

Full SAP Calculation Printout



Plot Reference	Plot 1	Issued on Date	05/10/2026
Assessment Reference	Baseline	Plot Type Ref	
Plot Address		SAP Version	10.2
SAP Rating	92 A	DER	1.56
Environmental	98 A	% DER < TER	79.06
CO ₂ Emissions (t/year)	0.24	DFEE	30.18
Compliance Check	See BREL	% DFEE < TFEE	15.80
% DPER < TPER	58.19	DPER	16.33
Assessor Details	Mr. Joe Mountain	Assessor ID	AV71-0001
Client			

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	95.0000 (1b)	x 2.5000 (2b)	= 237.5000 (1b) - (3b)
First floor	95.0000 (1c)	x 2.6000 (2c)	= 247.0000 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	190.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 484.5000 (5)

2. Ventilation rate

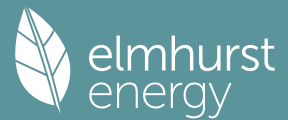
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (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) = 20.0000 / (5) = 0.0413 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	4.0000 (17)
Infiltration rate	0.2413 (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) = 0.2051 (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	0.2615	0.2564	0.2512	0.2256	0.2205	0.1948	0.1948	0.1897	0.2051	0.2205	0.2307	0.2410 (22b)
Effective ac	0.5342	0.5329	0.5316	0.5254	0.5243	0.5190	0.5190	0.5180	0.5210	0.5243	0.5266	0.5290 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Windows			33.3500	1.1450	38.1870		(27)
Ground Floor			95.0000	0.1400	13.3000	110.0000	10450.0000 (28a)
External Wall	234.6000	33.3500	201.2500	0.1500	30.1875	0.0000	0.0000 (29a)
Roof	95.0000		95.0000	0.1300	12.3500	9.0000	855.0000 (30)
Total net area of external elements Aum(A, m ²)			424.6000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 94.0245		(33)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 11305.0000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							59.5000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				11.2000	0.0260	0.2912	
E3 Sill				11.2000	0.0190	0.2128	
E4 Jamb				23.4500	0.0140	0.3283	
E6 Intermediate floor within a dwelling				31.0000	0.0020	0.0620	
E16 Corner (normal)				25.0000	0.0410	1.0250	
E5 Ground floor (normal)				37.0000	0.0460	1.7020	
E10 Eaves (insulation at ceiling level)				21.2300	0.0460	0.9766	
E12 Gable (insulation at ceiling level)				11.3000	0.0330	0.3729	

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

Point Thermal bridges
Total fabric heat loss

(33) + (36) + (36a) =
98.9953 (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
(39)m	85.4086	85.1963	84.9883	84.0111	83.8282	82.9771	82.9771	82.8195	83.3050	83.8282	84.1981	84.5848 (38)
Heat transfer coeff	184.4039	184.1916	183.9836	183.0064	182.8235	181.9724	181.9724	181.8148	182.3003	182.8235	183.1934	183.5801 (39)
Average = Sum(39)m / 12 =												183.0055

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9705	0.9694	0.9683	0.9632	0.9622	0.9577	0.9577	0.9569	0.9595	0.9622	0.9642	0.9662 (40)
HLP (average)												0.9632
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.9889 (42)

Hot water usage for mixer showers 74.3338 73.2167 71.5889 68.4743 66.1759 63.6127 62.1557 63.7712 65.5421 68.2942 71.4757 74.0490 (42a)

Hot water usage for baths 32.0892 31.6126 30.9415 29.7041 28.7775 27.7501 27.1952 27.8616 28.5872 29.6866 30.9495 31.9807 (42b)

Hot water usage for other uses 45.2393 43.5942 41.9491 40.3041 38.6590 37.0140 37.0140 38.6590 40.3041 41.9491 43.5942 45.2393 (42c)

