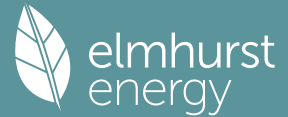


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Property Reference	3B5P				Issued on Date	28/08/2025	
Assessment Reference	Proposed			Prop Type Ref			
Property							
SAP Rating	87 B	DER	3.10	TER	10.29		
Environmental	97 A	% DER < TER				69.87	
CO ₂ Emissions (t/year)	0.28	DFEE	32.97	TFEE	34.96		
Compliance Check	See BREL	% DFEE < TFEE				5.68	
% DPER < TPER	39.34	DPER	32.48	TPER	53.54		
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	47.1100 (1b)	x 2.3800 (2b)	= 112.1218 (1b) - (3b)
First floor	47.1100 (1c)	x 2.7000 (2c)	= 127.1970 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.2200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 239.3188 (5)

2. Ventilation rate

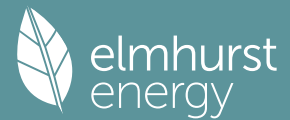
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1254 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	4.0000 (17)
Infiltration rate	0.3254 (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) = 0.2766 (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	0.3526	0.3457	0.3388	0.3042	0.2973	0.2627	0.2627	0.2558	0.2766	0.2973	0.3111	0.3249 (22b)
Effective ac	0.5622	0.5598	0.5574	0.5463	0.5442	0.5345	0.5345	0.5327	0.5382	0.5442	0.5484	0.5528 (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							
Windows			11.5200	1.0536	12.1379		(27)
Patio Door			5.0400	1.0536	5.3103		(27)
Ground Floor			47.1100	0.1200	5.6532	75.0000	3533.2500 (28a)
External Wall STone	99.0900	16.5600	82.5300	0.1800	14.8554	9.0000	742.7700 (29a)
Plane Ceiling	47.1100		47.1100	0.0800	3.7688	9.0000	423.9900 (30)
Total net area of external elements Aum(A, m ²)			193.3100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.7257		(33)
Main dwelling							
Party W			47.4800	0.0000	0.0000	20.0000	949.6000 (32)
Int W			180.3300			9.0000	1622.9700 (32c)
Int F			47.1100			18.0000	847.9800 (32d)
Int C			47.1100			9.0000	423.9900 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	8544.5500 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							90.6872 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				11.8600	0.1830	2.1704	
E3 Sill				8.4000	0.0330	0.2772	

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E4 Jamb	26.0000	0.0330	0.8580
E5 Ground floor (normal)	19.4300	0.1710	3.3225
E10 Eaves (insulation at ceiling level)	10.1200	0.0350	0.3542
E12 Gable (insulation at ceiling level)	9.3100	0.1080	1.0055
E16 Corner (normal)	10.2000	0.0460	0.4692
E6 Intermediate floor within a dwelling	19.4300	0.0670	1.3018
P1 Party wall - Ground floor	9.3100	0.1600	1.4896
P2 Party wall - Intermediate floor within a dwelling	9.3100	0.0000	0.0000
E18 Party wall between dwellings	10.2000	0.0840	0.8568
P4 Party wall - Roof (insulation at ceiling level)	9.3100	0.2400	2.2344

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 14.3396 (36)

