss											73.7734	(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	52.7869	52.4853	52.1897	50.8012	50.5414	49.3321	49.3321	49.1081	49.7979	50.5414	51.0669	51.6164 (38)
Average = Sum(39)m / 12 =	126.5603	126.2587	125.9631	124.5746	124.3148	123.1055	123.1055	122.8815	123.5713	124.3148	124.8404	125.3898 (39)
												124.5734
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1828	1.1800	1.1772	1.1642	1.1618	1.1505	1.1505	1.1484	1.1549	1.1618	1.1667	1.1719 (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												2.7956 (42)
Hot water usage for mixer showers												
	71.0923	70.0239	68.4671	65.4883	63.2901	60.8387	59.4453	60.9903	62.6840	65.3161	68.3588	70.8199 (42a)
Hot water usage for baths												
	30.6952	30.2394	29.5974	28.4138	27.5274	26.5447	26.0138	26.6513	27.3454	28.3970	29.6050	30.5915 (42b)
Hot water usage for other uses												
	43.2594	41.6863	40.1133	38.5402	36.9671	35.3941	35.3941	36.9671	38.5402	40.1133	41.6863	43.2594 (42c)
Average daily hot water use (litres/day)												133.3308 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	145.0469	141.9496	138.1777	132.4423	127.7847	122.7774	120.8532	124.6088	128.5696	133.8264	139.6502	144.6708 (44)
Energy conte	229.7189	202.1344	212.3741	181.3069	172.0228	150.9692	146.1614	154.2917	158.5392	181.6011	198.9573	226.5195 (45)
Energy content (annual)												
Distribution loss	(46)m = 0.15 x (45)m											
	34.4578	30.3202	31.8561	27.1960	25.8034	22.6454	21.9242	23.1438	23.7809	27.2402	29.8436	33.9779 (46)
Water storage loss:												
Store volume												250.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												2.0900 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.1286 (55)
Total storage loss												
	34.9866	31.6008	34.9866	33.8580	34.9866	33.8580	34.9866	34.9866	33.8580	34.9866	33.8580	34.9866 (56)
If cylinder contains dedicated solar storage												
	34.9866	31.6008	34.9866	33.8580	34.9866	33.8580	34.9866	34.9866	33.8580	34.9866	33.8580	34.9866 (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												
	287.9679	254.7464	270.6231	237.6769	230.2718	207.3392	204.4104	212.5407	214.9092	239.8501	255.3273	284.7685 (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	287.9679	254.7464	270.6231	237.6769	230.2718	207.3392	204.4104	212.5407	214.9092	239.8501	255.3273	284.7685 (64)
12Total per year (kWh/year)												2900.4312 (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												
	122.9807	109.2993	117.2136	105.3805	103.7968	95.2932	95.1979	97.9012	97.8103	106.9816	111.2493	121.9169 (65)

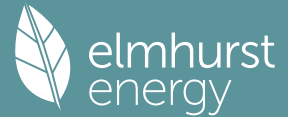
5. Internal gains (see Table 5 and 5a)												

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	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	141.3897	156.5386	141.3897	146.1027	141.3897	146.1027	141.3897	141.3897	146.1027	141.3897	146.1027	141.3897 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	267.1732	269.9457	262.9593	248.0860	229.3112	211.6655	199.8771	197.1047	204.0911	218.9644	237.7392	255.3849 (68)
Pumps, fans	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778 (69)
Losses e.g. evaporation (negative values) (Table 5)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Water heating gains (Table 5)	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227 (71)
Total internal gains	165.2967	162.6477	157.5451	146.3619	139.5118	132.3517	127.9541	131.5876	135.8476	143.7924	154.5129	163.8668 (72)
	638.7932	654.0656	626.8276	605.4841	575.1462	555.0535	534.1545	535.0156	550.9750	569.0801	603.2883	625.5749 (73)

