

Full SAP Calculation Printout



Property Reference	OP-D320 F2GOLD				Issued on Date	29/11/2024	
Assessment Reference	F2GOLD			Prop Type Ref	F2GOLD		
Property	F2GOLD						
SAP Rating	77 C		DER	5.33		TER	11.96
Environmental	95 A		% DER < TER				55.43
CO ₂ Emissions (t/year)	0.44		DFEE	49.79		TFEE	50.66
Compliance Check	See BREL		% DFEE < TFEE				1.71
% DPER < TPER	11.86		DPER	56.05		TPER	63.59
Assessor Details	Mr. Matthew Stainrod					Assessor ID	AU83-0001
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)
Ground floor	14.2700 (1b)	x 2.5000 (2b)	= 35.6750 (1b) - (3b)
First floor	74.4800 (1c)	x 2.3600 (2c)	= 175.7728 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	88.7500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	211.4478 (5)

2. Ventilation rate

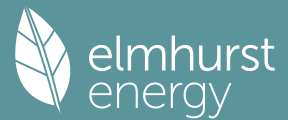
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (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) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.5000 (17)
Infiltration rate	0.1750 (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) = 0.1487 (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	0.1897	0.1859	0.1822	0.1636	0.1599	0.1413	0.1413	0.1376	0.1487	0.1599	0.1673	0.1748 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												71.2000 (23c)
Effective ac	0.3337	0.3299	0.3262	0.3076	0.3039	0.2853	0.2853	0.2816	0.2927	0.3039	0.3113	0.3188 (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
Front Door			6.4200	1.0000	6.4200		(26)
Windows (U _w = 1.30)			10.9600	1.2357	13.5437		(27)
Ground Floor			14.2700	0.1100	1.5697		(28a)
Exposed Floor			60.2100	0.1400	8.4294		(28b)
External Wall	104.5100	15.2400	89.2700	0.1700	15.1759		(29a)
Semi Exposed	30.7900	2.1400	28.6500	0.1700	4.8705		(29a)
Roof - ceiling	74.4800		74.4800	0.1100	8.1928		(30)
Total net area of external elements A _{um} (A, m ²)			284.2600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	58.2020		(33)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							100.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				12.3700	0.0500	0.6185	

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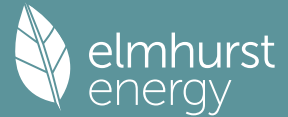
E3 Sill						9.3100		0.0500		0.4655		
E4 Jamb						28.8000		0.0500		1.4400		
E5 Ground floor (normal)						18.3200		0.1600		2.9312		
E6 Intermediate floor within a dwelling						6.0200		0.0000		0.0000		
E10 Baves (insulation at ceiling level)						23.6100		0.0600		1.4166		
E12 Gable (insulation at ceiling level)						14.2900		0.0600		0.8574		
E16 Corner (normal)						24.1700		0.0900		2.1753		
E20 Exposed floor (normal)						31.8800		0.3200		10.2016		
E21 Exposed floor (inverted)						12.3000		0.3200		3.9360		
E17 Corner (inverted - internal area greater than external area)						4.7200		-0.0900		-0.4248		
Thermal bridges (Sum(L x Psi) calculated using Appendix K)											23.6173	(36)
Point Thermal bridges											0.0000	
Total fabric heat loss											(33) + (36) + (36a) =	81.8193 (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	23.2818	23.0223	22.7628	21.4654	21.2059	19.9085	19.9085	19.6490	20.4274	21.2059	21.7249	22.2438 (38)
Average = Sum(39)m / 12 =	105.1011	104.8416	104.5821	103.2847	103.0252	101.7278	101.7278	101.4683	102.2468	103.0252	103.5442	104.0632 (39)
												103.2198
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1842	1.1813	1.1784	1.1638	1.1608	1.1462	1.1462	1.1433	1.1521	1.1608	1.1667	1.1725 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31
												1.1630

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.6082 (42)
Hot water usage for mixer showers	93.4327	92.0286	89.9825	86.0677	83.1787	79.9569	78.1257	80.1562	82.3821	85.8414	89.8402	93.0747 (42a)
Hot water usage for baths	30.8888	30.4301	29.7841	28.5930	27.7011	26.7121	26.1779	26.8194	27.5179	28.5761	29.7917	30.7844 (42b)
Hot water usage for other uses	43.5166	41.9342	40.3518	38.7694	37.1869	35.6045	35.6045	37.1869	38.7694	40.3518	41.9342	43.5166 (42c)
Average daily hot water use (litres/day)												154.3412 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	167.8382	164.3929	160.1184	153.4301	148.0667	142.2736	139.9081	144.1626	148.6694	154.7692	161.5662	167.3758 (44)
Energy content (annual)	265.8146	234.0933	246.0960	210.0381	199.3263	174.9419	169.2067	178.5034	183.3242	210.0204	230.1806	262.0700 (45)
Distribution loss (46)m = 0.15 x (45)m	39.8722	35.1140	36.9144	31.5057	29.8989	26.2413	25.3810	26.7755	27.4986	31.5031	34.5271	39.3105 (46)
Water storage loss:												
Store volume												230.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8000 (48)
Temperature factor from Table 2b												0.7800 (49)
Enter (49) or (54) in (55)												1.4040 (55)
Total storage loss	43.5240	39.3120	43.5240	42.1200	43.5240	42.1200	43.5240	43.5240	42.1200	43.5240	42.1200	43.5240 (56)
If cylinder contains dedicated solar storage	43.5240	39.3120	43.5240	42.1200	43.5240	42.1200	43.5240	43.5240	42.1200	43.5240	42.1200	43.5240 (57)
Primary loss	54.8576	49.5488	54.8576	53.0880	54.8576	22.5120	23.2624	23.2624	22.5120	54.8576	53.0880	54.8576 (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	364.1962	322.9541	344.4776	305.2461	297.7079	239.5739	235.9931	245.2898	247.9562	308.4020	325.3886	360.4516 (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	364.1962	322.9541	344.4776	305.2461	297.7079	239.5739	235.9931	245.2898	247.9562	308.4020	325.3886	360.4516 (64)
12Total per year (kWh/year)												3597.6371 (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	132.2694	117.4751	125.7130	112.3081	110.1621	76.1778	74.8712	77.9623	78.9649	113.7179	119.0055	131.0243 (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	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	131.7092	145.8209	131.7092	136.0995	131.7092	136.0995	131.7092	131.7092	136.0995	131.7092	136.0995	131.7092 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	236.7592	239.2160	233.0249	219.8448	203.2072	187.5703	177.1238	174.6670	180.8581	194.0382	210.6758	226.3127 (68)
Pumps, fans	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411 (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)	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289 (71)
Total internal gains	177.7815	174.8141	168.9691	155.9834	148.0673	105.8025	100.6333	104.7880	109.6735	152.8466	165.2854	176.1080 (72)
	608.3732	621.9743	595.8265	574.0510	545.1070	491.5956	471.5896	473.2876	488.7544	540.7174	574.1840	596.2533 (73)

6. Solar gains												
[Jan]												
	Area											
	m2											
	Solar flux											
	Table 6a											
	W/m2											
	Specific data											
	or Table 6b											
	Specific data											
	or Table 6c											
	Access											
	factor											
	Table 6d											
	Gains											
	W											
North	6.5200											21.1881 (74)
South	3.7200											53.1515 (78)
West	0.7200											4.3217 (80)