Point Thermal bridges 0.0000

Total fabric heat loss (33) + (36) + (36a) = 56.0653 (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	44.3971	44.2064	44.0196	43.1419	42.9777	42.2132	42.2132	42.0716	42.5077	42.9777	43.3099	43.6572 (38)
Average = Sum(39)m / 12 =	100.4624	100.2717	100.0849	99.2072	99.0429	98.2785	98.2785	98.1369	98.5729	99.0429	99.3751	99.7225 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0663	1.0642	1.0622	1.0529	1.0512	1.0431	1.0431	1.0416	1.0462	1.0512	1.0547	1.0584 (40)
HLP (average)												1.0529
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6792 (42)
Hot water usage for mixer showers	69.1410	68.1020	66.5879	63.6909	61.5530	59.1688	57.8137	59.3163	60.9635	63.5234	66.4826	68.8761	(42a)
Hot water usage for baths	29.8561	29.4127	28.7883	27.6370	26.7749	25.8190	25.3027	25.9227	26.5978	27.6207	28.7957	29.7552	(42b)
Hot water usage for other uses	42.0676	40.5379	39.0081	37.4784	35.9487	34.4190	34.4190	35.9487	37.4784	39.0081	40.5379	42.0676	(42c)
Average daily hot water use (litres/day)													129.6703 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	141.0647	138.0526	134.3843	128.8063	124.2766	119.4068	117.5353	121.1877	125.0398	130.1522	135.8161	140.6989	(44)
Energy content (annual)	223.4121	196.5850	206.5437	176.3294	167.3002	146.8246	142.1488	150.0557	154.1865	176.6153	193.4950	220.3005	(45)
Distribution loss (46)m = 0.15 x (45)m	33.5118	29.4877	30.9816	26.4494	25.0950	22.0237	21.3223	22.5084	23.1280	26.4923	29.0243	33.0451	(46)
Water storage loss:													
Store volume													210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3200 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7128 (55)
Total storage loss	22.0968	19.9584	22.0968	21.3840	22.0968	21.3840	22.0968	22.0968	21.3840	22.0968	21.3840	22.0968	(56)
If cylinder contains dedicated solar storage	22.0968	19.9584	22.0968	21.3840	22.0968	21.3840	22.0968	22.0968	21.3840	22.0968	21.3840	22.0968	(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	268.7713	237.5546	251.9029	220.2254	212.6594	190.7206	187.5080	195.4149	198.0825	221.9745	237.3910	265.6597	(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	268.7713	237.5546	251.9029	220.2254	212.6594	190.7206	187.5080	195.4149	198.0825	221.9745	237.3910	265.6597	(64)
12Total per year (kWh/year)													
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	110.5719	98.1402	104.9631	93.7463	91.9147	83.9360	83.5518	86.1809	86.3838	95.0120	99.4539	109.5373	(65)

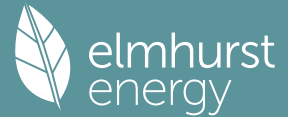
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
(66)m	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
127.5528	141.2192	127.5528	131.8046	127.5528	131.8046	127.5528	131.8046	127.5528	131.8046	127.5528	131.8046	127.5528 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
246.6309	249.1902	242.7410	229.0113	211.6800	195.3911	184.5091	181.9498	188.3991	202.1287	219.4600	235.7489	235.7489 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960 (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)												
-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677 (71)
Water heating gains (Table 5)												
148.6181	146.0420	141.0795	130.2032	123.5412	116.5778	112.3009	115.8345	119.9775	127.7042	138.1304	147.2275	147.2275 (72)
Total internal gains	585.9898	599.6392	574.5611	554.2070	525.9620	506.9613	487.5506	488.5251	503.3691	520.5737	552.5829	573.7172 (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
East	5.7900	19.6403	0.6300	0.0000	0.7700	55.1642 (76)
South	2.9400	46.7521	0.6300	0.0000	0.7700	66.6775 (78)
West	2.7900	19.6403	0.6300	0.0000	0.7700	26.5817 (80)
West	5.0400	19.6403	0.6300	0.0000	0.7700	48.0186 (80)

