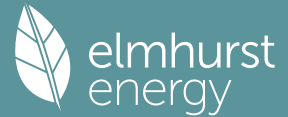


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Property Reference	4B7P				Issued on Date	28/08/2025		
Assessment Reference	Proposed			Prop Type Ref	4B7P			
Property								
SAP Rating	87 B		DER	2.85		TER	9.54	
Environmental	97 A		% DER < TER				70.13	
CO ₂ Emissions (t/year)	0.28		DFEE	32.78		TFEE	35.09	
Compliance Check	See BREL		% DFEE < TFEE				6.56	
% DPER < TPER	39.72		DPER	29.89		TPER	49.59	
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	54.2000 (1b)	x 2.3800 (2b)	= 128.9960 (1b) - (3b)
First floor	54.2000 (1c)	x 2.6800 (2c)	= 145.2560 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	108.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 274.2520 (5)

2. Ventilation rate

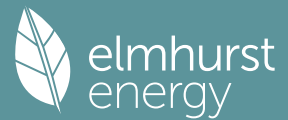
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1094 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	4.0000 (17)
Infiltration rate	0.3094 (18)
Number of sides sheltered	1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2862 (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	0.3649	0.3577	0.3506	0.3148	0.3076	0.2719	0.2719	0.2647	0.2862	0.3076	0.3220	0.3363 (22b)
Effective ac	0.5666	0.5640	0.5615	0.5496	0.5473	0.5370	0.5370	0.5350	0.5410	0.5473	0.5518	0.5565 (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			2.1200	1.2000	2.5440		(26)
Glazing			20.4000	1.0536	21.4943		(27)
Ground Floor			54.2000	0.1200	6.5040	75.0000	4065.0000 (28a)
External	105.7500	22.5200	83.2300	0.1800	14.9814	9.0000	749.0700 (29a)
Ceiling	54.2000		54.2000	0.1000	5.4200	9.0000	487.8000 (30)
Total net area of external elements Aum(A, m ²)			214.1500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	50.9437		(33)
Main dwelling							
Party W			47.4300	0.0000	0.0000	20.0000	948.6000 (32)
Int W T			216.0000			9.0000	1944.0000 (32c)
Int F			54.2000			18.0000	975.6000 (32d)
Int C			54.2000			9.0000	487.8000 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9657.8700 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							89.0947 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				12.2000	0.1830	2.2326	
E3 Sill				11.2100	0.0330	0.3699	

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E4 Jamb						24.7200		0.0330		0.8158		
E5 Ground floor (normal)						20.9000		0.1710		3.5739		
E6 Intermediate floor within a dwelling						20.9000		0.0670		1.4003		
E10 Eaves (insulation at ceiling level)						20.9500		0.0350		0.7333		
E16 Corner (normal)						10.1000		0.0460		0.4646		
P1 Party wall - Ground floor						9.3400		0.1600		1.4944		
P2 Party wall - Intermediate floor within a dwelling						9.3400		0.0000		0.0000		
P4 Party wall - Roof (insulation at ceiling level)						9.3400		0.2400		2.2416		
Thermal bridges (Sum(L x Psi) calculated using Appendix K)											13.3263	(36)
Point Thermal bridges											0.0000	
Total fabric heat loss											(33) + (36) + (36a) =	64.2700 (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	51.2764	51.0425	50.8132	49.7360	49.5345	48.5964	48.5964	48.4227	48.9578	49.5345	49.9422	50.3684 (38)
Average = Sum(39)m / 12 =	115.5464	115.3125	115.0831	114.0060	113.8045	112.8664	112.8664	112.6927	113.2277	113.8045	114.2122	114.6384 (39)
												114.0051
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0659	1.0638	1.0617	1.0517	1.0499	1.0412	1.0412	1.0396	1.0445	1.0499	1.0536	1.0575 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												