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Solar gains	78.6612	135.9940	193.6119	256.1471	304.3580	310.5325	295.8495	258.1392	214.7502	152.1213	94.5295	67.1451 (83)
Total gains	687.0344	757.9683	789.4384	830.1981	849.4651	802.1281	767.4391	731.4268	703.5046	692.8386	668.7135	663.3984 (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	23.4562	23.5143	23.5726	23.8688	23.9289	24.2341	24.2341	24.2960	24.1111	23.9289	23.8089	23.6902
alpha	2.5637	2.5676	2.5715	2.5913	2.5953	2.6156	2.6156	2.6197	2.6074	2.5953	2.5873	2.5793
util living area	0.9430	0.9252	0.9009	0.8489	0.7638	0.6445	0.5141	0.5495	0.7238	0.8560	0.9213	0.9474 (86)
Living	18.4856	18.7572	19.1678	19.7537	20.2919	20.6915	20.8779	20.8507	20.5493	19.9049	19.1194	18.4470
Non living	17.0167	17.3591	17.8764	18.6090	19.2562	19.7132	19.8917	19.8729	19.5669	18.8068	17.8279	16.9735
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	19.7137	18.7572	19.1678	19.7537	20.2919	20.6915	20.8779	20.8507	20.5493	19.9049	19.1194	18.8042 (87)
Th 2	19.9326	19.9350	19.9373	19.9491	19.9514	19.9633	19.9633	19.9656	19.9585	19.9514	19.9467	19.9420 (88)
util rest of house	0.9349	0.9145	0.8860	0.8245	0.7221	0.5746	0.4143	0.4518	0.6625	0.8281	0.9083	0.9398 (89)
MIT 2	18.7701	17.3591	17.8764	18.6090	19.2562	19.7132	19.8917	19.8729	19.5669	18.8068	17.8279	17.5085 (90)
Living area fraction									FLA = Living area / (4) =			0.2851 (91)
MIT	19.0391	17.7577	18.2446	18.9354	19.5515	19.9921	20.1729	20.1517	19.8470	19.1198	18.1961	17.8778 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0391	17.7577	18.2446	18.9354	19.5515	19.9921	20.1729	20.1517	19.8470	19.1198	18.1961	17.8778 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9267	0.8855	0.8556	0.7961	0.7040	0.5767	0.4358	0.4707	0.6551	0.8010	0.8797	0.9203 (94)
Useful gains	636.7053	671.1896	675.4239	660.9553	598.0017	462.5962	334.4238	344.2590	460.8563	554.9330	588.2680	610.5161 (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	1549.0990	1348.0199	1228.2729	1036.4988	808.8995	548.5233	363.4585	380.6737	587.6072	877.7547	1148.9319	1423.3575 (97)
Space heating kWh	678.8209	454.8300	411.3197	270.3913	156.9080	0.0000	0.0000	0.0000	0.0000	240.1793	403.6780	604.7540 (98a)
Space heating requirement - total per year (kWh/year)												3220.8812
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	678.8209	454.8300	411.3197	270.3913	156.9080	0.0000	0.0000	0.0000	0.0000	240.1793	403.6780	604.7540 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3220.8812
Space heating per m2										(98c) / (4) =		36.2916 (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 %)												250.4344 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	678.8209	454.8300	411.3197	270.3913	156.9080	0.0000	0.0000	0.0000	0.0000	240.1793	403.6780	604.7540 (98)
Space heating efficiency (main heating system 1)	250.4344	250.4344	250.4344	250.4344	250.4344	0.0000	0.0000	0.0000	0.0000	250.4344	250.4344	250.4344 (210)
Space heating fuel (main heating system)	271.0573	181.6164	164.2424	107.9689	62.6543	0.0000	0.0000	0.0000	0.0000	95.9051	161.1911	241.4820 (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	364.1962	322.9541	344.4776	305.2461	297.7079	239.5739	235.9931	245.2898	247.9562	308.4020	325.3886	360.4516 (64)
Efficiency of water heater (217)m	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200 (216)
Fuel for water heating, kWh/month	135.1779	119.8701	127.8590	113.2975	110.4996	88.9221	87.5930	91.0436	92.0333	114.4689	120.7738	133.7880 (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	32.5137	29.3672	32.5137	31.4648	32.5137	31.4648	32.5137	32.5137	31.4648	32.5137	31.4648	32.5137 (231)
Lighting	27.3666	21.9545	19.7676	14.4826	11.1868	9.1397	10.2049	13.2648	17.2296	22.6062	25.5336	28.1272 (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												1286.1175 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												269.4200
Water heating fuel used												1335.3267 (219)

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Space cooling fuel	0.0000 (221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 1.4840)	
mechanical ventilation fans (SFP = 1.4840)	382.8220 (230a)
Total electricity for the above, kWh/year	382.8220 (231)
Electricity for lighting (calculated in Appendix L)	220.8639 (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	3225.1301 (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	1286.1175	0.1546	198.8245 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1335.3267	0.1415	188.9936 (264)
Space and water heating			387.8181 (265)
Pumps, fans and electric keep-hot	382.8220	0.1387	53.1021 (267)
Energy for lighting	220.8639	0.1443	31.8775 (268)
Total CO2, kg/year			472.7977 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.3300 (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	1286.1175	1.5723	2022.1543 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1335.3267	1.5234	2034.2153 (278)
Space and water heating			4056.3696 (279)
Pumps, fans and electric keep-hot	382.8220	1.5128	579.1331 (281)
Energy for lighting	220.8639	1.5338	338.7685 (282)
Total Primary energy kWh/year			4974.2712 (286)
Dwelling Primary energy Rate (DPER)			56.0500 (287)

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

1. Overall dwelling characteristics

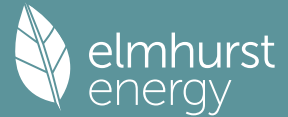
	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	14.2700 (1b)	x 2.5000 (2b)	= 35.6750 (1b) - (3b)
First floor	74.4800 (1c)	x 2.3600 (2c)	= 175.7728 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	88.7500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	211.4478 (5)

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) = 0.1419 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3919 (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) = 0.3331 (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	0.4247	0.4164	0.4080	0.3664	0.3581	0.3164	0.3164	0.3081	0.3331	0.3581	0.3747	0.3914 (22b)
Effective ac	0.5902	0.5867	0.5832	0.5671	0.5641	0.5501	0.5501	0.5475	0.5555	0.5641	0.5702	0.5766 (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	
TER Opaque door			6.4200	1.0000	6.4200			(26)
TER Opening Type (Uw = 1.20)			10.9600	1.1450	12.5496			(27)
Ground Floor			14.2700	0.1300	1.8551			(28a)
Exposed Floor			60.2100	0.1300	7.8273			(28b)
External Wall	104.5100	15.2400	89.2700	0.1800	16.0686			(29a)
Semi Exposed	30.7900	2.1400	28.6500	0.1800	5.1570			(29a)
Roof - ceiling	74.4800		74.4800	0.1100	8.1928			(30)
Total net area of external elements Aum(A, m2)			284.2600					(31)
Fabric heat loss, W/K = Sum (A x U)					58.0704			(33)
(26)...(30) + (32) =								

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

100.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element	12.3700	0.0500	0.6185	
E2 Other lintels (including other steel lintels)	9.3100	0.0500	0.4655	
E3 Sill	28.8000	0.0500	1.4400	
E4 Jamb	18.3200	0.1600	2.9312	
E5 Ground floor (normal)	6.0200	0.0000	0.0000	
E6 Intermediate floor within a dwelling	23.6100	0.0600	1.4166	
E10 Eaves (insulation at ceiling level)	14.2900	0.0600	0.8574	
E12 Gable (insulation at ceiling level)	24.1700	0.0900	2.1753	
E16 Corner (normal)	31.8800	0.3200	10.2016	
E20 Exposed floor (normal)	12.3000	0.3200	3.9360	
E21 Exposed floor (inverted)	4.7200	-0.0900	-0.4248	
E17 Corner (inverted - internal area greater than external area)				

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

23.6173 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 81.6877 (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	41.1818	40.9374	40.6979	39.5729	39.3624	38.3825	38.3825	38.2011	38.7599	39.3624	39.7882	40.2334	(38)
Heat transfer coeff	122.8695	122.6251	122.3856	121.2606	121.0501	120.0702	120.0702	119.8888	120.4477	121.0501	121.4759	121.9211	(39)
Average = Sum(39)m / 12 =												121.2596	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3844	1.3817	1.3790	1.3663	1.3639	1.3529	1.3529	1.3509	1.3572	1.3639	1.3687	1.3738	(40)
HLP (average)												1.3663	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