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Solar gains	196.4420	363.0474	557.1517	766.9159	911.0390	922.5655	882.2647	775.1291	631.5175	418.9937	240.8366	164.3275 (83)
Total gains	782.4317	962.6866	1131.7128	1321.1229	1437.0009	1429.5268	1369.8154	1263.6542	1134.8865	939.5673	793.4195	738.0446 (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	23.6256	23.6705	23.7147	23.9245	23.9642	24.1506	24.1506	24.1855	24.0785	23.9642	23.8841	23.8009
alpha	2.5750	2.5780	2.5810	2.5950	2.5976	2.6100	2.6100	2.6124	2.6052	2.5976	2.5923	2.5867
util living area	0.9199	0.8737	0.8034	0.6864	0.5502	0.4095	0.3049	0.3413	0.5242	0.7544	0.8829	0.9291 (86)
Living	18.7340	19.1694	19.7161	20.3021	20.6895	20.8960	20.9646	20.9518	20.7968	20.2357	19.3825	18.6522
Non living	17.3937	17.9343	18.6050	19.3072	19.7462	19.9662	20.0271	20.0194	19.8743	19.2524	18.2153	17.2954
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	19.8408	19.1694	19.7161	20.3021	20.6895	20.8960	20.9646	20.9518	20.7968	20.2357	19.3825	18.9806 (87)
Th 2	20.0285	20.0302	20.0318	20.0395	20.0409	20.0476	20.0476	20.0488	20.0450	20.0409	20.0380	20.0350 (88)
util rest of house	0.9101	0.8592	0.7820	0.6548	0.5077	0.3559	0.2425	0.2758	0.4672	0.7203	0.8670	0.9203 (89)
MIT 2	18.9781	17.9343	18.6050	19.3072	19.7462	19.9662	20.0271	20.0194	19.8743	19.2524	18.2153	17.7891 (90)
Living area fraction										FLA = Living area / (4) =		0.2340 (91)
MIT	19.1800	18.2233	18.8650	19.5400	19.9669	20.1838	20.2465	20.2376	20.0902	19.4825	18.4885	18.0679 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1800	18.2233	18.8650	19.5400	19.9669	20.1838	20.2465	20.2376	20.0902	19.4825	18.4885	18.0679 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9002	0.8261	0.7522	0.6370	0.5043	0.3638	0.2557	0.2891	0.4700	0.6979	0.8348	0.8973 (94)
Useful gains	704.3078	795.2877	851.2214	841.5063	724.6242	520.0815	350.3150	365.2747	533.4279	655.7211	662.3709	662.2631 (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	1494.8781	1335.9502	1237.5515	1055.5685	818.7808	548.7705	358.3718	376.6064	590.4719	879.7509	1131.7318	1382.9445 (97)
Space heating kWh	588.1843	363.3252	287.4296	154.1248	70.0525	0.0000	0.0000	0.0000	0.0000	166.6782	337.9399	536.1870 (98a)
Space heating requirement - total per year (kWh/year)												2503.9214
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	588.1843	363.3252	287.4296	154.1248	70.0525	0.0000	0.0000	0.0000	0.0000	166.6782	337.9399	536.1870 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2503.9214
Space heating per m2										(98c) / (4) =		26.5753 (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 %)												301.9364 (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	588.1843	363.3252	287.4296	154.1248	70.0525	0.0000	0.0000	0.0000	0.0000	166.6782	337.9399	536.1870 (98)
Space heating efficiency (main heating system 1)	301.9364	301.9364	301.9364	301.9364	301.9364	0.0000	0.0000	0.0000	0.0000	301.9364	301.9364	301.9364 (210)
Space heating fuel (main heating system)	194.8041	120.3317	95.1954	51.0454	23.2011	0.0000	0.0000	0.0000	0.0000	55.2031	111.9242	177.5828 (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	268.7713	237.5546	251.9029	220.2254	212.6594	190.7206	187.5080	195.4149	198.0825	221.9745	237.3910	265.6597 (64)
Efficiency of water heater (217)m	305.9950	305.9950	305.9950	305.9950	305.9950	305.9950	305.9950	305.9950	305.9950	305.9950	305.9950	305.9950 (216)
Fuel for water heating, kWh/month	87.8352	77.6335	82.3225	71.9703	69.4977	62.3280	61.2781	63.8621	64.7339	72.5419	77.5800	86.8183 (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	33.5826	26.9412	24.2576	17.7721	13.7277	11.2157	12.5229	16.2777	21.1431	27.7409	31.3333	34.5160 (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												829.2877 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												305.9950