Assumed occupancy												2.8049 (42)
Hot water usage for mixer showers												
	71.2483	70.1776	68.6173	65.6321	63.4290	60.9722	59.5757	61.1242	62.8216	65.4594	68.5088	70.9753 (42a)
Hot water usage for baths												
	30.7623	30.3055	29.6621	28.4759	27.5876	26.6027	26.0707	26.7096	27.4052	28.4591	29.6697	30.6583 (42b)
Hot water usage for other uses												
	43.3547	41.7782	40.2016	38.6251	37.0486	35.4720	35.4720	37.0486	38.6251	40.2016	41.7782	43.3547 (42c)
Average daily hot water use (litres/day)												133.6234 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	145.3653	142.2612	138.4811	132.7330	128.0652	123.0469	121.1185	124.8823	128.8518	134.1201	139.9567	144.9884 (44)
Energy conte	230.2232	202.5781	212.8402	181.7049	172.4004	151.3006	146.4823	154.6304	158.8872	181.9998	199.3940	227.0167 (45)
Energy content (annual)										Total = Sum(45)m =		2219.4577
Distribution loss (46)m = 0.15 x (45)m												
	34.5335	30.3867	31.9260	27.2557	25.8601	22.6951	21.9723	23.1946	23.8331	27.3000	29.9091	34.0525 (46)
Water storage loss:												180.0000 (47)
Store volume												1.3200 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.7128 (55)
Enter (49) or (54) in (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												
	275.5824	243.5477	258.1994	225.6009	217.7596	195.1966	191.8415	199.9896	202.7832	227.3590	243.2900	272.3759 (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	275.5824	243.5477	258.1994	225.6009	217.7596	195.1966	191.8415	199.9896	202.7832	227.3590	243.2900	272.3759 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2753.5257 (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)
												0.0000 (64a)
Heat gains from water heating, kWh/month												
	112.8366	100.1329	107.0567	95.5337	93.6105	85.4242	84.9927	87.7020	87.9468	96.8023	101.4153	111.7704 (65)

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

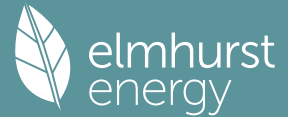
Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	140.8891	155.9844	140.8891	145.5854	140.8891	145.5854	140.8891	140.8891	145.5854	140.8891	145.5854	140.8891 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	269.2369	272.0307	264.9904	250.0022	231.0824	213.3004	201.4210	198.6272	205.6675	220.6557	239.5755	257.3575 (68)
Pumps, fans	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244 (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)	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949 (71)
Total internal gains	151.6620	149.0073	143.8935	132.6857	125.8205	118.6448	114.2375	117.8790	122.1483	130.1106	140.8546	150.2291 (72)
	626.8611	642.0955	614.8460	593.3464	562.8652	542.6037	521.6207	522.4683	538.4744	556.7285	591.0886	613.5487 (73)

6. Solar gains												

[Jan]												
	Area											
	m2											
	Solar flux											
	Table 6a											
	W/m2											
	Specific data											
	or Table 6b											
	g											
	Specific data											
	or Table 6c											
	FF											
	Access											
	factor											
	Table 6d											
	Gains											
	W											
North	5.4400											25.3885 (74)
East	0.7200											6.2065 (76)
South	9.3800											192.4727 (78)
West	4.8600											41.8937 (80)

Solar gains	265.9614	457.8336	638.9402	812.2496	928.2742	929.6157	892.9026	805.1629	698.8014	509.4010	319.4411	227.0345 (83)