6. Solar gains												

[Jan]												
			Area	Solar flux	g	FF	Access	Gains				
			m2	Table 6a	or Table 6b	or Table 6c	factor	W				
				W/m2			Table 6d					
North			2.7900	10.6334	0.6300	0.0000	0.7700	14.3915 (74)				
East			7.6400	19.6403	0.6300	0.0000	0.7700	72.7900 (76)				
South			2.7900	46.7521	0.6300	0.0000	0.7700	63.2756 (78)				
West			0.7600	19.6403	0.6300	0.0000	0.7700	7.2409 (80)				
North			5.0400	10.6334	0.6300	0.0000	0.7700	25.9976 (74)				
Solar gains	183.6957	337.3724	520.9905	735.8936	900.0997	925.1760	878.9547	752.7936	595.4532	389.4219	224.6176	154.1599 (83)
Total gains	822.4889	991.4379	1147.8181	1341.3777	1475.2460	1480.2295	1413.1092	1287.8091	1146.4282	958.5020	827.9059	779.7348 (84)

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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	19.7205	19.7676	19.8140	20.0348	20.0767	20.2739	20.2739	20.3109	20.1975	20.0767	19.9922	19.9046
alpha	2.3147	2.3178	2.3209	2.3357	2.3384	2.3516	2.3516	2.3541	2.3465	2.3384	2.3328	2.3270
util living area	0.9281	0.8931	0.8392	0.7399	0.6115	0.4680	0.3575	0.4011	0.5924	0.7967	0.8983	0.9353 (86)
Living	18.1876	18.6077	19.1981	19.9199	20.4667	20.7994	20.9230	20.8972	20.6348	19.8887	18.9220	18.1192
Non living	16.6657	17.1913	17.9245	18.8044	19.4385	19.8012	19.9150	19.8981	19.6445	18.7935	17.6013	16.5846
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	19.5613	18.6077	19.1981	19.9199	20.4667	20.7994	20.9230	20.8972	20.6348	19.8887	18.9220	18.5222 (87)
Th 2	19.9338	19.9360	19.9383	19.9487	19.9507	19.9598	19.9598	19.9615	19.9563	19.9507	19.9467	19.9426 (88)
util rest of house	0.9190	0.8801	0.8197	0.7092	0.5664	0.4062	0.2810	0.3217	0.5306	0.7647	0.8837	0.9270 (89)
MIT 2	18.6309	17.1913	17.9245	18.8044	19.4385	19.8012	19.9150	19.8981	19.6445	18.7935	17.6013	17.1897 (90)
Living area fraction									fLA = Living area / (4) =			0.1808 (91)
MIT	18.7991	17.4474	18.1548	19.0061	19.6244	19.9817	20.0973	20.0788	19.8236	18.9915	17.8401	17.4307 (92)
Temperature adjustment												0.0000
adjusted MIT	18.7991	17.4474	18.1548	19.0061	19.6244	19.9817	20.0973	20.0788	19.8236	18.9915	17.8401	17.4307 (93)
8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9074	0.8399	0.7793	0.6777	0.5512	0.4075	0.2915	0.3311	0.5220	0.7295	0.8446	0.9005 (94)
Useful gains	746.3342	832.7400	894.5016	909.0719	813.1602	603.2486	411.8945	426.3346	598.4219	699.2402	699.2627	702.1192 (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	1835.0122	1584.2195	1468.0759	1258.9682	985.1257	662.5204	430.5392	452.0555	707.2686	1043.1940	1340.8017	1658.9908 (97)
Space heating kWh	809.9765	504.9942	426.7392	251.9253	127.9424	0.0000	0.0000	0.0000	0.0000	255.9016	461.9081	711.9124 (98a)
Space heating requirement - total per year (kWh/year)												3551.2997
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	809.9765	504.9942	426.7392	251.9253	127.9424	0.0000	0.0000	0.0000	0.0000	255.9016	461.9081	711.9124 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3551.2997
Space heating per m2										(98c) / (4) =		33.1897 (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 %)												331.1935 (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	809.9765	504.9942	426.7392	251.9253	127.9424	0.0000	0.0000	0.0000	0.0000	255.9016	461.9081	711.9124 (98)
Space heating efficiency (main heating system 1)	331.1935	331.1935	331.1935	331.1935	331.1935	0.0000	0.0000	0.0000	0.0000	331.1935	331.1935	331.1935 (210)
Space heating fuel (main heating system)	244.5629	152.4771	128.8489	76.0659	38.6307	0.0000	0.0000	0.0000	0.0000	77.2665	139.4677	214.9536 (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	287.9679	254.7464	270.6231	237.6769	230.2718	207.3392	204.4104	212.5407	214.9092	239.8501	255.3273	284.7685 (64)
Efficiency of water heater (217)m	296.8872	296.8872	296.8872	296.8872	296.8872	296.8872	296.8872	296.8872	296.8872	296.8872	296.8872	296.8872 (216)
Fuel for water heating, kWh/month	96.9957	85.8058	91.1535	80.0563	77.5620	69.8377	68.8512	71.5897	72.3875	80.7883	86.0014	95.9181 (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	30.4312	24.4131	21.9813	16.1044	12.4395	10.1632	11.3477	14.7502	19.1591	25.1377	28.3930	31.2770 (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												1072.2733 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												296.8872
Water heating fuel used												976.9471 (219)
Space cooling fuel												0.0000 (221)

