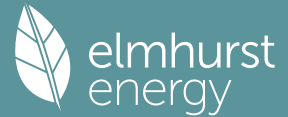


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Property Reference	Axminster			Issued on Date	28/08/2025
Assessment Reference	Proposed	Prop Type Ref	Proposed		
Property	Beaumont Business Park				
SAP Rating	85 B	DER	3.64	TER	12.08
Environmental	97 A	% DER < TER			69.87
CO ₂ Emissions (t/year)	0.27	DFEE	36.86	TFEE	38.08
Compliance Check	See BREL	% DFEE < TFEE			3.18
% DPER < TPER	39.95	DPER	38.12	TPER	63.47
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	39.2700 (1b)	x 2.3900 (2b)	= 93.8553 (1b) - (3b)
First floor	39.2700 (1c)	x 2.6500 (2c)	= 104.0655 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	78.5400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 197.9208 (5)

2. Ventilation rate

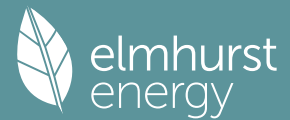
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	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) = 0.2021 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	4.0000 (17)
Infiltration rate	0.4021 (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) = 0.3418 (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	0.4358	0.4272	0.4187	0.3760	0.3674	0.3247	0.3247	0.3162	0.3418	0.3674	0.3845	0.4016 (22b)
Effective ac	0.5950	0.5913	0.5876	0.5707	0.5675	0.5527	0.5527	0.5500	0.5584	0.5675	0.5739	0.5806 (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							
Patio Doors			5.0400	1.1000	5.5440		(26a)
Windows			5.8500	1.0536	6.1638		(27)
Front Door			2.2300	1.2000	2.6760		(26)
Ground Floor			39.3600	0.1200	4.7232	75.0000	2952.0000 (28a)
External Wall Render	90.9800	13.1200	77.8600	0.1800	14.0148	9.0000	700.7400 (29a)
Plane Ceiling	39.3600		39.3600	0.0800	3.1488	9.0000	354.2400 (30)
Total net area of external elements Aum(A, m ²)			169.7000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	36.2706		(33)
Main dwelling							
Party Wall			40.3900	0.0000	0.0000	20.0000	807.8000 (32)
Internal Wall			160.8400			75.0000	12063.0000 (32c)
Internal Floor			39.3600			18.0000	708.4800 (32d)
Internal Ceiling			39.3600			9.0000	354.2400 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	17940.5000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							228.4250 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				8.5400	0.1830	1.5628	