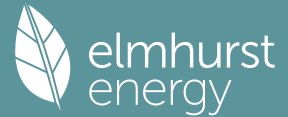
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6082 (42)
Hot water usage for mixer showers	67.9510	66.9299	65.4418	62.5947	60.4936	58.1505	56.8187	58.2954	59.9143	62.4301	65.3384	67.6907	(42a)
Hot water usage for baths	29.3444	28.9086	28.2949	27.1633	26.3160	25.3765	24.8690	25.4784	26.1420	27.1473	28.3022	29.2452	(42b)
Hot water usage for other uses	41.3408	39.8375	38.3342	36.8309	35.3276	33.8243	33.8243	35.3276	36.8309	38.3342	39.8375	41.3408	(42c)
Average daily hot water use (litres/day)												127.4380	(43)
Daily hot water use	138.6362	135.6760	132.0709	126.5889	122.1372	117.3513	115.5120	119.1015	122.8871	127.9116	133.4780	138.2767	(44)
Energy conte	219.5659	193.2008	202.9881	173.2939	164.4202	144.2971	139.7017	147.4725	151.5321	173.5748	190.1639	216.5079	(45)
Energy content (annual)										Total = Sum(45)m =		2116.7188	
Distribution loss (46)m = 0.15 x (45)m	32.9349	28.9801	30.4482	25.9941	24.6630	21.6446	20.9553	22.1209	22.7298	26.0362	28.5246	32.4762	(46)
Water storage loss:													
Store volume												230.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7973	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.9706	(55)
Total storage loss	30.0872	27.1756	30.0872	29.1167	30.0872	29.1167	30.0872	30.0872	29.1167	30.0872	29.1167	30.0872	(56)
If cylinder contains dedicated solar storage	30.0872	27.1756	30.0872	29.1167	30.0872	29.1167	30.0872	30.0872	29.1167	30.0872	29.1167	30.0872	(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	272.9155	241.3875	256.3377	224.9226	217.7698	195.9258	193.0513	200.8221	203.1608	226.9244	241.7925	269.8575	(62)
WWHRS	-31.0644	-27.4736	-28.7688	-23.8217	-22.2009	-18.9975	-17.8071	-18.9361	-19.6556	-23.1717	-26.2508	-30.4891	(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	241.8512	213.9139	227.5689	201.1009	195.5689	176.9283	175.2442	181.8860	183.5052	203.7527	215.5418	239.3684	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2456.2304	(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	115.6854	102.7887	110.1732	98.9232	97.3494	89.2817	89.1305	91.7143	91.6874	100.3933	104.5324	114.6686	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	131.7092	145.8209	131.7092	136.0995	131.7092	136.0995	131.7092	131.7092	136.0995	131.7092	136.0995	131.7092	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	236.7592	239.2160	233.0249	219.8448	203.2072	187.5703	177.1238	174.6670	180.8581	194.0382	210.6758	226.3127	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	(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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Water heating gains (Table 5)	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	(71)
Total internal gains	155.4911	152.9593	148.0823	137.3933	130.8460	124.0024	119.7991	123.2719	127.3436	134.9373	145.1839	154.1244	(72)
	589.0828	603.1195	577.9397	558.4609	530.8857	509.7955	490.7554	491.7714	506.4245	525.8080	557.0825	577.2697	(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				6.5200	10.6334		0.6300		0.7000		0.7700		21.1881 (74)
South				3.7200	46.7521		0.6300		0.7000		0.7700		53.1515 (78)
West				0.7200	19.6403		0.6300		0.7000		0.7700		4.3217 (80)
Solar gains	78.6612	135.9940	193.6119	256.1471	304.3580	310.5325	295.8495	258.1392	214.7502	152.1213	94.5295	67.1451	(83)
Total gains	667.7440	739.1136	771.5516	814.6080	835.2438	820.3280	786.6049	749.9106	721.1747	677.9293	651.6120	644.4148	(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	20.0642	20.1042	20.1435	20.3304	20.3658	20.5320	20.5320	20.5630	20.4676	20.3658	20.2944	20.2203		
alpha	2.3376	2.3403	2.3429	2.3554	2.3577	2.3688	2.3688	2.3709	2.3645	2.3577	2.3530	2.3480		
util living area	0.9499	0.9348	0.9144	0.8708	0.7983	0.6799	0.5553	0.5899	0.7508	0.8774	0.9319	0.9537	(86)	
MIT	17.9874	18.2704	18.7241	19.3801	20.0181	20.5476	20.8035	20.7655	20.3791	19.5794	18.6905	17.9428	(87)	
Th 2	19.7753	19.7774	19.7795	19.7893	19.7911	19.7996	19.7996	19.8012	19.7963	19.7911	19.7874	19.7835	(88)	
util rest of house	0.9420	0.9245	0.9000	0.8469	0.7558	0.6027	0.4381	0.4766	0.6851	0.8501	0.9194	0.9464	(89)	
MIT 2	16.3056	16.6632	17.2368	18.0598	18.8355	19.4418	19.6907	19.6624	19.2680	18.3191	17.2053	16.2535	(90)	
Living area fraction									fLA = Living area / (4) =			0.2851	(91)	
MIT	16.7850	17.1214	17.6608	18.4362	19.1726	19.7570	20.0080	19.9769	19.5848	18.6783	17.6287	16.7350	(92)	
Temperature adjustment												0.0000		
adjusted MIT	16.7850	17.1214	17.6608	18.4362	19.1726	19.7570	20.0080	19.9769	19.5848	18.6783	17.6287	16.7350	(93)	

8. Space heating requirement

Utilisation	0.9138	0.8930	0.8660	0.8127	0.7296	0.5996	0.4605	0.4951	0.6714	0.8173	0.8880	0.9194	(94)	
Useful gains	610.2047	660.0196	668.1663	662.0177	609.4195	491.8580	362.2514	371.2837	484.1959	554.0605	578.6106	592.4687	(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	1534.0298	1498.6461	1365.9246	1156.3642	904.5608	619.2030	409.1946	428.8305	660.6263	977.8846	1278.9790	1528.2865	(97)	
Space heating kWh	687.3259	563.5570	519.1322	355.9295	219.5852	0.0000	0.0000	0.0000	0.0000	315.3252	504.2652	696.2484	(98a)	
Space heating requirement - total per year (kWh/year)												3861.3685		
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	687.3259	563.5570	519.1322	355.9295	219.5852	0.0000	0.0000	0.0000	0.0000	315.3252	504.2652	696.2484	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												3861.3685		
Space heating per m2										(98c) / (4) =		43.5084	(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	687.3259	563.5570	519.1322	355.9295	219.5852	0.0000	0.0000	0.0000	0.0000	315.3252	504.2652	696.2484	(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)	744.6651	610.5709	562.4400	385.6224	237.9037	0.0000	0.0000	0.0000	0.0000	341.6308	546.3329	754.3320	(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	241.8512	213.9139	227.5689	201.1009	195.5689	176.9283	175.2442	181.8860	183.5052	203.7527	215.5418	239.3684	(64)	
Efficiency of water heater (217)m	86.2676	86.1274	85.8492	85.3258	84.3202	79.8000	79.8000	79.8000	79.8000	85.0355	85.8990	79.8000	(216)	
Fuel for water heating, kWh/month	280.3500	248.3692	265.0799	235.6859	231.9360	221.7146	219.6043	227.9273	229.9565	239.6090	250.9246	277.3369	(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	27.3666	21.9545	19.7676	14.4826	11.1868	9.1397	10.2049	13.2648	17.2296	22.6062	25.5336	28.1272	(232)	
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-60.0364	-80.1350	-109.1027	-115.9672	-119.6656	-109.8086	-108.4274	-104.9195	-98.0506	-88.3427	-64.3756	-52.4500	(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)	

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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	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233b)m	-49.0170	-100.9293	-196.7412	-290.1000	-378.5568	-374.1202	-319.0044	-236.8551	-142.4468	-64.7992	-38.9281			(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	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	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	0.0000	(235d)
Annual totals kWh/year														
Space heating fuel - main system 1													4183.4978	(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													2928.4943	(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)													220.8639	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-3681.3606	(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													3737.4954	(238)

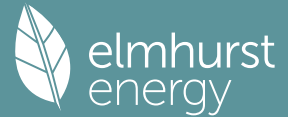
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	4183.4978	0.2100	878.5345 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2928.4943	0.2100	614.9838 (264)
Space and water heating			1493.5183 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	220.8639	0.1443	31.8775 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1111.2811	0.1358	-150.8897
PV Unit electricity exported	-2570.0795	0.1264	-324.9804
Total			-475.8701 (269)
Total CO2, kg/year			1061.4549 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.9600 (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	4183.4978	1.1300	4727.3525 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2928.4943	1.1300	3309.1986 (278)
Space and water heating			8036.5511 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	220.8639	1.5338	338.7685 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1111.2811	1.5019	-1669.0165
PV Unit electricity exported	-2570.0795	0.4642	-1192.9649
Total			-2861.9814 (283)
Total Primary energy kWh/year			5643.4389 (286)
Target Primary Energy Rate (TPER)			63.5900 (287)

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Property Reference	OP-D320 F2GOLD				Issued on Date	29/11/2024	
Assessment Reference	F2GOLD			Prop Type Ref	F2GOLD		
Property	F2GOLD						
SAP Rating	77 C		DER	5.33		TER	11.96
Environmental	95 A		% DER < TER				55.43
CO ₂ Emissions (t/year)	0.44		DFEE	49.79		TFEE	50.66
Compliance Check	See BREL		% DFEE < TFEE				1.71
% DPER < TPER	11.86		DPER	56.05		TPER	63.59
Assessor Details	Mr. Matthew Stainrod				Assessor ID	AU83-0001	
Client							

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	14.2700 (1b)	x 2.5000 (2b)	= 35.6750 (1b) - (3b)
First floor	74.4800 (1c)	x 2.3600 (2c)	= 175.7728 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	88.7500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 211.4478 (5)