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Total gains 892.8226 1099.9291 1253.7862 1405.5960 1491.1393 1472.2195 1414.5233 1327.6313 1237.2757 1066.1295 910.5297 840.5832 (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	23.2179	23.2650	23.3113	23.5316	23.5732	23.7692	23.7692	23.8058	23.6933	23.5732	23.4891	23.4018
alpha	2.5479	2.5510	2.5541	2.5688	2.5715	2.5846	2.5846	2.5871	2.5796	2.5715	2.5659	2.5601
util living area	0.9194	0.8730	0.8122	0.7130	0.5890	0.4476	0.3355	0.3688	0.5434	0.7565	0.8812	0.9288 (86)
Living	18.6958	19.1359	19.6463	20.2117	20.6233	20.8671	20.9537	20.9397	20.7717	20.2117	19.3607	18.6126
Non living	17.3480	17.8947	18.5232	19.2070	19.6800	19.9435	20.0218	20.0130	19.8527	19.2266	18.1904	17.2482
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	19.8213	19.1359	19.6463	20.2117	20.6233	20.8671	20.9537	20.9397	20.7717	20.2117	19.3607	18.9465 (87)
Th 2	20.0288	20.0305	20.0323	20.0405	20.0420	20.0491	20.0491	20.0505	20.0464	20.0420	20.0389	20.0357 (88)
util rest of house	0.9096	0.8586	0.7915	0.6824	0.5462	0.3911	0.2680	0.2994	0.4860	0.7228	0.8652	0.9200 (89)
MIT 2	18.9600	17.8947	18.5232	19.2070	19.6800	19.9435	20.0218	20.0130	19.8527	19.2266	18.1904	17.7505 (90)
Living area fraction									fLA = Living area / (4) =			0.1522 (91)
MIT	19.0911	18.0836	18.6941	19.3599	19.8236	20.0841	20.1637	20.1541	19.9926	19.3765	18.3685	17.9326 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0911	18.0836	18.6941	19.3599	19.8236	20.0841	20.1637	20.1541	19.9926	19.3765	18.3685	17.9326 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8985	0.8227	0.7578	0.6584	0.5358	0.3933	0.2764	0.3072	0.4825	0.6961	0.8302	0.8953 (94)
Useful gains	802.2383	904.9438	950.1673	925.4984	798.9814	578.9695	390.9355	407.8466	597.0121	742.1848	755.9119	752.5621 (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	1709.0626	1520.2353	1403.3394	1192.4934	924.5018	618.9709	402.2177	423.0542	667.2058	998.8101	1287.0046	1574.2778 (97)
Space heating kWh	674.6772	413.4759	337.1600	192.2363	93.3871	0.0000	0.0000	0.0000	0.0000	190.9292	382.3868	611.3565 (98a)
Space heating requirement - total per year (kWh/year)												2895.6091
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	674.6772	413.4759	337.1600	192.2363	93.3871	0.0000	0.0000	0.0000	0.0000	190.9292	382.3868	611.3565 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2895.6091
Space heating per m2										(98c) / (4) =		26.7123 (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 %)

328.3256 (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	674.6772	413.4759	337.1600	192.2363	93.3871	0.0000	0.0000	0.0000	0.0000	190.9292	382.3868	611.3565 (98)
Space heating efficiency (main heating system 1)	328.3256	328.3256	328.3256	328.3256	328.3256	0.0000	0.0000	0.0000	0.0000	328.3256	328.3256	328.3256 (210)
Space heating fuel (main heating system)	205.4903	125.9347	102.6908	58.5505	28.4434	0.0000	0.0000	0.0000	0.0000	58.1524	116.4657	186.2044 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating requirement	275.5824	243.5477	258.1994	225.6009	217.7596	195.1966	191.8415	199.9896	202.7832	227.3590	243.2900	272.3759 (64)
Efficiency of water heater (217)m	297.2916	297.2916	297.2916	297.2916	297.2916	297.2916	297.2916	297.2916	297.2916	297.2916	297.2916	297.2916 (216)
Fuel for water heating, kWh/month	92.6977	81.9221	86.8506	75.8854	73.2478	65.6583	64.5297	67.2705	68.2102	76.4767	81.8355	91.6191 (219)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)
Lighting	35.6008	28.5603	25.7153	18.8402	14.5527	11.8897	13.2754	17.2559	22.4137	29.4080	33.2163	36.5902 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)
Annual totals kWh/year												
Space heating fuel - main system 1												881.9322 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												297.2916
Water heating fuel used												926.2035 (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)	287.3185 (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	2095.4543 (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	881.9322	0.1557	137.3298 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	926.2035	0.1410	130.6154 (264)
Space and water heating			267.9451 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	287.3185	0.1443	41.4689 (268)
Total CO2, kg/year			309.4141 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			2.8500 (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	881.9322	1.5764	1390.2929 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	926.2035	1.5215	1409.1774 (278)
Space and water heating			2799.4703 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	287.3185	1.5338	440.6987 (282)
Total Primary energy kWh/year			3240.1690 (286)
Dwelling Primary energy Rate (DPER)			29.8900 (287)