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E3 Sill	5.0800	0.0330	0.1676
E4 Jamb	19.9000	0.0330	0.6567
E5 Ground floor (normal)	17.8300	0.1710	3.0489
E6 Intermediate floor within a dwelling	17.8300	0.0670	1.1946
E10 Baves (insulation at ceiling level)	7.7200	0.0350	0.2702
E18 Party wall between dwellings	10.2000	0.0840	0.8568
E16 Corner (normal)	10.2000	0.0460	0.4692
E12 Gable (insulation at ceiling level)	10.1200	0.1080	1.0930
P1 Party wall - Ground floor	7.9200	0.1600	1.2672
P4 Party wall - Roof (insulation at ceiling level)	7.9200	0.2400	1.9008
P2 Party wall - Intermediate floor within a dwelling	7.9200	0.0000	0.0000
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			12.4879 (36)
Point Thermal Bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	48.7585 (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	38.8585	38.6177	38.3817	37.2730	37.0655	36.0999	36.0999	35.9211	36.4718	37.0655	37.4852	37.9239	(38)
Heat transfer coeff	87.6170	87.3762	87.1401	86.0314	85.8240	84.8583	84.8583	84.6795	85.2303	85.8240	86.2436	86.6823	(39)
Average = Sum(39)m / 12 =												86.0304	
HLP	1.1156	1.1125	1.1095	1.0954	1.0927	1.0804	1.0804	1.0782	1.0852	1.0927	1.0981	1.1037	(40)
HLP (average)												1.0954	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.4346 (42)
Hot water usage for mixer showers	65.0395	64.0621	62.6378	59.9127	57.9016	55.6589	54.3841	55.7976	57.3471	59.7551	62.5388	64.7903	(42a)
Hot water usage for baths	28.0923	27.6751	27.0876	26.0043	25.1932	24.2937	23.8079	24.3913	25.0266	25.9890	27.0946	27.9974	(42b)
Hot water usage for other uses	39.5625	38.1238	36.6852	35.2466	33.8079	32.3693	32.3693	33.8079	35.2466	36.6852	38.1238	39.5625	(42c)
Average daily hot water use (litres/day)												121.9762	(43)
Daily hot water use	132.6943	129.8611	126.4106	121.1636	116.9027	112.3219	110.5614	113.9969	117.6202	122.4293	127.7572	132.3502	(44)
Energy conte	210.1554	184.9204	194.2884	165.8669	157.3736	138.1129	133.7144	141.1520	145.0375	166.1354	182.0135	207.2284	(45)
Energy content (annual)										Total = Sum(45)m =		2025.9989	
Distribution loss (46)m = 0.15 x (45)m	31.5233	27.7381	29.1433	24.8800	23.6060	20.7169	20.0572	21.1728	21.7556	24.9203	27.3020	31.0843	(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	255.5146	225.8900	239.6476	209.7629	202.7328	182.0089	179.0736	186.5112	188.9335	211.4946	225.9095	252.5876	(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	255.5146	225.8900	239.6476	209.7629	202.7328	182.0089	179.0736	186.5112	188.9335	211.4946	225.9095	252.5876	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2560.0669	(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	106.1640	94.2617	100.8883	90.2675	88.6141	81.0394	80.7474	83.2204	83.3418	91.5274	95.6363	105.1908	(65)

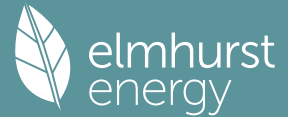
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	133.4526	147.7511	133.4526	137.9011	133.4526	137.9011	133.4526	133.4526	137.9011	133.4526	137.9011	133.4526	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	216.3621	218.6073	212.9495	200.9049	185.7007	171.4109	161.8644	159.6192	165.2770	177.3216	192.5258	206.8156	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	(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)	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	(71)
Water heating gains (Table 5)	142.6936	140.2704	135.6025	125.3716	119.1049	112.5547	108.5314	111.8554	115.7525	123.0207	132.8282	141.3855	(72)
Total internal gains	552.0270	566.1475	541.5233	523.6962	497.7769	481.3852	463.3671	464.4459	478.4491	493.3136	522.7737	541.1724	(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
North	3.7300	10.6334	0.6300	0.0000	0.7700	19.2403 (74)
South	2.1200	46.7521	0.6300	0.0000	0.7700	48.0804 (78)