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Water heating fuel used	878.4016 (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)	271.0307 (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	1978.7200 (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	829.2877	0.1559	129.2872	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	878.4016	0.1410	123.8623	(264)
Space and water heating			253.1495	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	271.0307	0.1443	39.1181	(268)
Total CO2, kg/year			292.2676	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.1000	(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	829.2877	1.5771	1307.8765	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	878.4016	1.5214	1336.4041	(278)
Space and water heating			2644.2806	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	271.0307	1.5338	415.7160	(282)
Total Primary energy kWh/year			3059.9966	(286)
Dwelling Primary energy Rate (DPER)			32.4800	(287)

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

1. Overall dwelling characteristics

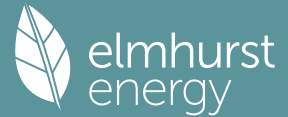
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	47.1100 (1b)	x 2.3800 (2b)	= 112.1218	(1b) - (3b)
First floor	47.1100 (1c)	x 2.7000 (2c)	= 127.1970	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	94.2200			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 239.3188	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	3 * 10 =	30.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1254 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.3754 (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) =	0.3191 (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	0.4068	0.3988	0.3908	0.3510	0.3430	0.3031	0.3031	0.2951	0.3191	0.3430	0.3589	0.3749 (22b)
Effective ac	0.5827	0.5795	0.5764	0.5616	0.5588	0.5459	0.5459	0.5435	0.5509	0.5588	0.5644	0.5703 (25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opening Type			16.5600	1.1450	18.9618			(27)
Ground Floor			47.1100	0.1300	6.1243			(28a)
External Wall STone	99.0900	16.5600	82.5300	0.1800	14.8554			(29a)
Plane Ceiling	47.1100		47.1100	0.1100	5.1821			(30)
Total net area of external elements Aum(A, m2)			193.3100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.1236			(33)
Main dwelling								
Party W			47.4800	0.0000	0.0000			(32)

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

90.6872 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element	11.8600	0.0500	0.5930
E2 Other lintels (including other steel lintels)	8.4000	0.0500	0.4200
E3 Sill	26.0000	0.0500	1.3000
E4 Jamb	19.4300	0.1600	3.1088
E5 Ground floor (normal)	10.1200	0.0600	0.6072
E10 Eaves (insulation at ceiling level)	9.3100	0.0600	0.5586
E12 Gable (insulation at ceiling level)	10.2000	0.0900	0.9180
E16 Corner (normal)	19.4300	0.0000	0.0000
E6 Intermediate floor within a dwelling	9.3100	0.0800	0.7448
P1 Party wall - Ground floor	9.3100	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	10.2000	0.0600	0.6120
E18 Party wall between dwellings	9.3100	0.1200	1.1172
P4 Party wall - Roof (insulation at ceiling level)			

Thermal bridges (Sum(L x Psi) calculated using Appendix K)

9.9796 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 55.1032 (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	46.0220	45.7683	45.5195	44.3513	44.1328	43.1153	43.1153	42.9269	43.5072	44.1328	44.5749	45.0372	(38)
Heat transfer coeff	101.1252	100.8715	100.6228	99.4546	99.2360	98.2185	98.2185	98.0301	98.6105	99.2360	99.6782	100.1404	(39)
Average = Sum(39)m / 12 =												99.4535	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0733	1.0706	1.0680	1.0556	1.0532	1.0424	1.0424	1.0404	1.0466	1.0532	1.0579	1.0628	(40)
HLP (average)												1.0555	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