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Electricity for pumps and fans:
 Total electricity for the above, kWh/year 0.0000 (231)
 Electricity for lighting (calculated in Appendix L) 245.5975 (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 2294.8179 (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	1072.2733	0.1553	166.5560 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	976.9471	0.1409	137.6523 (264)
Space and water heating			304.2083 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	245.5975	0.1443	35.4473 (268)
Total CO2, kg/year			339.6556 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.1700 (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	1072.2733	1.5750	1688.8307 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	976.9471	1.5210	1485.9356 (278)
Space and water heating			3174.7662 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	245.5975	1.5338	376.7056 (282)
Total Primary energy kWh/year			3551.4718 (286)
Dwelling Primary energy Rate (DPER)			33.1900 (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			
Ground floor	53.5000 (1b)	x 2.4000 (2b)	= 128.4000 (1b) - (3b)
First floor	53.5000 (1c)	x 2.7000 (2c)	= 144.4500 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	107.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 272.8500 (5)

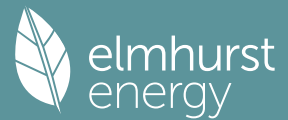
2. Ventilation rate

	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) = 0.1466 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3966 (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) = 0.3371 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.4298	0.4214	0.4130	0.3708	0.3624	0.3203	0.3203	0.3118	0.3371	0.3624	0.3792	0.3961 (22b)
Effective ac	0.5924	0.5888	0.5853	0.5688	0.5657	0.5513	0.5513	0.5486	0.5568	0.5657	0.5719	0.5784 (25)

3. Heat losses and heat loss parameter

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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			4.4600	1.0000	4.4600		(26)
TER Opening Type			19.0200	1.1450	21.7786		(27)
Ground Floor			53.5000	0.1300	6.9550		(28a)
External Wall Stone	151.9800	23.4800	128.5000	0.1800	23.1300		(29a)
Plane Ceiling	53.5000		53.5000	0.1100	5.8850		(30)
Total net area of external elements Aum(A, m2)			258.9800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		62.2086		(33)