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Solar gains	67.3207	115.5125	162.7848	213.7251	253.3271	258.4161	246.2023	215.0765	179.9014	128.7010	80.7270	57.5855 (83)
Total gains	619.3477	681.6600	704.3081	737.4213	751.1040	739.8013	709.5694	679.5224	658.3506	622.0145	603.5008	598.7579 (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	56.8779	57.0347	57.1892	57.9262	58.0662	58.7270	58.7270	58.8510	58.4707	58.0662	57.7837	57.4912	
alpha	4.7919	4.8023	4.8126	4.8617	4.8711	4.9151	4.9151	4.9234	4.8980	4.8711	4.8522	4.8327	
util living area	0.9906	0.9839	0.9725	0.9371	0.8539	0.6832	0.5153	0.5568	0.7804	0.9407	0.9819	0.9919 (86)	
Living	19.7469	19.9138	20.1457	20.4819	20.7677	20.9441	20.9886	20.9834	20.8898	20.5446	20.1029	19.7253	
Non living	18.5448	18.7578	19.0519	19.4743	19.8043	19.9828	20.0128	20.0123	19.9363	19.5573	19.0077	18.5243	
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	20.3590	19.9138	20.1457	20.4819	20.7677	20.9441	20.9886	20.9834	20.8898	20.5446	20.1029	19.9036 (87)	
Th 2	19.9881	19.9906	19.9931	20.0046	20.0068	20.0168	20.0168	20.0187	20.0130	20.0068	20.0024	19.9978 (88)	
util rest of house	0.9878	0.9792	0.9641	0.9170	0.8073	0.5972	0.4056	0.4460	0.7044	0.9178	0.9758	0.9896 (89)	
MIT 2	19.4127	18.7578	19.0519	19.4743	19.8043	19.9828	20.0128	20.0123	19.9363	19.5573	19.0077	18.7898 (90)	
Living area fraction									fLA = Living area / (4) =				0.2228 (91)
MIT	19.6236	19.0154	19.2957	19.6988	20.0189	20.1970	20.2302	20.2287	20.1488	19.7773	19.2517	19.0380 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.6236	19.0154	19.2957	19.6988	20.0189	20.1970	20.2302	20.2287	20.1488	19.7773	19.2517	19.0380 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9866	0.9732	0.9566	0.9096	0.8080	0.6139	0.4300	0.4705	0.7159	0.9112	0.9697	0.9866 (94)
Useful gains	611.0665	663.3942	673.7612	670.7235	606.8703	454.1877	305.1471	319.7184	471.3260	566.7841	585.1901	590.7135 (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	1342.6041	1233.3510	1115.0153	929.0380	713.9631	474.9522	308.0537	324.2102	515.5394	787.6283	1048.0082	1286.1908 (97)
Space heating kWh	544.2640	383.0110	328.2930	185.9865	79.6770	0.0000	0.0000	0.0000	0.0000	164.3081	333.2290	517.4351 (98a)
Space heating requirement - total per year (kWh/year)												2536.2037
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	544.2640	383.0110	328.2930	185.9865	79.6770	0.0000	0.0000	0.0000	0.0000	164.3081	333.2290	517.4351 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2536.2037
Space heating per m2										(98c) / (4) =		32.2919 (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 %)												307.6016 (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	544.2640	383.0110	328.2930	185.9865	79.6770	0.0000	0.0000	0.0000	0.0000	164.3081	333.2290	517.4351 (98)
Space heating efficiency (main heating system 1)	307.6016	307.6016	307.6016	307.6016	307.6016	0.0000	0.0000	0.0000	0.0000	307.6016	307.6016	307.6016 (210)
Space heating fuel (main heating system)	176.9380	124.5153	106.7267	60.4634	25.9027	0.0000	0.0000	0.0000	0.0000	53.4159	108.3314	168.2160 (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	255.5146	225.8900	239.6476	209.7629	202.7328	182.0089	179.0736	186.5112	188.9335	211.4946	225.9095	252.5876 (64)
Efficiency of water heater (217)m	306.3991	306.3991	306.3991	306.3991	306.3991	306.3991	306.3991	306.3991	306.3991	306.3991	306.3991	306.3991 (216)
Fuel for water heating, kWh/month	83.3927	73.7241	78.2142	68.4607	66.1662	59.4026	58.4445	60.8720	61.6626	69.0259	73.7305	82.4374 (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	34.2065	27.4417	24.7082	18.1023	13.9827	11.4240	12.7555	16.5801	21.5359	28.2563	31.9154	35.1572 (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												824.5094 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												306.3991
Water heating fuel used												835.5334 (219)

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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)	276.0659 (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	1936.1087 (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	824.5094	0.1555	128.1998	(261)
Total CO2 associated with community systems			0.0000	(262)
Water heating (other fuel)	835.5334	0.1410	117.7937	(264)
Space and water heating			245.9935	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	276.0659	0.1443	39.8448	(268)
Total CO2, kg/year			285.8383	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.6400	(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	824.5094	1.5756	1299.1176	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	835.5334	1.5213	1271.0953	(278)
Space and water heating			2570.2129	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	276.0659	1.5338	423.4391	(282)
Total Primary energy kWh/year			2993.6520	(286)
Dwelling Primary energy Rate (DPER)			38.1200	(287)