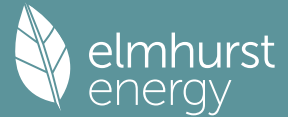
2. Ventilation rate

Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	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) =	
Pressure test	30.0000 / (5) =	
Pressure Test Method	Yes	
Measured/design AP50	Blower Door	
Infiltration rate	3.5000 (17)	
Number of sides sheltered	0.3169 (18)	
Shelter factor	2 (19)	
Infiltration rate adjusted to include shelter factor	(20) = 1 - [0.075 x (19)] =	
	(21) = (18) x (20) =	
	0.8500 (20)	
	0.2693 (21)	
Wind speed	Jan 5.1000	Feb 5.0000
Wind factor	Mar 4.9000	Apr 4.4000
Adj infilt rate	May 4.3000	Jun 3.8000
	Jul 3.8000	Aug 3.7000
	Sep 4.0000	Oct 4.3000
	Nov 4.5000	Dec 4.7000 (22)
	1.2750	1.1250
	0.3434	0.3367
	0.3300	0.2963
	0.2895	0.2559
	0.2559	0.2559
	0.2491	0.2693
	0.2895	0.3030
	0.3165 (22b)	0.3165 (22b)
	0.0000 (23b)	0.0000 (23b)
	0.0000 (23c)	0.0000 (23c)
	0.5590	0.5567
	0.5544	0.5439
	0.5419	0.5327
	0.5327	0.5310
	0.5363	0.5419
	0.5459	0.5501 (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
Front Door			6.4200	1.0000	6.4200		(26)
Windows (Uw = 1.30)			10.9600	1.2357	13.5437		(27)
Ground Floor			14.2700	0.1100	1.5697		(28a)
Exposed Floor			60.2100	0.1400	8.4294		(28b)
External Wall	104.5100	15.2400	89.2700	0.1700	15.1759		(29a)
Semi Exposed	30.7900	2.1400	28.6500	0.1700	4.8705		(29a)
Roof - ceiling	74.4800		74.4800	0.1100	8.1928		(30)
Total net area of external elements Aum(A, m ²)			284.2600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		58.2020		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							100.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				12.3700	0.0500	0.6185	
E3 Sill				9.3100	0.0500	0.4655	
E4 Jamb				28.8000	0.0500	1.4400	
E5 Ground floor (normal)				18.3200	0.1600	2.9312	

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E6 Intermediate floor within a dwelling	6.0200	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	23.6100	0.0600	1.4166
E12 Gable (insulation at ceiling level)	14.2900	0.0600	0.8574
E16 Corner (normal)	24.1700	0.0900	2.1753
E20 Exposed floor (normal)	31.8800	0.3200	10.2016
E21 Exposed floor (inverted)	12.3000	0.3200	3.9360
E17 Corner (inverted - internal area greater than external area)	4.7200	-0.0900	-0.4248
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			23.6173 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	81.8193 (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	39.0035	38.8438	38.6871	37.9515	37.8139	37.1732	37.1732	37.0546	37.4200	37.8139	38.0923	38.3834 (38)
Average = Sum(39)m / 12 =	120.8229	120.6631	120.5065	119.7709	119.6332	118.9925	118.9925	118.8739	119.2393	119.6332	119.9117	120.2027 (39)
												119.7702
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.3614	1.3596	1.3578	1.3495	1.3480	1.3408	1.3408	1.3394	1.3435	1.3480	1.3511	1.3544 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6082 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	29.3444	28.9086	28.2949	27.1633	26.3160	25.3765	24.8690	25.4784	26.1420	27.1473	28.3022	29.2452 (42b)
Hot water usage for other uses	41.3408	39.8375	38.3342	36.8309	35.3276	33.8243	33.8243	35.3276	36.8309	38.3342	39.8375	41.3408 (42c)
Average daily hot water use (litres/day)												64.7894 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	70.6852	68.7461	66.6291	63.9942	61.6436	59.2008	58.6933	60.8060	62.9729	65.4815	68.1396	70.5860 (44)
Energy content (annual)	111.9481	97.8935	102.4064	87.6049	82.9841	72.7943	70.9845	75.2906	77.6518	88.8578	97.0774	110.5206 (45)
Distribution loss (46)m = 0.15 x (45)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 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	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	95.1559	83.2095	87.0455	74.4641	70.5365	61.8751	60.3368	63.9970	66.0041	75.5291	82.5158	93.9425 (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	95.1559	83.2095	87.0455	74.4641	70.5365	61.8751	60.3368	63.9970	66.0041	75.5291	82.5158	93.9425 (64)
12Total per year (kWh/year)												914.6118 (64)
Electric shower(s)	54.4175	48.4864	52.9453	50.5251	51.4731	49.1004	50.7371	51.4731	50.5251	52.9453	51.9497	54.4175 (64a)
Heat gains from water heating, kWh/month	37.3933	32.9240	34.9977	31.2473	30.5024	27.7439	27.7685	28.8675	29.1323	32.1186	33.6164	37.0900 (65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												618.9955 (64a)

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	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	131.7092	145.8209	131.7092	136.0995	131.7092	136.0995	131.7092	131.7092	136.0995	131.7092	136.0995	131.7092 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	236.7592	239.2160	233.0249	219.8448	203.2072	187.5703	177.1238	174.6670	180.8581	194.0382	210.6758	226.3127 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411 (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)	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289 (71)
Water heating gains (Table 5)	50.2599	48.9940	47.0399	43.3990	40.9979	38.5332	37.3232	38.8004	40.4615	43.1702	46.6894	49.8521 (72)
Total internal gains	480.8516	496.1542	473.8973	461.4666	438.0376	424.3263	408.2796	407.3000	419.5424	431.0409	455.5880	469.9974 (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				6.5200	10.6334	0.6300	0.7000	0.7700	21.1881 (74)			
South				3.7200	46.7521	0.6300	0.7000	0.7700	53.1515 (78)			
West				0.7200	19.6403	0.6300	0.7000	0.7700	4.3217 (80)			
Solar gains	78.6612	135.9940	193.6119	256.1471	304.3580	310.5325	295.8495	258.1392	214.7502	152.1213	94.5295	67.1451 (83)
Total gains	559.5128	632.1483	667.5092	717.6137	742.3957	734.8588	704.1291	665.4392	634.2927	583.1622	550.1175	537.1425 (84)

7. Mean internal temperature (heating season)

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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	20.4041	20.4311	20.4576	20.5833	20.6070	20.7179	20.7179	20.7386	20.6750	20.6070	20.5591	20.5093
alpha	2.3603	2.3621	2.3638	2.3722	2.3738	2.3812	2.3812	2.3826	2.3783	2.3738	2.3706	2.3673
util living area	0.9645	0.9513	0.9339	0.8949	0.8290	0.7167	0.5948	0.6327	0.7890	0.9047	0.9504	0.9677 (86)
MIT	17.8356	18.1267	18.5909	19.2656	19.9310	20.4938	20.7742	20.7287	20.3060	19.4591	18.5428	17.7822 (87)
Th 2	19.7931	19.7945	19.7958	19.8022	19.8034	19.8090	19.8090	19.8101	19.8069	19.8034	19.8010	17.7985 (88)
util rest of house	0.9587	0.9434	0.9223	0.8745	0.7906	0.6423	0.4761	0.5193	0.7283	0.8821	0.9409	0.9624 (89)
MIT 2	16.9339	17.2220	17.6812	18.3446	18.9809	19.4904	19.7086	19.6811	19.3363	18.5421	17.6415	16.8845 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	17.1909	17.4799	17.9405	18.6071	19.2517	19.7765	20.0124	19.9797	19.6128	18.8035	17.8984	17.1404 (92)
Temperature adjustment	0.0000											
adjusted MIT	17.1909	17.4799	17.9405	18.6071	19.2517	19.7765	20.0124	19.9797	19.6128	18.8035	17.8984	17.1404 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9409	0.9222	0.8983	0.8483	0.7691	0.6400	0.4987	0.5376	0.7165	0.8574	0.9199	0.9457 (94)
Useful gains	526.4585	582.9729	599.5940	608.7872	570.9590	470.2941	351.1751	357.7159	454.4405	500.0227	506.0742	507.9522 (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	1557.5209	1517.9329	1378.6538	1162.6312	903.4402	615.9613	406.0483	425.5363	657.3383	981.4151	1294.8544	1555.4743 (97)
Space heating kWh	767.1104	628.2931	579.6205	398.7677	247.3660	0.0000	0.0000	0.0000	0.0000	358.1559	567.9218	779.3564 (98a)
Space heating requirement - total per year (kWh/year)	4326.5918											
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	767.1104	628.2931	579.6205	398.7677	247.3660	0.0000	0.0000	0.0000	0.0000	358.1559	567.9218	779.3564 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	4326.5918											
Space heating per m2	(98c) / (4) = 48.7503 (99)											