Average daily hot water use (litres/day) 139.4116 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	151.6623	148.4235	144.4795	138.4825	133.6124	128.3768	126.3649	130.2919	134.4334	139.9300	146.0194	151.2690 (44)
Energy conte	240.1959	211.3531	222.0597	189.5757	179.8680	157.8542	152.8274	161.3285	165.7699	189.8836	208.0313	236.8507 (45)
Energy content (annual)												2315.5980
Distribution loss (46)m = 0.15 x (45)m	36.0294	31.7030	33.3089	28.4363	26.9802	23.6781	22.9241	24.1993	24.8655	28.4825	31.2047	35.5276 (46)
Water storage loss (or HIU loss):												
Store volume												300.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												0.8900 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.4806 (55)
Total storage loss	14.8986	13.4568	14.8986	14.4180	14.8986	14.4180	14.8986	14.8986	14.4180	14.8986	14.4180	14.8986 (56)
If cylinder contains dedicated solar storage	14.8986	13.4568	14.8986	14.4180	14.8986	14.4180	14.8986	14.8986	14.4180	14.8986	14.4180	14.8986 (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	278.3569	245.8211	260.2207	226.5057	218.0290	194.7842	190.9884	199.4895	202.6999	228.0446	244.9613	275.0117 (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	-12.3467	-26.7248	-54.7442	-85.0746	-114.9297	-116.6188	-115.2549	-95.9565	-68.6777	-38.9901	-16.6981	-9.6912 (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	266.0102	219.0963	205.4765	141.4311	103.0993	78.1654	75.7335	103.5331	134.0221	189.0545	228.2633	265.3204 (64)
12Total per year (kWh/year)												2009.2057 (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	110.3940	97.8493	104.3636	92.5779	90.3349	82.0305	81.3439	84.1705	84.6625	93.6651	98.7144	109.2816 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	186.9716	207.0042	186.9716	193.2039	186.9716	193.2039	186.9716	186.9716	193.2039	186.9716	193.2039	186.9716 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	361.4395	365.1901	355.7387	335.6178	310.2187	286.3471	270.3994	266.6488	276.1002	296.2212	321.6203	345.4919 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445 (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)	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558 (71)
Water heating gains (Table 5)	148.3790	145.6091	140.2737	128.5804	121.4179	113.9313	109.3332	113.1324	117.5868	125.8940	137.1034	146.8839 (72)
Total internal gains	764.6235	785.6369	750.8174	725.2355	686.4416	661.3158	634.5376	634.5863	654.7244	676.9201	719.7610	747.1808 (73)

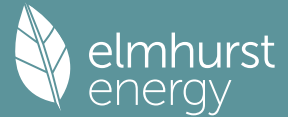
6. Solar gains

[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	11.5500	10.6334	0.7600	0.0000	0.7700	71.8717 (74)						
East	2.0000	19.6403	0.7600	0.0000	0.7700	22.9870 (76)						
South	17.8000	46.7521	0.7600	0.0000	0.7700	486.9957 (78)						
West	2.0000	19.6403	0.7600	0.0000	0.7700	22.9870 (80)						
Solar gains	604.8414	1024.8588	1397.4690	1739.1603	1966.2969	1963.1493	1887.8549	1714.7070	1514.1684	1130.4709	723.2431	518.5316 (83)
Total gains	1369.4648	1810.4957	2148.2864	2464.3958	2652.7385	2624.4650	2522.3926	2349.2932	2168.8928	1807.3910	1443.0041	1265.7124 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