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

1. Overall dwelling characteristics

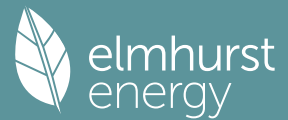
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	39.2700 (1b)	x 2.3900 (2b)	= 93.8553 (1b) - (3b)	
First floor	39.2700 (1c)	x 2.6500 (2c)	= 104.0655 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	78.5400		(4)	
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)... (3n) =	197.9208 (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) =	0.1516 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.4016	(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) =	0.3413 (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	0.4352	0.4267	0.4181	0.3755	0.3669	0.3243	0.3243	0.3157	0.3413	0.3669	0.3840	0.4011	(22b)
Effective ac	0.5947	0.5910	0.5874	0.5705	0.5673	0.5526	0.5526	0.5498	0.5583	0.5673	0.5737	0.5804	(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 Opaque door			2.2300	1.0000	2.2300			(26)
TER Semi-glazed door			5.0400	1.0000	5.0400			(26a)
TER Opening Type			5.8500	1.1450	6.6985			(27)
Ground Floor			39.3600	0.1300	5.1168			(28a)
External Wall Render	90.9800	13.1200	77.8600	0.1800	14.0148			(29a)
Plane Ceiling	39.3600		39.3600	0.1100	4.3296			(30)
Total net area of external elements Aum(A, m2)			169.7000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	37.4297			(33)
Main dwelling								
Party Wall			40.3900	0.0000	0.0000			(32)

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

228.4250 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element	8.5400	0.0500	0.4270	
E2 Other lintels (including other steel lintels)	5.0800	0.0500	0.2540	
E3 Sill	19.9000	0.0500	0.9950	
E4 Jamb	17.8300	0.1600	2.8528	
E5 Ground floor (normal)	17.8300	0.0000	0.0000	
E6 Intermediate floor within a dwelling	7.7200	0.0600	0.4632	
E10 Baves (insulation at ceiling level)	10.2000	0.0600	0.6120	
E18 Party wall between dwellings	10.2000	0.0900	0.9180	
E16 Corner (normal)	10.2000	0.0600	0.6072	
E12 Gable (insulation at ceiling level)	7.9200	0.0800	0.6336	
P1 Party wall - Ground floor	7.9200	0.1200	0.9504	
P4 Party wall - Roof (insulation at ceiling level)	7.9200	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				8.7132 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	46.1429 (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	38.8423	38.6022	38.3667	37.2609	37.0540	36.0909	36.0909	35.9125	36.4619	37.0540	37.4726	37.9101	(38)
Heat transfer coeff	84.9852	84.7450	84.5096	83.4038	83.1969	82.2338	82.2338	82.0554	82.6048	83.1969	83.6154	84.0530	(39)
Average = Sum(39)m / 12 =												83.4028	
HLP	1.0821	1.0790	1.0760	1.0619	1.0593	1.0470	1.0470	1.0448	1.0518	1.0593	1.0646	1.0702	(40)
HLP (average)												1.0619	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