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

1. Overall dwelling characteristics

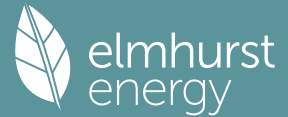
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	54.2000 (1b)	x 2.3800 (2b)	= 128.9960 (1b) - (3b)
First floor	54.2000 (1c)	x 2.6800 (2c)	= 145.2560 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	108.4000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	274.2520 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1459 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3959 (18)
Number of sides sheltered	1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3662 (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	0.4669	0.4577	0.4485	0.4028	0.3936	0.3479	0.3479	0.3387	0.3662	0.3936	0.4119	0.4302 (22b)
Effective ac	0.6090	0.6047	0.6006	0.5811	0.5775	0.5605	0.5605	0.5574	0.5670	0.5775	0.5848	0.5926 (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			2.1200	1.0000	2.1200		(26)
TER Opening Type			20.4000	1.1450	23.3588		(27)
Ground Floor			54.2000	0.1300	7.0460		(28a)
External	105.7500	22.5200	83.2300	0.1800	14.9814		(29a)
Ceiling	54.2000		54.2000	0.1100	5.9620		(30)
Total net area of external elements Aum(A, m2)			214.1500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	53.4682		(33)
Main dwelling							
Party W			47.4300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							89.0947 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	12.2000	0.0500	0.6100
E3 Sill	11.2100	0.0500	0.5605
E4 Jamb	24.7200	0.0500	1.2360
E5 Ground floor (normal)	20.9000	0.1600	3.3440
E6 Intermediate floor within a dwelling	20.9000	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	20.9500	0.0600	1.2570
E16 Corner (normal)	10.1000	0.0900	0.9090
P1 Party wall - Ground floor	9.3400	0.0800	0.7472
P2 Party wall - Intermediate floor within a dwelling	9.3400	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	9.3400	0.1200	1.1208
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			9.7845 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	63.2527 (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	55.1144	54.7314	54.3560	52.5928	52.2629	50.7271	50.7271	50.4427	51.3187	52.2629	52.9303	53.6280 (38)
Average = Sum(39)m / 12 =	118.3671	117.9841	117.6087	115.8455	115.5156	113.9798	113.9798	113.6954	114.5714	115.5156	116.1829	116.8807 (39)
HLP	1.0919	1.0884	1.0850	1.0687	1.0656	1.0515	1.0515	1.0489	1.0569	1.0656	1.0718	1.0782 (40)
HLP (average)												1.0687
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