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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	17.0293	17.0490	17.0682	17.1594	17.1766	17.2569	17.2569	17.2718	17.2259	17.1766	17.1419	17.1058
alpha	2.1353	2.1366	2.1379	2.1440	2.1451	2.1505	2.1505	2.1515	2.1484	2.1451	2.1428	2.1404
util living area	0.8932	0.8276	0.7515	0.6448	0.5233	0.3971	0.2986	0.3302	0.4878	0.6992	0.8458	0.9067 (86)
Living	18.7049	19.1554	19.6349	20.1302	20.4946	20.7156	20.8029	20.7876	20.6252	20.1155	19.3156	18.6074
Non living	17.3982	17.9559	18.5448	19.1440	19.5687	19.8144	19.8997	19.8880	19.7244	19.1434	18.1680	17.2785
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	23	0	0	0	0	0	0	0	0	0	0	0
16 / 9	8	28	31	0	0	0	0	0	0	0	3	31
MIT	20.6645	19.9553	20.2268	20.1302	20.4946	20.7156	20.8029	20.7876	20.6252	20.1155	19.3887	19.6449 (87)
Th 2	20.1079	20.1089	20.1098	20.1141	20.1149	20.1187	20.1187	20.1194	20.1172	20.1149	20.1133	20.1116 (88)
util rest of house	0.8834	0.8133	0.7318	0.6177	0.4876	0.3512	0.2438	0.2735	0.4403	0.6689	0.8304	0.8980 (89)
MIT 2	19.7981	19.1550	19.4165	19.1440	19.5687	19.8144	19.8997	19.8880	19.7244	19.1434	18.2764	18.8566 (90)
Living area fraction									fLA = Living area / (4) =			0.0989 (91)
MIT	19.8838	19.2342	19.4967	19.2416	19.6603	19.9036	19.9891	19.9771	19.8135	19.2396	18.3864	18.9346 (92)
Temperature adjustment												0.0000
adjusted MIT	19.8838	19.2342	19.4967	19.2416	19.6603	19.9036	19.9891	19.9771	19.8135	19.2396	18.3864	18.9346 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8808	0.7977	0.7170	0.5886	0.4681	0.3395	0.2355	0.2640	0.4229	0.6351	0.7936	0.8847 (94)
Useful gains	1206.2215	1444.2065	1540.2293	1450.4629	1241.7887	890.9432	593.9165	620.1621	917.2444	1147.8046	1145.1106	1119.7272 (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	2873.7222	2640.2435	2391.1714	1892.5701	1455.3278	965.1007	616.7199	650.3617	1041.5715	1579.5253	2067.5981	2704.9787 (97)
Space heating kWh	1240.6205	803.7368	633.0496	318.3172	158.8731	0.0000	0.0000	0.0000	0.0000	321.2002	664.1910	1179.4272 (98a)
Space heating requirement - total per year (kWh/year)												5319.4155
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	1240.6205	803.7368	633.0496	318.3172	158.8731	0.0000	0.0000	0.0000	0.0000	321.2002	664.1910	1179.4272 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5319.4155
Space heating per m2										(98c) / (4) =		27.9969 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)

Fraction of space heat from main system(s)												0.0000 (201)
Efficiency of main space heating system 1 (in %)												1.0000 (202)
Efficiency of main space heating system 2 (in %)												314.3391 (206)
Efficiency of secondary/supplementary heating system, %												0.0000 (207)
												0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	1240.6205	803.7368	633.0496	318.3172	158.8731	0.0000	0.0000	0.0000	0.0000	321.2002	664.1910	1179.4272 (98)
Space heating efficiency (main heating system 1)	314.3391	314.3391	314.3391	314.3391	314.3391	0.0000	0.0000	0.0000	0.0000	314.3391	314.3391	314.3391 (210)
Space heating fuel (main heating system)	394.6758	255.6910	201.3906	101.2655	50.5419	0.0000	0.0000	0.0000	0.0000	102.1827	211.2976	375.2085 (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	266.0102	219.0963	205.4765	141.4311	103.0993	78.1654	75.7335	103.5331	134.0221	189.0545	228.2633	265.3204 (64)
Efficiency of water heater	168.1176	168.1176	168.1176	168.1176	168.1176	168.1176	168.1176	168.1176	168.1176	168.1176	168.1176	168.1176 (216)
Fuel for water heating, kWh/month	158.2287	130.3232	122.2219	84.1263	61.3257	46.4945	45.0479	61.5837	79.7193	112.4537	135.7759	157.8183 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)
Lighting	27.5099	22.0695	19.8711	14.5584	11.2453	9.1875	10.2584	13.3342	17.3199	22.7246	25.6674	28.2745 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-48.7970	-72.5262	-109.0045	-124.1291	-133.0380	-118.6856	-116.8075	-110.1943	-96.9302	-82.4090	-54.0321	-41.5466 (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	-0.0926	-2.2545	-8.1015	-19.8086	-33.8658	-41.3801	-40.9459	-32.9049	-22.3401	-7.8260	-1.6767	-0.0776 (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												1692.2537 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												168.1176
Water heating fuel used												1195.1191 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year

Electricity for lighting (calculated in Appendix L)

0.0000 (231)
222.0207 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation

Wind generation

-1319.3744 (233)
0.0000 (234)