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	1118.5299	880.5448	903.4416	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.5792	0.6535	0.6226	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	647.8746	575.4259	562.4872	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	798.3949	765.3594	722.8263	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	108.3746	141.3105	119.2923	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	27.0937	35.3276	29.8231	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	92.2444 (107)											
Energy for space heating	48.7503 (99)											
Energy for space cooling	1.0394 (108)											
Total	49.7897 (109)											
Fabric Energy Efficiency (DFEE)	49.8 (109)											

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

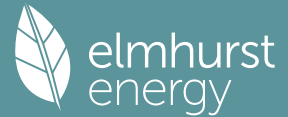
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	14.2700 (1b)	x 2.5000 (2b)	= 35.6750 (1b) - (3b)
First floor	74.4800 (1c)	x 2.3600 (2c)	= 175.7728 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	88.7500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	211.4478 (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)
Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1419 (8)

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Pressure test													Yes
Pressure Test Method													Blower Door
Measured/design AP50													5.0000 (17)
Infiltration rate													0.3919 (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) = 0.3331 (21)
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
	0.4247	0.4164	0.4080	0.3664	0.3581	0.3164	0.3164	0.3081	0.3331	0.3581	0.3747	0.3914	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)													0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =													0.0000 (23c)
Effective ac	0.5902	0.5867	0.5832	0.5671	0.5641	0.5501	0.5501	0.5475	0.5555	0.5641	0.5702	0.5766	(25)

3. Heat losses and heat loss parameter

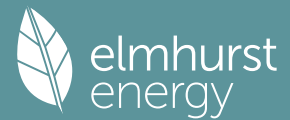
Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Opaque door			6.4200	1.0000	6.4200			(26)
TER Opening Type (Uw = 1.20)			10.9600	1.1450	12.5496			(27)
Ground Floor			14.2700	0.1300	1.8551			(28a)
Exposed Floor			60.2100	0.1300	7.8273			(28b)
External Wall	104.5100	15.2400	89.2700	0.1800	16.0686			(29a)
Semi Exposed	30.7900	2.1400	28.6500	0.1800	5.1570			(29a)
Roof - ceiling	74.4800		74.4800	0.1100	8.1928			(30)
Total net area of external elements Aum(A, m2)			284.2600					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 58.0704			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							100.0000	(35)
List of Thermal Bridges								
K1 Element				Length	Psi-value	Total		
E2 Other lintels (including other steel lintels)				12.3700	0.0500	0.6185		
E3 Sill				9.3100	0.0500	0.4655		
E4 Jamb				28.8000	0.0500	1.4400		
E5 Ground floor (normal)				18.3200	0.1600	2.9312		
E6 Intermediate floor within a dwelling				6.0200	0.0000	0.0000		
E10 Eaves (insulation at ceiling level)				23.6100	0.0600	1.4166		
E12 Gable (insulation at ceiling level)				14.2900	0.0600	0.8574		
E16 Corner (normal)				24.1700	0.0900	2.1753		
E20 Exposed floor (normal)				31.8800	0.3200	10.2016		
E21 Exposed floor (inverted)				12.3000	0.3200	3.9360		
E17 Corner (inverted - internal area greater than external area)				4.7200	-0.0900	-0.4248		
Thermal bridges (Sum(L x Psi) calculated using Appendix K)						23.6173		(36)
Point Thermal bridges						(36a) = 0.0000		
Total fabric heat loss						(33) + (36) + (36a) = 81.6877		(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	41.1818	40.9374	40.6979	39.5729	39.3624	38.3825	38.3825	38.2011	38.7599	39.3624	39.7882	40.2334	(38)
Average = Sum(39)m / 12 =	122.8695	122.6251	122.3856	121.2606	121.0501	120.0702	120.0702	119.8888	120.4477	121.0501	121.4759	121.9211	(39)
												121.2596	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.3844	1.3817	1.3790	1.3663	1.3639	1.3529	1.3529	1.3509	1.3572	1.3639	1.3687	1.3738	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6082	(42)
Hot water usage for mixer showers														(42a)
Hot water usage for baths														(42b)
Hot water usage for other uses														(42c)
Average daily hot water use (litres/day)	41.3408	39.8375	38.3342	36.8309	35.3276	33.8243	33.8243	35.3276	36.8309	38.3342	39.8375	41.3408	64.7894	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Energy conte	70.6852	68.7461	66.6291	63.9942	61.6436	59.2008	58.6933	60.8060	62.9729	65.4815	68.1396	70.5860		(44)
Energy content (annual)	111.9481	97.8935	102.4064	87.6049	82.9841	72.7943	70.9845	75.2906	77.6518	88.8578	97.0774	110.5206		(45)
Distribution loss (46)m = 0.15 x (45)m													1076.0139	
Water storage loss:														
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
If cylinder contains dedicated solar storage														(56)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
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	0.0000	(59)
Total heat required for water heating calculated for each month														(61)
WWHRS	95.1559	83.2095	87.0455	74.4641	70.5365	61.8751	60.3368	63.9970	66.0041	75.5291	82.5158	93.9425		(62)
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	0.0000	(63a)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
Output from w/h	95.1559	83.2095	87.0455	74.4641	70.5365	61.8751	60.3368	63.9970	66.0041	75.5291	82.5158	93.9425		(64)
12Total per year (kWh/year)													914.6118	(64)
Electric shower(s)													915	(64)
Heat gains from water heating, kWh/month	54.4175	48.4864	52.9453	50.5251	51.4731	49.1004	50.7371	51.4731	50.5251	52.9453	51.9497	54.4175		(64a)
	37.3933	32.9240	34.9977	31.2473	30.5024	27.7439	27.7685	28.8675	29.1323	32.1186	33.6164	37.0900		(65)

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

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	131.7092	145.8209	131.7092	136.0995	131.7092	136.0995	131.7092	131.7092	136.0995	131.7092	136.0995	131.7092 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	236.7592	239.2160	233.0249	219.8448	203.2072	187.5703	177.1238	174.6670	180.8581	194.0382	210.6758	226.3127 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411 (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)	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289 (71)
Water heating gains (Table 5)	50.2599	48.9940	47.0399	43.3990	40.9979	38.5332	37.3232	38.8004	40.4615	43.1702	46.6894	49.8521 (72)
Total internal gains	480.8516	496.1542	473.8973	461.4666	438.0376	424.3263	408.2796	407.3000	419.5424	431.0409	455.5880	469.9974 (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				6.5200	10.6334	0.6300	0.7000	0.7700	21.1881 (74)			
South				3.7200	46.7521	0.6300	0.7000	0.7700	53.1515 (78)			
West				0.7200	19.6403	0.6300	0.7000	0.7700	4.3217 (80)			
Solar gains	78.6612	135.9940	193.6119	256.1471	304.3580	310.5325	295.8495	258.1392	214.7502	152.1213	94.5295	67.1451 (83)
Total gains	559.5128	632.1483	667.5092	717.6137	742.3957	734.8588	704.1291	665.4392	634.2927	583.1622	550.1175	537.1425 (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	20.0642	20.1042	20.1435	20.3304	20.3658	20.5320	20.5320	20.5630	20.4676	20.3658	20.2944	20.2203
alpha	2.3376	2.3403	2.3429	2.3554	2.3577	2.3688	2.3688	2.3709	2.3645	2.3577	2.3530	2.3480
util living area	0.9647	0.9516	0.9344	0.8958	0.8305	0.7187	0.5973	0.6349	0.7907	0.9054	0.9507	0.9678 (86)
MIT	17.7865	18.0803	18.5500	19.2377	19.9108	20.4841	20.7687	20.7229	20.2935	19.4364	18.5106	17.7408 (87)
Th 2	19.7753	19.7774	19.7795	19.7893	19.7911	19.7996	19.7996	19.8012	19.7963	19.7911	19.7874	19.7835 (88)
util rest of house	0.9589	0.9437	0.9228	0.8753	0.7921	0.6440	0.4778	0.5208	0.7298	0.8829	0.9412	0.9625 (89)
MIT 2	16.8747	17.1659	17.6310	18.3095	18.9538	19.4754	19.6971	19.6698	19.3179	18.5124	17.6015	16.8345 (90)
Living area fraction	17.1346	17.4266	17.8930	18.5741	19.2266	19.7629	20.0026	19.9700	19.5960	18.7758	17.8606	17.0929 (92)
Temperature adjustment												0.0000
adjusted MIT	17.1346	17.4266	17.8930	18.5741	19.2266	19.7629	20.0026	19.9700	19.5960	18.7758	17.8606	17.0929 (93)