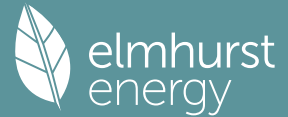
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6792 (42)
Hot water usage for mixer showers	69.1410	68.1020	66.5879	63.6909	61.5530	59.1688	57.8137	59.3163	60.9635	63.5234	66.4826	68.8761	(42a)
Hot water usage for baths	29.8561	29.4127	28.7883	27.6370	26.7749	25.8190	25.3027	25.9227	26.5978	27.6207	28.7957	29.7552	(42b)
Hot water usage for other uses	42.0676	40.5379	39.0081	37.4784	35.9487	34.4190	34.4190	35.9487	37.4784	39.0081	40.5379	42.0676	(42c)
Average daily hot water use (litres/day)												129.6703	(43)
Daily hot water use	141.0647	138.0526	134.3843	128.8063	124.2766	119.4068	117.5353	121.1877	125.0398	130.1522	135.8161	140.6989	(44)
Energy conte	223.4121	196.5850	206.5437	176.3294	167.3002	146.8246	142.1488	150.0557	154.1865	176.6153	193.4950	220.3005	(45)
Energy content (annual)										Total = Sum(45)m =		2153.7969	
Distribution loss (46)m = 0.15 x (45)m	33.5118	29.4877	30.9816	26.4494	25.0950	22.0237	21.3223	22.5084	23.1280	26.4923	29.0243	33.0451	(46)
Water storage loss:													
Store volume												210.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7016	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.9188	(55)
Total storage loss	28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842	(56)
If cylinder contains dedicated solar storage	28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842	(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	275.1587	243.3239	258.2903	226.4067	219.0468	196.9020	193.8954	201.8023	204.2639	228.3619	243.5723	272.0471	(62)
WWHRS	-31.6084	-27.9547	-29.2726	-24.2388	-22.5897	-19.3302	-18.1190	-19.2677	-19.9998	-23.5775	-26.7105	-31.0230	(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	243.5503	215.3691	229.0177	202.1679	196.4571	177.5718	175.7764	182.5346	184.2641	204.7844	216.8619	241.0240	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2469.3793	(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	115.6818	102.7556	110.0730	98.6914	97.0246	88.8811	88.6617	91.2908	91.3289	100.1219	104.3990	114.6472	(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	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	133.9596	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	127.5528	141.2192	127.5528	131.8046	127.5528	131.8046	127.5528	127.5528	131.8046	127.5528	131.8046	127.5528	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	246.6309	249.1902	242.7410	229.0113	211.6800	195.3911	184.5091	181.9498	188.3991	202.1287	219.4600	235.7489	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	36.3960	(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)	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	-107.1677	(71)