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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	1790.0190 (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	1692.2537	0.1561	264.1698 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1195.1191	0.1458	174.1910 (264)
Space and water heating			438.3608 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	222.0207	0.1443	32.0444 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1108.1002	0.1345	-149.0610
PV Unit electricity exported	-211.2743	0.1151	-24.3132
Total			-173.3742 (269)
Total CO2, kg/year			297.0310 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			1.5600 (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	1692.2537	1.5779	2670.1778 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1195.1191	1.5392	1839.4926 (278)
Space and water heating			4509.6705 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	222.0207	1.5338	340.5428 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1108.1002	1.4972	-1659.0181
PV Unit electricity exported	-211.2743	0.4218	-89.1102
Total			-1748.1283 (283)
Total Primary energy kWh/year			3102.0850 (286)
Dwelling Primary energy Rate (DPER)			16.3300 (287)

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

1. Overall dwelling characteristics

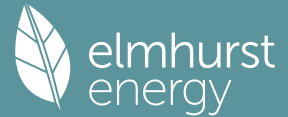
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	95.0000 (1b)	x 2.5000 (2b)	= 237.5000 (1b) - (3b)
First floor	95.0000 (1c)	x 2.6000 (2c)	= 247.0000 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	190.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	484.5000 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.0826 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3326 (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) = 0.2827 (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	0.3604	0.3533	0.3463	0.3109	0.3039	0.2685	0.2685	0.2615	0.2827	0.3039	0.3180	0.3321 (22b)
Effective ac	0.5649	0.5624	0.5600	0.5483	0.5462	0.5361	0.5361	0.5342	0.5400	0.5462	0.5506	0.5552 (25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opening Type			33.3500	1.1450	38.1870			(27)
Ground Floor			95.0000	0.1300	12.3500			(28a)
External Wall	234.6000	33.3500	201.2500	0.1800	36.2250			(29a)
Roof	95.0000		95.0000	0.1100	10.4500			(30)
Total net area of external elements Aum(A, m2)			424.6000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26) ... (30) + (32) =		97.2120			(33)

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

59.5000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)	11.2000	0.0500	0.5600	
E3 Sill	11.2000	0.0500	0.5600	
E4 Jamb	23.4500	0.0500	1.1725	
E6 Intermediate floor within a dwelling	31.0000	0.0000	0.0000	
E16 Corner (normal)	25.0000	0.0900	2.2500	
E5 Ground floor (normal)	37.0000	0.1600	5.9200	
E10 Eaves (insulation at ceiling level)	21.2300	0.0600	1.2738	
E12 Gable (insulation at ceiling level)	11.3000	0.0600	0.6780	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				12.4143 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	109.6263 (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	90.3267	89.9235	89.5282	87.6718	87.3244	85.7075	85.7075	85.4081	86.3303	87.3244	88.0271	88.7617	(38)
Heat transfer coeff	199.9531	199.5498	199.1546	197.2981	196.9508	195.3338	195.3338	195.0344	195.9567	196.9508	197.6534	198.3880	(39)
Average = Sum(39)m / 12 =												197.2964	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.0524	1.0503	1.0482	1.0384	1.0366	1.0281	1.0281	1.0265	1.0314	1.0366	1.0403	1.0441	(40)
HLP (average)												1.0384	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