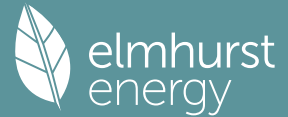
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.8049 (42)
Hot water usage for mixer showers	71.2483	70.1776	68.6173	65.6321	63.4290	60.9722	59.5757	61.1242	62.8216	65.4594	68.5088	70.9753 (42a)	
Hot water usage for baths	30.7623	30.3055	29.6621	28.4759	27.5876	26.6027	26.0707	26.7096	27.4052	28.4591	29.6697	30.6583 (42b)	
Hot water usage for other uses	43.3547	41.7782	40.2016	38.6251	37.0486	35.4720	35.4720	37.0486	38.6251	40.2016	41.7782	43.3547 (42c)	
Average daily hot water use (litres/day)												133.6234 (43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy content (annual)	145.3653	142.2612	138.4811	132.7330	128.0652	123.0469	121.1185	124.8823	128.8518	134.1201	139.9567	144.9884 (44)	
Distribution loss (46)m = 0.15 x (45)m	230.2232	202.5781	212.8402	181.7049	172.4004	151.3006	146.4823	154.6304	158.8872	181.9998	199.3940	227.0167 (45)	
										Total = Sum(45)m =		2219.4577	
Water storage loss:	34.5335	30.3867	31.9260	27.2557	25.8601	22.6951	21.9723	23.1946	23.8331	27.3000	29.9091	34.0525 (46)	
Store volume												180.0000 (47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.5520 (48)	
Temperature factor from Table 2b												0.5400 (49)	
Enter (49) or (54) in (55)												0.8381 (55)	
Total storage loss	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (56)	
If cylinder contains dedicated solar storage	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (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	279.4658	247.0553	262.0829	229.3591	221.6430	198.9547	195.7250	203.8730	206.5414	231.2424	247.0482	276.2594 (62)	
WWHRS	-32.5718	-28.8067	-30.1647	-24.9776	-23.2782	-19.9193	-18.6712	-19.8550	-20.6093	-24.2961	-27.5245	-31.9686 (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	246.8941	218.2486	231.9182	204.3815	198.3648	179.0354	177.0537	184.0181	185.9321	206.9463	219.5237	244.2908 (64)	
12Total per year (kWh/year)												2496.6073 (64)	
Electric shower(s)												2497 (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)	
												0.0000 (64a)	
Heat gains from water heating, kWh/month	115.9433	102.9390	110.1635	98.5402	96.7173	88.4308	88.0995	90.8087	90.9533	99.9091	104.4219	114.8772 (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	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437	140.2437 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	137.7782	152.5401	137.7782	142.3708	137.7782	142.3708	137.7782	137.7782	142.3708	137.7782	142.3708	137.7782 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	269.2369	272.0307	264.9904	250.0022	231.0824	213.3004	201.4210	198.6272	205.6675	220.6557	239.5755	257.3575 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244	37.0244 (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)	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949	-112.1949 (71)
Water heating gains (Table 5)	155.8378	153.1831	148.0692	136.8614	129.9963	122.8205	118.4133	122.0548	126.3241	134.2864	145.0304	154.4048 (72)
Total internal gains												