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Water heating gains (Table 5)	155.4863	152.9101	147.9476	137.0714	130.4094	123.4459	119.1690	122.7027	126.8457	134.5724	144.9986	154.0957 (72)
Total internal gains	595.8579	609.5074	584.4293	564.0751	535.8301	513.8295	494.4188	495.3932	510.2372	530.4418	562.4510	583.5853 (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
East				5.7900	19.6403		0.6300		0.7000		0.7700		34.7534 (76)
South				2.9400	46.7521		0.6300		0.7000		0.7700		42.0068 (78)
West				7.8300	19.6403		0.6300		0.7000		0.7700		46.9982 (80)
Solar gains	123.7584	228.7198	351.0055	483.1570	573.9546	581.2163	555.8268	488.3313	397.8560	263.9660	151.7271	103.5263	(83)
Total gains	719.6164	838.2272	935.4348	1047.2321	1109.7847	1095.0457	1050.2456	983.7246	908.0932	794.4079	714.1781	687.1116	(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	23.4708	23.5298	23.5880	23.8650	23.9176	24.1654	24.1654	24.2118	24.0693	23.9176	23.8115	23.7016
alpha	2.5647	2.5687	2.5725	2.5910	2.5945	2.6110	2.6110	2.6141	2.6046	2.5945	2.5874	2.5801
util living area	0.9324	0.9023	0.8563	0.7696	0.6525	0.5077	0.3866	0.4240	0.6123	0.8085	0.9039	0.9388 (86)
MIT	18.5988	18.9508	19.4444	20.0561	20.5275	20.8266	20.9377	20.9192	20.7036	20.0734	19.2440	18.5432 (87)
Th 2	20.0227	20.0249	20.0271	20.0373	20.0392	20.0481	20.0481	20.0498	20.0447	20.0392	20.0353	20.0313 (88)
util rest of house	0.9238	0.8903	0.8386	0.7414	0.6098	0.4470	0.3109	0.3468	0.5533	0.7783	0.8901	0.9310 (89)
MIT 2	17.2220	17.6631	18.2777	19.0279	19.5792	19.9084	20.0109	19.9989	19.7886	19.0680	18.0448	17.1572 (90)
Living area fraction	17.5442	17.9644	18.5507	19.2686	19.8011	20.1233	20.2278	20.2142	20.0027	19.3033	18.3255	17.4816 (92)
Temperature adjustment	17.5442	17.9644	18.5507	19.2686	19.8011	20.1233	20.2278	20.2142	20.0027	19.3033	18.3255	17.4816 (93)
adjusted MIT	17.5442	17.9644	18.5507	19.2686	19.8011	20.1233	20.2278	20.2142	20.0027	19.3033	18.3255	17.4816 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	643.6343	719.1040	753.9428	749.7535	664.0381	494.9896	342.0295	354.8454	499.9228	596.8035	613.1556	620.4105 (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	1339.3212	1317.8293	1212.5762	1031.2004	803.9222	542.4878	356.3169	373.9113	582.0689	863.6784	1118.9344	1330.0225 (97)
Space heating kWh	517.5910	402.3434	341.2232	202.6418	104.0738	0.0000	0.0000	0.0000	0.0000	198.5549	364.1607	527.9514 (98a)
Space heating requirement - total per year (kWh/year)												2658.5403
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	517.5910	402.3434	341.2232	202.6418	104.0738	0.0000	0.0000	0.0000	0.0000	198.5549	364.1607	527.9514 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2658.5403
Space heating per m2										(98c) / (4) =		28.2163 (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)
Space heating requirement	517.5910	402.3434	341.2232	202.6418	104.0738	0.0000	0.0000	0.0000	0.0000	198.5549	364.1607	527.9514 (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)	560.7704	435.9084	369.6893	219.5469	112.7560	0.0000	0.0000	0.0000	0.0000	215.1191	394.5403	571.9950 (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	243.5503	215.3691	229.0177	202.1679	196.4571	177.5718	175.7764	182.5346	184.2641	204.7844	216.8619	241.0240 (64)
Efficiency of water heater (217)m	85.7070	85.4403	84.9521	84.0650	82.7027	79.8000	79.8000	79.8000	79.8000	83.9905	85.2130	79.8000 (216)
Fuel for water heating, kWh/month	284.1661	252.0697	269.5845	240.4899	237.5461	222.5210	220.2712	228.7401	230.9074	243.8184	254.4940	281.0182 (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	26.5030	21.2617	19.1438	14.0255	10.8337	8.8513	9.8829	12.8462	16.6859	21.8928	24.7279	27.2396 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-43.3425	-60.7317	-86.7631	-96.9255	-103.9689	-96.8180	-95.5837	-90.4788	-81.4220	-69.1120	-47.5024	-37.5130 (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)												

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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	-25.6358	-53.7949	-106.6889	-159.9196	-211.1662	-212.0980	-209.6367	-177.6610	-130.4121	-76.8667	-34.2031	-20.2853	(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												2880.3253	(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												2965.6268	(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)												213.8941	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-2328.5298	(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												3817.3164	(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	2880.3253	0.2100	604.8683 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2965.6268	0.2100	622.7816 (264)
Space and water heating			1227.6499 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	213.8941	0.1443	30.8715 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-910.1615	0.1347	-122.6227
PV Unit electricity exported	-1418.3682	0.1260	-178.6452
Total			-301.2679 (269)
Total CO2, kg/year			969.1828 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.2900 (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	2880.3253	1.1300	3254.7676 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2965.6268	1.1300	3351.1583 (278)
Space and water heating			6605.9259 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	213.8941	1.5338	328.0778 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-910.1615	1.4979	-1363.3613
PV Unit electricity exported	-1418.3682	0.4623	-655.7540
Total			-2019.1154 (283)
Total Primary energy kWh/year			5044.9892 (286)
Target Primary Energy Rate (TPER)			53.5400 (287)