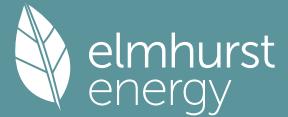
Assumed occupancy													2.9889 (42)
Hot water usage for mixer showers													
74.3338	73.2167	71.5889	68.4743	66.1759	63.6127	62.1557	63.7712	65.5421	68.2942	71.4757	74.0490	(42a)	
Hot water usage for baths													
32.0892	31.6126	30.9415	29.7041	28.7775	27.7501	27.1952	27.8616	28.5872	29.6866	30.9495	31.9807	(42b)	
Hot water usage for other uses													
45.2393	43.5942	41.9491	40.3041	38.6590	37.0140	37.0140	38.6590	40.3041	41.9491	43.5942	45.2393	(42c)	
Average daily hot water use (litres/day)												139.4116	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	151.6623	148.4235	144.4795	138.4825	133.6124	128.3768	126.3649	130.2919	134.4334	139.9300	146.0194	151.2690	(44)
Energy conte	240.1959	211.3531	222.0597	189.5757	179.8680	157.8542	152.8274	161.3285	165.7699	189.8836	208.0313	236.8507	(45)
Energy content (annual)										Total = Sum(45)m =		2315.5980	
Distribution loss (46)m = 0.15 x (45)m													
36.0294	31.7030	33.3089	28.4363	26.9802	23.6781	22.9241	24.1993	24.8655	28.4825	31.2047	35.5276	(46)	
Water storage loss (or HIU loss):													
Store volume												300.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												2.1127	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												1.1409	(55)
Total storage loss													
35.3664	31.9439	35.3664	34.2256	35.3664	34.2256	35.3664	35.3664	34.2256	35.3664	34.2256	35.3664	(56)	
If cylinder contains dedicated solar storage													
35.3664	31.9439	35.3664	34.2256	35.3664	34.2256	35.3664	35.3664	34.2256	35.3664	34.2256	35.3664	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	(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	(61)	
Total heat required for water heating calculated for each month													
298.8248	264.3082	280.6885	246.3132	238.4968	214.5918	211.4562	219.9574	222.5074	248.5124	264.7689	295.4795	(62)	
WWHRS	-33.9823	-30.0542	-31.4711	-26.0593	-24.2863	-20.7820	-19.4798	-20.7148	-21.5018	-25.3483	-28.7165	-33.3530	(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	264.8425	234.2540	249.2174	220.2539	214.2105	193.8098	191.9764	199.2426	201.0056	223.1642	236.0524	262.1265	(64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				2690.1556	(64)
Electric shower(s)												2690	(64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)	
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
126.7682	112.6390	120.7379	108.4240	106.7092	97.8766	97.7182	100.5448	100.5085	110.0394	114.5605	125.6559	(65)	

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

Metabolic gains (Table 5), Watts													
(66)m	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	149.4447	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
186.9716	207.0042	186.9716	193.2039	186.9716	193.2039	186.9716	186.9716	193.2039	186.9716	193.2039	186.9716	(67)	
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
361.4395	365.1901	355.7387	335.6178	310.2187	286.3471	270.3994	266.6488	276.1002	296.2212	321.6203	345.4919	(68)	
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	37.9445	(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	(70)	
Losses e.g. evaporation (negative values) (Table 5)													
-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	-119.5558	(71)	
Water heating gains (Table 5)													
170.3874	167.6175	162.2821	150.5888	143.4263	135.9397	131.3416	135.1408	139.5952	147.9024	159.1118	168.8923	(72)	
Total internal gains													
789.6319	810.6453	775.8258	750.2439	711.4500	683.3242	656.5460	656.5947	676.7328	701.9285	744.7694	772.1892	(73)	