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630.9260 645.8270 618.9109 597.3075 566.9300 543.5648 522.6855 523.5332 539.4355 560.7933 595.0497 617.6135 (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				5.4400	10.6334		0.6300		0.7000		0.7700		17.6784 (74)
East				0.7200	19.6403		0.6300		0.7000		0.7700		4.3217 (76)
South				9.3800	46.7521		0.6300		0.7000		0.7700		134.0218 (78)
West				4.8600	19.6403		0.6300		0.7000		0.7700		29.1713 (80)
Solar gains	185.1931	318.7968	444.9041	565.5822	646.3720	647.3061	621.7422	560.6477	486.5864	354.7040	222.4319	158.0877	(83)
Total gains	816.1191	964.6238	1063.8150	1162.8897	1213.3019	1190.8710	1144.4277	1084.1808	1026.0219	915.4972	817.4816	775.7013	(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	22.6646	22.7382	22.8107	23.1579	23.2241	23.5370	23.5370	23.5959	23.4155	23.2241	23.0907	22.9528
alpha	2.5110	2.5159	2.5207	2.5439	2.5483	2.5691	2.5691	2.5731	2.5610	2.5483	2.5394	2.5302
util living area	0.9333	0.9014	0.8587	0.7812	0.6733	0.5310	0.4070	0.4411	0.6205	0.8076	0.9037	0.9400 (86)
MIT	18.5000	18.8778	19.3664	19.9760	20.4650	20.7970	20.9254	20.9063	20.6792	20.0398	19.1833	18.4469 (87)
Th 2	20.0074	20.0103	20.0131	20.0265	20.0290	20.0407	20.0407	20.0428	20.0362	20.0290	20.0239	20.0186 (88)
util rest of house	0.9248	0.8894	0.8411	0.7537	0.6309	0.4690	0.3280	0.3615	0.5614	0.7774	0.8899	0.9324 (89)
MIT 2	17.0914	17.5651	18.1748	18.9278	19.5046	19.8755	19.9956	19.9831	19.7577	19.0223	17.9646	17.0312 (90)
Living area fraction	17.3058	17.7650	18.3562	19.0873	19.6508	20.0158	20.1371	20.1237	19.8980	19.1772	18.1501	17.2467 (92)
MIT	17.3058	17.7650	18.3562	19.0873	19.6508	20.0158	20.1371	20.1237	19.8980	19.1772	18.1501	17.2467 (92)
Temperature adjustment												0.0000
adjusted MIT	17.3058	17.7650	18.3562	19.0873	19.6508	20.0158	20.1371	20.1237	19.8980	19.1772	18.1501	17.2467 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8930	0.8538	0.8049	0.7231	0.6128	0.4673	0.3363	0.3686	0.5522	0.7459	0.8553	0.9022 (94)
Useful gains	728.7880	823.5813	856.2547	840.8753	743.5160	556.5050	384.8177	399.5820	566.5841	682.9057	699.1517	699.8036 (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	1539.4599	1517.8601	1394.3870	1180.1547	918.4405	617.2902	403.1562	423.3636	664.2839	990.7949	1283.8297	1524.9013 (97)
Space heating kWh	603.1399	466.5553	400.3705	244.2812	130.1438	0.0000	0.0000	0.0000	0.0000	229.0696	420.9682	613.8727 (98a)
Space heating requirement - total per year (kWh/year)												3108.4011
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	603.1399	466.5553	400.3705	244.2812	130.1438	0.0000	0.0000	0.0000	0.0000	229.0696	420.9682	613.8727 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3108.4011
Space heating per m2										(98c) / (4) =		28.6753 (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	603.1399	466.5553	400.3705	244.2812	130.1438	0.0000	0.0000	0.0000	0.0000	229.0696	420.9682	613.8727 (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)	653.4560	505.4771	433.7708	264.6600	141.0009	0.0000	0.0000	0.0000	0.0000	248.1794	456.0869	665.0841 (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	246.8941	218.2486	231.9182	204.3815	198.3648	179.0354	177.0537	184.0181	185.9321	206.9463	219.5237	244.2908 (64)
Efficiency of water heater	85.9834	85.7189	85.2725	84.4607	83.1382	79.8000	79.8000	79.8000	79.8000	84.2881	85.4952	79.8000 (216)
Fuel for water heating, kWh/month	287.1416	254.6096	271.9730	241.9840	238.5966	224.3551	221.8719	230.5991	232.9976	245.5226	256.7673	283.9345 (219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	28.6276	22.9661	20.6784	15.1499	11.7022	9.5608	10.6752	13.8760	18.0235	23.6478	26.7102	29.4232 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-49.1604	-68.5285	-97.3976	-108.2158	-115.5706	-107.4173	-106.0192	-100.5858	-90.8994	-77.6770	-53.7403	-42.5880 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												

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(233b)m	-30.1991	-63.2341	-125.1688	-187.2843	-246.9919	-247.9901	-245.1366	-207.9087	-152.8155	-90.2713	-40.2618	-23.9089	(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												3367.7152	(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												2990.3531	(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)												231.0410	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-2678.9708	(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												3996.1384	(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	3367.7152	0.2100	707.2202	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2990.3531	0.2100	627.9741	(264)
Space and water heating			1335.1943	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	231.0410	0.1443	33.3464	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1017.7998	0.1348	-137.2439	
PV Unit electricity exported	-1661.1710	0.1260	-209.3110	
Total			-346.5549	(269)
Total CO2, kg/year			1033.9150	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.5400	(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	3367.7152	1.1300	3805.5182	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2990.3531	1.1300	3379.0989	(278)
Space and water heating			7184.6171	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	231.0410	1.5338	354.3784	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1017.7998	1.4984	-1525.0449	
PV Unit electricity exported	-1661.1710	0.4625	-768.3224	
Total			-2293.3673	(283)
Total Primary energy kWh/year			5375.7290	(286)
Target Primary Energy Rate (TPER)			49.5900	(287)