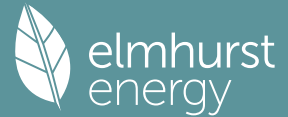
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K			83.9720 (35)
List of Thermal Bridges			
K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	16.7200	0.0500	0.8360
E3 Sill	11.8300	0.0500	0.5915
E4 Jamb	34.6000	0.0500	1.7300
E5 Ground floor (normal)	29.8000	0.1600	4.7680
E6 Intermediate floor within a dwelling	29.8000	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	17.7000	0.0600	1.0620
E12 Gable (insulation at ceiling level)	12.1200	0.0600	0.7272
E16 Corner (normal)	20.4000	0.0900	1.8360
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			11.5507 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 73.7593 (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	53.3374	53.0144	52.6978	51.2109	50.9327	49.6377	49.6377	49.3979	50.1365	50.9327	51.4955	52.0839 (38)
Average = Sum(39)m / 12 =	127.0967	126.7737	126.4572	124.9703	124.6921	123.3970	123.3970	123.1572	123.8958	124.6921	125.2548	125.8432 (39)
												124.9689
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1878	1.1848	1.1818	1.1679	1.1653	1.1532	1.1532	1.1510	1.1579	1.1653	1.1706	1.1761 (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												2.7956 (42)
Hot water usage for mixer showers												
Hot water usage for baths	71.0923	70.0239	68.4671	65.4883	63.2901	60.8387	59.4453	60.9903	62.6840	65.3161	68.3588	70.8199 (42a)
Hot water usage for other uses	30.6952	30.2394	29.5974	28.4138	27.5274	26.5447	26.0138	26.6513	27.3454	28.3970	29.6050	30.5915 (42b)
Average daily hot water use (litres/day)	43.2594	41.6863	40.1133	38.5402	36.9671	35.3941	35.3941	36.9671	38.5402	40.1133	41.6863	43.2594 (42c)
												133.3308 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	145.0469	141.9496	138.1777	132.4423	127.7847	122.7774	120.8532	124.6088	128.5696	133.8264	139.6502	144.6708 (44)
Energy content (annual)	229.7189	202.1344	212.3741	181.3069	172.0228	150.9692	146.1614	154.2917	158.5392	181.6011	198.9573	226.5195 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 2214.5962
Water storage loss:	34.4578	30.3202	31.8561	27.1960	25.8034	22.6454	21.9242	23.1438	23.7809	27.2402	29.8436	33.9779 (46)
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	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	284.6257	251.7276	267.2808	234.4425	226.9296	204.1048	201.0682	209.1985	211.6748	236.5079	252.0929	281.4263 (62)
WWHRS	-32.5004	-28.7436	-30.0987	-24.9229	-23.2272	-19.8757	-18.6303	-19.8115	-20.5642	-24.2429	-27.4643	-31.8986 (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	252.1252	222.9839	237.1822	209.5196	203.7023	184.2290	182.4379	189.3870	191.1106	212.2650	224.6286	249.5277 (64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 2559.0990 (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	120.3070	106.8843	114.5398	102.7930	101.1230	92.7057	92.5241	95.2274	95.2228	104.3078	108.6618	119.2432 (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	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784	139.7784 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	137.9164	152.6931	137.9164	142.5136	137.9164	137.9164	137.9164	137.9164	142.5136	137.9164	142.5136	137.9164 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	267.1732	269.9457	262.9593	248.0860	229.3112	211.6655	199.8771	197.1047	204.0911	218.9644	237.7392	255.3849 (68)
Pumps, fans	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778	36.9778 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227	-111.8227 (71)
Total internal gains	161.7029	159.0540	153.9514	142.7681	135.9180	128.7580	124.3604	127.9938	132.2538	140.1987	150.9191	160.2731 (72)
	634.7260	649.6263	622.7605	601.3012	571.0791	547.8706	527.0874	527.9484	543.7921	565.0129	599.1054	621.5078 (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	FF	Access factor Table 6d	Gains W
North					7.8300	10.6334	0.6300	0.7000		0.7700	25.4452 (74)
East					7.6400	19.6403	0.6300	0.7000		0.7700	45.8577 (76)
South					2.7900	46.7521	0.6300	0.7000		0.7700	39.8636 (78)
West					0.7600	19.6403	0.6300	0.7000		0.7700	4.5618 (80)
Solar gains	115.7283	212.5446	328.2240	463.6129	567.0628	582.8609	553.7415	474.2599	375.1355	245.3358	97.1207 (83)