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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					11.5500	10.6334		0.6300	0.7000	0.7700		37.5341 (74)
East					2.0000	19.6403		0.6300	0.7000	0.7700		12.0046 (76)
South					17.8000	46.7521		0.6300	0.7000	0.7700		254.3271 (78)
West					2.0000	19.6403		0.6300	0.7000	0.7700		12.0046 (80)
Solar gains	315.8704	535.2190	729.8098	908.2536	1026.8727	1025.2289	985.9074	895.4831	790.7545	590.3735	377.7042	270.7963 (83)
Total gains	1105.5023	1345.8643	1505.6356	1658.4975	1738.3226	1708.5530	1642.4534	1552.0778	1467.4873	1292.3021	1122.4736	1042.9855 (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	15.7051	15.7368	15.7680	15.9164	15.9445	16.0765	16.0765	16.1011	16.0254	15.9445	15.8878	15.8290
alpha	2.0470	2.0491	2.0512	2.0611	2.0630	2.0718	2.0718	2.0734	2.0684	2.0630	2.0592	2.0553
util living area	0.9279	0.8949	0.8542	0.7856	0.6910	0.5651	0.4477	0.4819	0.6461	0.8112	0.8999	0.9350 (86)
MIT	17.5639	18.0139	18.6162	19.3784	20.0563	20.5722	20.8135	20.7756	20.3939	19.5034	18.4044	17.4841 (87)
Th 2	20.0399	20.0417	20.0434	20.0514	20.0530	20.0600	20.0600	20.0613	20.0573	20.0530	20.0499	20.0467 (88)
util rest of house	0.9205	0.8844	0.8392	0.7625	0.6548	0.5087	0.3703	0.4054	0.5946	0.7860	0.8882	0.9283 (89)
MIT 2	16.0132	16.5753	17.3265	18.2692	19.0863	19.6819	19.9305	19.8985	19.4934	18.4398	17.0759	15.9149 (90)
Living area fraction	16.1667	16.7176	17.4541	18.3790	19.1823	19.7700	20.0179	19.9853	19.5825	18.5450	17.2074	16.0701 (92)
MIT	16.1667	16.7176	17.4541	18.3790	19.1823	19.7700	20.0179	19.9853	19.5825	18.5450	17.2074	16.0701 (92)
Temperature adjustment												0.0000
adjusted MIT	16.1667	16.7176	17.4541	18.3790	19.1823	19.7700	20.0179	19.9853	19.5825	18.5450	17.2074	16.0701 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8761	0.8339	0.7862	0.7128	0.6165	0.4896	0.3666	0.3987	0.5650	0.7354	0.8387	0.8861 (94)
Useful gains	968.4853	1122.3777	1183.7965	1182.1839	1071.7388	836.4544	602.1252	618.7623	829.1566	950.3345	941.3816	924.1529 (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	2372.7758	2358.2079	2181.5649	1870.1805	1473.6480	1009.8702	667.6233	699.2601	1074.3381	1564.7726	1997.7611	2354.8924 (97)
Space heating kWh	1044.7921	830.4779	742.3397	495.3575	299.0205	0.0000	0.0000	0.0000	0.0000	457.1420	760.5933	1064.4702 (98a)
Space heating requirement - total per year (kWh/year)												5694.1932
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	1044.7921	830.4779	742.3397	495.3575	299.0205	0.0000	0.0000	0.0000	0.0000	457.1420	760.5933	1064.4702 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5694.1932
Space heating per m2										(98c) / (4) =		29.9694 (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	1044.7921	830.4779	742.3397	495.3575	299.0205	0.0000	0.0000	0.0000	0.0000	457.1420	760.5933	1064.4702 (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)	1131.9525	899.7594	804.2684	536.6821	323.9659	0.0000	0.0000	0.0000	0.0000	495.2784	824.0447	1153.2721 (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	264.8425	234.2540	249.2174	220.2539	214.2105	193.8098	191.9764	199.2426	201.0056	223.1642	236.0524	262.1265 (64)
Efficiency of water heater	86.8199	86.6499	86.3522	85.8209	84.8079	79.8000	79.8000	79.8000	79.8000	85.6319	86.4897	79.8000 (216)
Fuel for water heating, kWh/month	305.0482	270.3453	288.6057	256.6436	252.5833	242.8694	240.5719	249.6774	251.8867	260.6086	272.9255	301.7657 (219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	38.8490	31.1661	28.0616	20.5591	15.8805	12.9745	14.4867	18.8304	24.4588	32.0912	36.2470	39.9287 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-79.9663	-108.4686	-150.0084	-161.9553	-169.0227	-155.5865	-153.4196	-147.3740	-136.1796	-120.5264	-86.2764	-69.6255 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)	-59.1324	-122.4807	-240.0987	-355.9876	-466.4650	-467.3601	-462.0748	-393.3452	-290.9960	-173.8478	-78.4875	-46.9282 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)

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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	(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	(235d)
Annual totals kWh/year										
Space heating fuel - main system 1									6169.2234	(211)
Space heating fuel - main system 2									0.0000	(213)
Space heating fuel - secondary									0.0000	(215)
Efficiency of water heater									79.8000	(219)
Water heating fuel used									3193.5313	(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)									313.5337	(232)
Energy saving/generation technologies (Appendices M ,N and Q)										
PV generation									-4695.6130	(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									5066.6753	(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	6169.2234	0.2100	1295.5369 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3193.5313	0.2100	670.6416 (264)
Space and water heating			1966.1785 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	313.5337	0.1443	45.2526 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1538.4091	0.1355	-208.3994
PV Unit electricity exported	-3157.2039	0.1263	-398.6606
Total			-607.0600 (269)
Total CO2, kg/year			1416.3004 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			7.4500 (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	6169.2234	1.1300	6971.2224 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3193.5313	1.1300	3608.6903 (278)
Space and water heating			10579.9127 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	313.5337	1.5338	480.9084 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1538.4091	1.5007	-2308.6929
PV Unit electricity exported	-3157.2039	0.4635	-1463.4087
Total			-3772.1017 (283)
Total Primary energy kWh/year			7418.8203 (286)
Target Primary Energy Rate (TPER)			39.0500 (287)