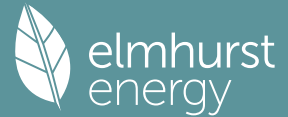
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.4346 (42)
Hot water usage for mixer showers													
65.0395	64.0621	62.6378	59.9127	57.9016	55.6589	54.3841	55.7976	57.3471	59.7551	62.5388	64.7903	64.7903	(42a)
Hot water usage for baths													
28.0923	27.6751	27.0876	26.0043	25.1932	24.2937	23.8079	24.3913	25.0266	25.9890	27.0946	27.9974	27.9974	(42b)
Hot water usage for other uses													
39.5625	38.1238	36.6852	35.2466	33.8079	32.3693	32.3693	33.8079	35.2466	36.6852	38.1238	39.5625	39.5625	(42c)
Average daily hot water use (litres/day)												121.9762	(43)
Daily hot water use													
132.6943	129.8611	126.4106	121.1636	116.9027	112.3219	110.5614	113.9969	117.6202	122.4293	127.7572	132.3502	132.3502	(44)
Energy conte	210.1554	184.9204	194.2884	165.8669	157.3736	138.1129	133.7144	141.1520	145.0375	166.1354	182.0135	207.2284	(45)
Energy content (annual)												2025.9989	
Distribution loss (46)m = 0.15 x (45)m													
31.5233	27.7381	29.1433	24.8800	23.6060	20.7169	20.0572	21.1728	21.7556	24.9203	27.3020	31.0843	31.0843	(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	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	28.4842	(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													
261.9020	231.6593	246.0350	215.9443	209.1202	188.1903	185.4610	192.8986	195.1149	217.8820	232.0909	258.9750	258.9750	(62)
WWHRS	-29.7334	-26.2964	-27.5361	-22.8010	-21.2497	-18.1835	-17.0441	-18.1247	-18.8134	-22.1789	-25.1260	-29.1827	(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													
232.1686	205.3629	218.4989	193.1433	187.8705	170.0068	168.4168	174.7738	176.3015	195.7031	206.9649	229.7923	229.7923	(64)
12Total per year (kWh/year)												2359.0034	(64)
Electric shower(s)												2359	(64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
111.2739	98.8771	105.9982	95.2126	93.7240	85.9844	85.8573	88.3303	88.2869	96.6373	100.5814	110.3007	110.3007	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	121.7287	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
133.4526	147.7511	133.4526	137.9011	133.4526	137.9011	133.4526	137.9011	133.4526	137.9011	133.4526	137.9011	133.4526	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
216.3621	218.6073	212.9495	200.9049	185.7007	171.4109	161.8644	159.6192	165.2770	177.3216	192.5258	206.8156	206.8156	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	35.1729	(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)													