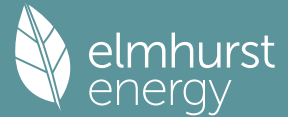
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9409	0.9223	0.8986	0.8489	0.7702	0.6414	0.5004	0.5391	0.7176	0.8579	0.9200	0.9456 (94)
Useful gains	526.4430	583.0440	599.7936	609.2179	571.7899	471.3340	352.3295	358.7102	455.1949	500.3001	506.1265	507.9263 (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	1576.9807	1536.0714	1394.3353	1173.0852	911.0974	619.9136	408.5484	428.0032	661.9801	989.6871	1307.1583	1571.9129 (97)
Space heating kWh	781.6000	640.4344	591.1391	405.9845	252.4448	0.0000	0.0000	0.0000	0.0000	364.1039	576.7429	791.6061 (98a)
Space heating requirement - total per year (kWh/year)												4404.0557
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	781.6000	640.4344	591.1391	405.9845	252.4448	0.0000	0.0000	0.0000	0.0000	364.1039	576.7429	791.6061 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4404.0557
Space heating per m2												49.6232 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	1128.6602	888.5197	911.1547	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.5750	0.6492	0.6185	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	648.9428	576.7863	563.5730	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	798.3949	765.3594	722.8263	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	107.6055	140.2983	118.4845	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	26.9014	35.0746	29.6211	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												91.5971 (107)
Energy for space heating												49.6232 (99)
Energy for space cooling												1.0321 (108)
Total												50.6552 (109)
Fabric Energy Efficiency (TFEE)												50.7 (109)

Full SAP Calculation Printout



Property Reference	OP-D320 F2GOLD				Issued on Date	29/11/2024	
Assessment Reference	F2GOLD			Prop Type Ref	F2GOLD		
Property	F2GOLD						
SAP Rating	77 C		DER	5.33		TER	11.96
Environmental	95 A		% DER < TER				55.43
CO ₂ Emissions (t/year)	0.44		DFEE	49.79		TFEE	50.66
Compliance Check	See BREL		% DFEE < TFEE				1.71
% DPER < TPER	11.86		DPER	56.05		TPER	63.59
Assessor Details	Mr. Matthew Stainrod				Assessor ID	AU83-0001	
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)
Ground floor	14.2700 (1b)	x 2.5000 (2b)	= 35.6750 (1b) - (3b)
First floor	74.4800 (1c)	x 2.3600 (2c)	= 175.7728 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	88.7500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	211.4478 (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	0 * 10 = 0.0000 (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) =											0.0000 / (5) = 0.0000 (8)
Pressure test	Yes											
Pressure Test Method	Blower Door											
Measured/design AP50	3.5000 (17)											
Infiltration rate	0.1750 (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) =											0.1487 (21)
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 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	0.1897	0.1859	0.1822	0.1636	0.1599	0.1413	0.1413	0.1376	0.1487	0.1599	0.1673	0.1748 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												71.2000 (23c)
Effective ac	0.3337	0.3299	0.3262	0.3076	0.3039	0.2853	0.2853	0.2816	0.2927	0.3039	0.3113	0.3188 (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
Front Door			6.4200	1.0000	6.4200		(26)
Windows (Uw = 1.30)			10.9600	1.2357	13.5437		(27)
Ground Floor			14.2700	0.1100	1.5697		(28a)
Exposed Floor			60.2100	0.1400	8.4294		(28b)
External Wall	104.5100	15.2400	89.2700	0.1700	15.1759		(29a)
Semi Exposed	30.7900	2.1400	28.6500	0.1700	4.8705		(29a)
Roof - ceiling	74.4800		74.4800	0.1100	8.1928		(30)
Total net area of external elements Aum (A, m ²)			284.2600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	58.2020		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							100.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				12.3700	0.0500	0.6185	

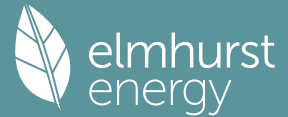
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 23.2818	Feb 23.0223	Mar 22.7628	Apr 21.4654	May 21.2059	Jun 19.9085	Jul 19.9085	Aug 19.6490	Sep 20.4274	Oct 21.2059	Nov 21.7249	Dec 22.2438 (38)
Heat transfer coeff	105.1011	104.8416	104.5821	103.2847	103.0252	101.7278	101.7278	101.4683	102.2468	103.0252	103.5442	104.0632 (39)
Average = Sum(39)m / 12 =												103.2198
HLP	Jan 1.1842	Feb 1.1813	Mar 1.1784	Apr 1.1638	May 1.1608	Jun 1.1462	Jul 1.1462	Aug 1.1433	Sep 1.1521	Oct 1.1608	Nov 1.1667	Dec 1.1725 (40)
HLP (average)												1.1630
Days in month	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy													2.6082 (42)
Hot water usage for mixer showers	93.4327	92.0286	89.9825	86.0677	83.1787	79.9569	78.1257	80.1562	82.3821	85.8414	89.8402	93.0747 (42a)	
Hot water usage for baths	30.8888	30.4301	29.7841	28.5930	27.7011	26.7121	26.1779	26.8194	27.5179	28.5761	29.7917	30.7844 (42b)	
Hot water usage for other uses	43.5166	41.9342	40.3518	38.7694	37.1869	35.6045	35.6045	37.1869	38.7694	40.3518	41.9342	43.5166 (42c)	
Average daily hot water use (litres/day)												154.3412 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	167.8382	164.3929	160.1184	153.4301	148.0667	142.2736	139.9081	144.1626	148.6694	154.7692	161.5662	167.3758 (44)	
Energy content (annual)	265.8146	234.0933	246.0960	210.0381	199.3263	174.9419	169.2067	178.5034	183.3242	210.0204	230.1806	262.0700 (45)	
Distribution loss (46)m = 0.15 x (45)m	39.8722	35.1140	36.9144	31.5057	29.8989	26.2413	25.3810	26.7755	27.4986	31.5031	34.5271	39.3105 (46)	
Water storage loss:													
Store volume												230.0000 (47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.8000 (48)	
Temperature factor from Table 2b												0.7800 (49)	
Enter (49) or (54) in (55)												1.4040 (55)	
Total storage loss	43.5240	39.3120	43.5240	42.1200	43.5240	42.1200	43.5240	43.5240	42.1200	43.5240	42.1200	43.5240 (56)	
If cylinder contains dedicated solar storage	43.5240	39.3120	43.5240	42.1200	43.5240	42.1200	43.5240	43.5240	42.1200	43.5240	42.1200	43.5240 (57)	
Primary loss	54.8576	49.5488	54.8576	53.0880	54.8576	22.5120	23.2624	23.2624	22.5120	54.8576	53.0880	54.8576 (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	364.1962	322.9541	344.4776	305.2461	297.7079	239.5739	235.9931	245.2898	247.9562	308.4020	325.3886	360.4516 (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	364.1962	322.9541	344.4776	305.2461	297.7079	239.5739	235.9931	245.2898	247.9562	308.4020	325.3886	360.4516 (64)	
12Total per year (kWh/year)												3597.6371 (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	132.2694	117.4751	125.7130	112.3081	110.1621	76.1778	74.8712	77.9623	78.9649	113.7179	119.0055	131.0243 (65)	

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	131.7092	145.8209	131.7092	136.0995	131.7092	136.0995	131.7092	131.7092	136.0995	131.7092	136.0995	131.7092 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	236.7592	239.2160	233.0249	219.8448	203.2072	187.5703	177.1238	174.6670	180.8581	194.0382	210.6758	226.3127 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411 (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)	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289 (71)
Water heating gains (Table 5)	177.7815	174.8141	168.9691	155.9834	148.0673	105.8025	100.6333	104.7880	109.6735	152.8466	165.2854	176.1080 (72)
Total internal gains	608.3732	621.9743	595.8265	574.0510	545.1070	491.5956	471.5896	473.2876	488.7544	540.7174	574.1840	596.2533 (73)

[Jan]	Area m ²	Solar flux Table 6a W/m ²	G Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	6.5200	10.6334	0.6300	0.7000		21.1881 (74)
South	3.7200	46.7521	0.6300	0.7000		53.1515 (78)
West	0.7200	19.6403	0.6300	0.7000		4.3217 (80)