Total gains	750.4543	862.1709	950.9845	1064.9141	1138.1419	1130.7315	1080.8289	1002.2084	918.9276	810.3487	718.6285 (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	19.6373	19.6873	19.7366	19.9714	20.0160	20.2260	20.2260	20.2654	20.1446	20.0160	19.9260	19.8329
alpha	2.3092	2.3125	2.3158	2.3314	2.3344	2.3484	2.3484	2.3510	2.3430	2.3344	2.3284	2.3222
util living area	0.9395	0.9165	0.8813	0.8105	0.7066	0.5688	0.4472	0.4899	0.6752	0.8419	0.9166	0.9446 (86)
MIT	18.0530	18.3964	18.9256	19.6404	20.2548	20.6912	20.8745	20.8406	20.5070	19.7113	18.7773	18.0026 (87)
Th 2	19.9298	19.9322	19.9346	19.9457	19.9478	19.9576	19.9576	19.9594	19.9538	19.9478	19.9436	19.9392 (88)
util rest of house	0.9315	0.9057	0.8655	0.7843	0.6639	0.5021	0.3574	0.3998	0.6145	0.8143	0.9041	0.9373 (89)
MIT 2	16.4954	16.9281	17.5929	18.4804	19.2137	19.7053	19.8819	19.8575	19.5205	18.5871	17.4218	16.4367 (90)
Living area fraction									fLA = Living area /	(4) =		0.1808 (91)
MIT	16.7771	17.1937	17.8339	18.6902	19.4020	19.8836	20.0614	20.0353	19.6989	18.7904	17.6669	16.7199 (92)
Temperature adjustment												0.0000
adjusted MIT	16.7771	17.1937	17.8339	18.6902	19.4020	19.8836	20.0614	20.0353	19.6989	18.7904	17.6669	16.7199 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8978	0.8678	0.8249	0.7467	0.6388	0.4970	0.3669	0.4069	0.5978	0.7761	0.8667	0.9051 (94)
Useful gains	673.7548	748.1505	784.4986	795.2037	726.9920	561.9825	396.5646	407.7769	549.2982	628.9483	641.9195	650.4643 (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	1585.8003	1558.5131	1433.2524	1223.4813	960.3765	651.9810	427.1234	447.7151	693.6832	1021.2753	1323.5573	1575.5459 (97)
Space heating kWh	678.5618	544.5636	482.6728	308.3599	173.6381	0.0000	0.0000	0.0000	0.0000	291.8913	490.7792	688.2607 (98a)
Space heating requirement - total per year (kWh/year)												3658.7275
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	678.5618	544.5636	482.6728	308.3599	173.6381	0.0000	0.0000	0.0000	0.0000	291.8913	490.7792	688.2607 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3658.7275
Space heating per m2										(98c) / (4) =		34.1937 (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 %)													92.3000 (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	678.5618	544.5636	482.6728	308.3599	173.6381	0.0000	0.0000	0.0000	0.0000	291.8913	490.7792	688.2607	(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)	735.1699	589.9931	522.9392	334.0844	188.1236	0.0000	0.0000	0.0000	0.0000	316.2419	531.7218	745.6779	(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	252.1252	222.9839	237.1822	209.5196	203.7023	184.2290	182.4379	189.3870	191.1106	212.2650	224.6286	249.5277	(64)
Efficiency of water heater													(216)
(217)m	86.1673	85.9828	85.6184	84.9250	83.7038	79.8000	79.8000	79.8000	79.8000	84.7745	85.7630	86.2128	(217)
Fuel for water heating, kWh/month	292.5995	259.3356	277.0224	246.7113	243.3609	230.8635	228.6189	237.3271	239.4869	250.3877	261.9180	289.4322	(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	28.6563	22.9891	20.6992	15.1651	11.7140	9.5704	10.6859	13.8899	18.0416	23.6716	26.7370	29.4527	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-48.6027	-67.7887	-96.3975	-107.1628	-114.4947	-106.4365	-105.0561	-99.6534	-90.0214	-76.8732	-53.1464	-42.1009	(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	-29.7318	-62.2722	-123.2944	-184.5208	-243.3852	-244.3808	-241.5644	-204.8569	-150.5458	-88.9060	-39.6417	-23.5372	(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)

13a. Primary energy - Individual heating systems including micro-CHP				
	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year	
Space heating - main system 1	3963.9518	1.1300	4479.2655	(275)
Total CO ₂ associated with community systems			0.0000	(473)
Water heating (other fuel)	3057.0640	1.1300	3454.4823	(278)
Space and water heating			7933.7478	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	231.2727	1.5338	354.7339	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1007.7343	1.4983	-1509.9175	
PV Unit electricity exported	-1636.6373	0.4625	-756.9369	
Total			-2266.8544	(283)
Total Primary energy kWh/year			6151.7281	(286)
Target Primary Energy Rate (TPER)			57.4900	(287)