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	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830	-97.3830 (71)
Water heating gains (Table 5)	149.5618	147.1386	142.4707	132.2398	125.9731	119.4228	115.3996	118.7235	122.6206	129.8888	139.6964	148.2536 (72)
Total internal gains	561.8951	576.0156	551.3915	533.5643	507.6450	488.2534	470.2353	471.3140	485.3173	503.1817	532.6419	551.0406 (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	
North	3.7300		10.6334		0.6300		0.7000		0.7700		12.1214 (74)	
South	2.1200		46.7521		0.6300		0.7000		0.7700		30.2906 (78)	
Solar gains	42.4120	72.7729	102.5544	134.6468	159.5961	162.8021	155.1074	135.4982	113.3379	81.0816	50.8580	36.2789 (83)
Total gains	604.3072	648.7885	653.9459	668.2111	667.2411	651.0555	625.3427	606.8122	598.6552	584.2633	583.4999	587.3194 (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	58.6393	58.8055	58.9693	59.7511	59.8997	60.6013	60.6013	60.7330	60.3291	59.8997	59.5999	59.2896
alpha	4.9093	4.9204	4.9313	4.9834	4.9933	5.0401	5.0401	5.0489	5.0219	4.9933	4.9733	4.9526
util living area	0.9913	0.9863	0.9784	0.9527	0.8883	0.7351	0.5625	0.5994	0.8128	0.9495	0.9836	0.9924 (86)
MIT	19.7824	19.9238	20.1297	20.4447	20.7301	20.9287	20.9850	20.9794	20.8755	20.5370	20.1236	19.7661 (87)
Th 2	20.0155	20.0180	20.0205	20.0320	20.0342	20.0443	20.0443	20.0462	20.0404	20.0342	20.0298	20.0252 (88)
util rest of house	0.9887	0.9823	0.9717	0.9367	0.8487	0.6513	0.4483	0.4859	0.7417	0.9294	0.9780	0.9902 (89)
MIT 2	18.6095	18.7908	19.0532	19.4535	19.7911	19.9990	20.0388	20.0379	19.9509	19.5714	19.0541	18.5959 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	18.8708	19.0432	19.2930	19.6743	20.0003	20.2061	20.2496	20.2477	20.1569	19.7865	19.2924	18.8566 (92)
Temperature adjustment												
adjusted MIT	18.8708	19.0432	19.2930	19.6743	20.0003	20.2061	20.2496	20.2477	20.1569	19.7865	19.2924	18.8566 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9847	0.9770	0.9651	0.9294	0.8471	0.6667	0.4737	0.5109	0.7514	0.9230	0.9724	0.9865 (94)
Useful gains	595.0338	633.8715	631.1325	621.0567	565.2349	434.0307	296.2166	310.0201	449.8038	539.2762	567.3676	579.3839 (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	1238.3066	1198.5701	1081.1339	898.6200	690.5582	461.0123	300.1219	315.7230	500.3315	764.2920	1019.4707	1231.9311 (97)
Space heating kWh	478.5950	379.4775	334.8011	199.8455	93.2405	0.0000	0.0000	0.0000	0.0000	167.4118	325.5142	485.4951 (98a)
Space heating requirement - total per year (kWh/year)												2464.3806
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	478.5950	379.4775	334.8011	199.8455	93.2405	0.0000	0.0000	0.0000	0.0000	167.4118	325.5142	485.4951 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2464.3806
Space heating per m2												(98c) / (4) = 31.3774 (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	478.5950	379.4775	334.8011	199.8455	93.2405	0.0000	0.0000	0.0000	0.0000	167.4118	325.5142	485.4951 (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)	518.5211	411.1349	362.7314	216.5174	101.0189	0.0000	0.0000	0.0000	0.0000	181.3779	352.6698	525.9968 (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	232.1686	205.3629	218.4989	193.1433	187.8705	170.0068	168.4168	174.7738	176.3015	195.7031	206.9649	229.7923 (64)
Efficiency of water heater (217)m	85.6449	85.4173	85.0137	84.1364	82.5759	79.8000	79.8000	79.8000	79.8000	83.7116	85.0708	79.8000 (216)
Fuel for water heating, kWh/month	271.0830	240.4232	257.0162	229.5598	227.5124	213.0411	211.0486	219.0148	220.9292	233.7825	243.2854	268.1510 (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	27.7288	22.2451	20.0292	14.6743	11.3348	9.2607	10.3400	13.4403	17.4577	22.9054	25.8716	28.4995 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-36.7691	-51.8245	-74.4440	-83.6184	-90.0737	-84.0355	-83.0347	-78.4889	-70.3711	-59.2945	-40.4371	-31.7935 (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	-20.7300	-43.6426	-86.8139	-130.4828	-172.6168	-173.4710	-171.3912	-145.0273	-106.2098	-62.3905	-27.6710	-16.3860	(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												2669.9682	(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												2834.8473	(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)												223.7875	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1941.0182	(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												3873.5848	(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	2669.9682	0.2100	560.6933 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2834.8473	0.2100	595.3179 (264)
Space and water heating			1156.0112 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	223.7875	0.1443	32.2995 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-784.1852	0.1346	-105.5519
PV Unit electricity exported	-1156.8330	0.1259	-145.6199
Total			-251.1719 (269)
Total CO2, kg/year			949.0681 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.0800 (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	2669.9682	1.1300	3017.0640 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2834.8473	1.1300	3203.3774 (278)
Space and water heating			6220.4414 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	223.7875	1.5338	343.2527 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-784.1852	1.4975	-1174.2880
PV Unit electricity exported	-1156.8330	0.4621	-534.5244
Total			-1708.8124 (283)
Total Primary energy kWh/year			4984.9825 (286)
Target Primary Energy Rate (TPER)			63.4700 (287)