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Solar gains	78.6612	135.9940	193.6119	256.1471	304.3580	310.5325	295.8495	258.1392	214.7502	152.1213	94.5295	67.1451 (83)
Total gains	687.0344	757.9683	789.4384	830.1981	849.4651	802.1281	767.4391	731.4268	703.5046	692.8386	668.7135	663.3984 (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	23.4562	23.5143	23.5726	23.8688	23.9289	24.2341	24.2341	24.2960	24.1111	23.9289	23.8089	23.6902
alpha	2.5637	2.5676	2.5715	2.5913	2.5953	2.6156	2.6156	2.6197	2.6074	2.5953	2.5873	2.5793
util living area	0.9430	0.9252	0.9009	0.8489	0.7638	0.6445	0.5141	0.5495	0.7238	0.8560	0.9213	0.9474 (86)
Living	18.4856	18.7572	19.1678	19.7537	20.2919	20.6915	20.8779	20.8507	20.5493	19.9049	19.1194	18.4470
Non living	17.0167	17.3591	17.8764	18.6090	19.2562	19.7132	19.8917	19.8729	19.5669	18.8068	17.8279	16.9735
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	19.7137	18.7572	19.1678	19.7537	20.2919	20.6915	20.8779	20.8507	20.5493	19.9049	19.1194	18.8042 (87)
Th 2	19.9326	19.9350	19.9373	19.9491	19.9514	19.9633	19.9633	19.9656	19.9585	19.9514	19.9467	19.9420 (88)
util rest of house	0.9349	0.9145	0.8860	0.8245	0.7221	0.5746	0.4143	0.4518	0.6625	0.8281	0.9083	0.9398 (89)
MIT 2	18.7701	17.3591	17.8764	18.6090	19.2562	19.7132	19.8917	19.8729	19.5669	18.8068	17.8279	17.5085 (90)
Living area fraction	19.0391	17.7577	18.2446	18.9354	19.5515	19.9921	20.1729	20.1517	19.8470	19.1198	18.1961	0.2851 (91)
MIT	19.0391	17.7577	18.2446	18.9354	19.5515	19.9921	20.1729	20.1517	19.8470	19.1198	18.1961	17.8778 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0391	17.7577	18.2446	18.9354	19.5515	19.9921	20.1729	20.1517	19.8470	19.1198	18.1961	17.8778 (93)

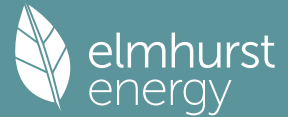
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9267	0.8855	0.8556	0.7961	0.7040	0.5767	0.4358	0.4707	0.6551	0.8010	0.8797	0.9203 (94)
Useful gains	636.7053	671.1896	675.4239	660.9553	598.0017	462.5962	334.4238	344.2590	460.8563	554.9330	588.2680	610.5161 (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	1549.0990	1348.0199	1228.2729	1036.4988	808.8995	548.5233	363.4585	380.6737	587.6072	877.7547	1148.9319	1423.3575 (97)
Space heating kWh	678.8209	454.8300	411.3197	270.3913	156.9080	0.0000	0.0000	0.0000	0.0000	240.1793	403.6780	604.7540 (98a)
Space heating requirement - total per year (kWh/year)												3220.8812
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	678.8209	454.8300	411.3197	270.3913	156.9080	0.0000	0.0000	0.0000	0.0000	240.1793	403.6780	604.7540 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3220.8812
Space heating per m2										(98c) / (4) =		36.2916 (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 %)												250.4344 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	678.8209	454.8300	411.3197	270.3913	156.9080	0.0000	0.0000	0.0000	0.0000	240.1793	403.6780	604.7540 (98)
Space heating efficiency (main heating system 1)	250.4344	250.4344	250.4344	250.4344	250.4344	0.0000	0.0000	0.0000	0.0000	250.4344	250.4344	250.4344 (210)
Space heating fuel (main heating system)	271.0573	181.6164	164.2424	107.9689	62.6543	0.0000	0.0000	0.0000	0.0000	95.9051	161.1911	241.4820 (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	364.1962	322.9541	344.4776	305.2461	297.7079	239.5739	235.9931	245.2898	247.9562	308.4020	325.3886	360.4516 (64)
Efficiency of water heater (217)m	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200	269.4200 (216)
Fuel for water heating, kWh/month	135.1779	119.8701	127.8590	113.2975	110.4996	88.9221	87.5930	91.0436	92.0333	114.4689	120.7738	133.7880 (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	32.5137	29.3672	32.5137	31.4648	32.5137	31.4648	32.5137	32.5137	31.4648	32.5137	31.4648	32.5137 (231)
Lighting	27.3666	21.9545	19.7676	14.4826	11.1868	9.1397	10.2049	13.2648	17.2296	22.6062	25.5336	28.1272 (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												1286.1175 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												269.4200
Water heating fuel used												1335.3267 (219)

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Space cooling fuel	0.0000 (221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 1.4840)	
mechanical ventilation fans (SFP = 1.4840)	382.8220 (230a)
Total electricity for the above, kWh/year	382.8220 (231)
Electricity for lighting (calculated in Appendix L)	220.8639 (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	3225.1301 (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	1286.1175	0.1546	198.8245 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1335.3267	0.1415	188.9936 (264)
Space and water heating			387.8181 (265)
Pumps, fans and electric keep-hot	382.8220	0.1387	53.1021 (267)
Energy for lighting	220.8639	0.1443	31.8775 (268)
Total CO2, kg/year			472.7977 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.3300 (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	1286.1175	1.5723	2022.1543 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1335.3267	1.5234	2034.2153 (278)
Space and water heating			4056.3696 (279)
Pumps, fans and electric keep-hot	382.8220	1.5128	579.1331 (281)
Energy for lighting	220.8639	1.5338	338.7685 (282)
Total Primary energy kWh/year			4974.2712 (286)
Dwelling Primary energy Rate (DPER)			56.0500 (287)

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

1. Overall dwelling characteristics

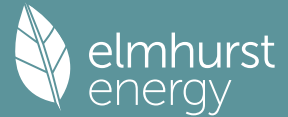
	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	14.2700 (1b)	x 2.5000 (2b)	= 35.6750 (1b) - (3b)
First floor	74.4800 (1c)	x 2.3600 (2c)	= 175.7728 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	88.7500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	211.4478 (5)

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) = 0.1419 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3919 (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) = 0.3331 (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	0.4247	0.4164	0.4080	0.3664	0.3581	0.3164	0.3164	0.3081	0.3331	0.3581	0.3747	0.3914 (22b)
Effective ac	0.5902	0.5867	0.5832	0.5671	0.5641	0.5501	0.5501	0.5475	0.5555	0.5641	0.5702	0.5766 (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	
TER Opaque door			6.4200	1.0000	6.4200			(26)
TER Opening Type (Uw = 1.20)			10.9600	1.1450	12.5496			(27)
Ground Floor			14.2700	0.1300	1.8551			(28a)
Exposed Floor			60.2100	0.1300	7.8273			(28b)
External Wall	104.5100	15.2400	89.2700	0.1800	16.0686			(29a)
Semi Exposed	30.7900	2.1400	28.6500	0.1800	5.1570			(29a)
Roof - ceiling	74.4800		74.4800	0.1100	8.1928			(30)
Total net area of external elements Aum(A, m2)			284.2600					(31)
Fabric heat loss, W/K = Sum (A x U)					58.0704			(33)
				(26)...(30) + (32) =				

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

100.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element	12.3700	0.0500	0.6185	
E2 Other lintels (including other steel lintels)	9.3100	0.0500	0.4655	
E3 Sill	28.8000	0.0500	1.4400	
E4 Jamb	18.3200	0.1600	2.9312	
E5 Ground floor (normal)	6.0200	0.0000	0.0000	
E6 Intermediate floor within a dwelling	23.6100	0.0600	1.4166	
E10 Eaves (insulation at ceiling level)	14.2900	0.0600	0.8574	
E12 Gable (insulation at ceiling level)	24.1700	0.0900	2.1753	
E16 Corner (normal)	31.8800	0.3200	10.2016	
E20 Exposed floor (normal)	12.3000	0.3200	3.9360	
E21 Exposed floor (inverted)	4.7200	-0.0900	-0.4248	
E17 Corner (inverted - internal area greater than external area)				

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

23.6173 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 81.6877 (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	41.1818	40.9374	40.6979	39.5729	39.3624	38.3825	38.3825	38.2011	38.7599	39.3624	39.7882	40.2334	(38)
Heat transfer coeff	122.8695	122.6251	122.3856	121.2606	121.0501	120.0702	120.0702	119.8888	120.4477	121.0501	121.4759	121.9211	(39)
Average = Sum(39)m / 12 =												121.2596	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3844	1.3817	1.3790	1.3663	1.3639	1.3529	1.3529	1.3509	1.3572	1.3639	1.3687	1.3738	(40)
HLP (average)												1.3663	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

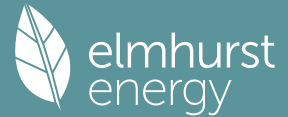
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6082 (42)
Hot water usage for mixer showers													
67.9510	66.9299	65.4418	62.5947	60.4936	58.1505	56.8187	58.2954	59.9143	62.4301	65.3384	67.6907	67.6907	(42a)
Hot water usage for baths													
29.3444	28.9086	28.2949	27.1633	26.3160	25.3765	24.8690	25.4784	26.1420	27.1473	28.3022	29.2452	29.2452	(42b)
Hot water usage for other uses													
41.3408	39.8375	38.3342	36.8309	35.3276	33.8243	33.8243	35.3276	36.8309	38.3342	39.8375	41.3408	41.3408	(42c)
Average daily hot water use (litres/day)												127.4380	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	138.6362	135.6760	132.0709	126.5889	122.1372	117.3513	115.5120	119.1015	122.8871	127.9116	133.4780	138.2767	(44)
Energy conte	219.5659	193.2008	202.9881	173.2939	164.4202	144.2971	139.7017	147.4725	151.5321	173.5748	190.1639	216.5079	(45)
Energy content (annual)												2116.7188	
Distribution loss (46)m = 0.15 x (45)m													
32.9349	28.9801	30.4482	25.9941	24.6630	21.6446	20.9553	22.1209	22.7298	26.0362	28.5246	32.4762	32.4762	(46)
Water storage loss:													
Store volume												230.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7973	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.9706	(55)
Total storage loss													
30.0872	27.1756	30.0872	29.1167	30.0872	29.1167	30.0872	30.0872	29.1167	30.0872	29.1167	30.0872	30.0872	(56)
If cylinder contains dedicated solar storage													
30.0872	27.1756	30.0872	29.1167	30.0872	29.1167	30.0872	30.0872	29.1167	30.0872	29.1167	30.0872	30.0872	(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													
272.9155	241.3875	256.3377	224.9226	217.7698	195.9258	193.0513	200.8221	203.1608	226.9244	241.7925	269.8575	269.8575	(62)
WWHRS	-31.0644	-27.4736	-28.7688	-23.8217	-22.2009	-18.9975	-17.8071	-18.9361	-19.6556	-23.1717	-26.2508	-30.4891	(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	241.8512	213.9139	227.5689	201.1009	195.5689	176.9283	175.2442	181.8860	183.5052	203.7527	215.5418	239.3684	(64)
12Total per year (kWh/year)												2456.2304	(64)
Electric shower(s)												2456	(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)
												0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													
Heat gains from water heating, kWh/month	115.6854	102.7887	110.1732	98.9232	97.3494	89.2817	89.1305	91.7143	91.6874	100.3933	104.5324	114.6686	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	130.4111	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
131.7092	145.8209	131.7092	136.0995	131.7092	136.0995	131.7092	131.7092	136.0995	131.7092	136.0995	131.7092	131.7092	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
236.7592	239.2160	233.0249	219.8448	203.2072	187.5703	177.1238	174.6670	180.8581	194.0382	210.6758	226.3127	226.3127	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	36.0411	(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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	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	-104.3289	(71)
Water heating gains (Table 5)	155.4911	152.9593	148.0823	137.3933	130.8460	124.0024	119.7991	123.2719	127.3436	134.9373	145.1839	154.1244	(72)
Total internal gains	589.0828	603.1195	577.9397	558.4609	530.8857	509.7955	490.7554	491.7714	506.4245	525.8080	557.0825	577.2697	(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					6.5200	10.6334	0.6300	0.7000			0.7700			21.1881 (74)
South					3.7200	46.7521	0.6300	0.7000			0.7700			53.1515 (78)
West					0.7200	19.6403	0.6300	0.7000			0.7700			4.3217 (80)
Solar gains	78.6612	135.9940	193.6119	256.1471	304.3580	310.5325	295.8495	258.1392	214.7502	152.1213	94.5295			67.1451 (83)
Total gains	667.7440	739.1136	771.5516	814.6080	835.2438	820.3280	786.6049	749.9106	721.1747	677.9293	651.6120			644.4148 (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	20.0642	20.1042	20.1435	20.3304	20.3658	20.5320	20.5320	20.5630	20.4676	20.3658	20.2944	20.2203		
alpha	2.3376	2.3403	2.3429	2.3554	2.3577	2.3688	2.3688	2.3709	2.3645	2.3577	2.3530	2.3480		
util living area	0.9499	0.9348	0.9144	0.8708	0.7983	0.6799	0.5553	0.5899	0.7508	0.8774	0.9319	0.9537	(86)	
MIT	17.9874	18.2704	18.7241	19.3801	20.0181	20.5476	20.8035	20.7655	20.3791	19.5794	18.6905	17.9428	(87)	
Th 2	19.7753	19.7774	19.7795	19.7893	19.7911	19.7996	19.7996	19.8012	19.7963	19.7911	19.7874	19.7835	(88)	
util rest of house	0.9420	0.9245	0.9000	0.8469	0.7558	0.6027	0.4381	0.4766	0.6851	0.8501	0.9194	0.9464	(89)	
MIT 2	16.3056	16.6632	17.2368	18.0598	18.8355	19.4418	19.6907	19.6624	19.2680	18.3191	17.2053	16.2535	(90)	
Living area fraction									fLA = Living area / (4) =			0.2851	(91)	
MIT	16.7850	17.1214	17.6608	18.4362	19.1726	19.7570	20.0080	19.9769	19.5848	18.6783	17.6287	16.7350	(92)	
Temperature adjustment												0.0000		
adjusted MIT	16.7850	17.1214	17.6608	18.4362	19.1726	19.7570	20.0080	19.9769	19.5848	18.6783	17.6287	16.7350	(93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisation	0.9138	0.8930	0.8660	0.8127	0.7296	0.5996	0.4605	0.4951	0.6714	0.8173	0.8880	0.9194	(94)	
Useful gains	610.2047	660.0196	668.1663	662.0177	609.4195	491.8580	362.2514	371.2837	484.1959	554.0605	578.6106	592.4687	(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	1534.0298	1498.6461	1365.9246	1156.3642	904.5608	619.2030	409.1946	428.8305	660.6263	977.8846	1278.9790	1528.2865	(97)	
Space heating kWh	687.3259	563.5570	519.1322	355.9295	219.5852	0.0000	0.0000	0.0000	0.0000	315.3252	504.2652	696.2484	(98a)	
Space heating requirement - total per year (kWh/year)												3861.3685		
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	687.3259	563.5570	519.1322	355.9295	219.5852	0.0000	0.0000	0.0000	0.0000	315.3252	504.2652	696.2484	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												3861.3685		
Space heating per m2										(98c) / (4) =		43.5084	(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	687.3259	563.5570	519.1322	355.9295	219.5852	0.0000	0.0000	0.0000	0.0000	315.3252	504.2652	696.2484	(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)	744.6651	610.5709	562.4400	385.6224	237.9037	0.0000	0.0000	0.0000	0.0000	341.6308	546.3329	754.3320	(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	241.8512	213.9139	227.5689	201.1009	195.5689	176.9283	175.2442	181.8860	183.5052	203.7527	215.5418	239.3684	(64)	
Efficiency of water heater (217)m	86.2676	86.1274	85.8492	85.3258	84.3202	79.8000	79.8000	79.8000	79.8000	85.0355	85.8990	86.3096	(216)	
Fuel for water heating, kWh/month	280.3500	248.3692	265.0799	235.6859	231.9360	221.7146	219.6043	227.9273	229.9565	239.6090	250.9246	277.3369	(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	27.3666	21.9545	19.7676	14.4826	11.1868	9.1397	10.2049	13.2648	17.2296	22.6062	25.5336	28.1272	(232)	
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-60.0364	-80.1350	-109.1027	-115.9672	-119.6656	-109.8086	-108.4274	-104.9195	-98.0506	-88.3427	-64.3756	-52.4500	(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)	

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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	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233b)m	-49.0170	-100.9293	-196.7412	-290.1000	-378.5568	-374.1202	-319.0044	-236.8551	-142.4468	-64.7992	-38.9281			(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	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	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	0.0000	(235d)
Annual totals kWh/year														
Space heating fuel - main system 1													4183.4978	(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													2928.4943	(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)													220.8639	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-3681.3606	(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													3737.4954	(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	4183.4978	0.2100	878.5345 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2928.4943	0.2100	614.9838 (264)
Space and water heating			1493.5183 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	220.8639	0.1443	31.8775 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1111.2811	0.1358	-150.8897
PV Unit electricity exported	-2570.0795	0.1264	-324.9804
Total			-475.8701 (269)
Total CO2, kg/year			1061.4549 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.9600 (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	4183.4978	1.1300	4727.3525 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2928.4943	1.1300	3309.1986 (278)
Space and water heating			8036.5511 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	220.8639	1.5338	338.7685 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1111.2811	1.5019	-1669.0165
PV Unit electricity exported	-2570.0795	0.4642	-1192.9649
Total			-2861.9814 (283)
Total Primary energy kWh/year			5643.4389 (286)
Target Primary Energy Rate (TPER)			63.5900 (287)