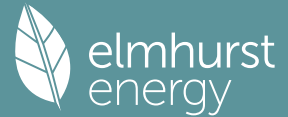


Full SAP Calculation Printout



Property Reference	OP-D320 P2TIGE				Issued on Date	29/11/2024
Assessment Reference	P2TIGE	Prop Type Ref	P2TIGE			
Property	P2TIGE					
SAP Rating	80 C	DER	4.50	TER	11.43	
Environmental	96 A	% DER < TER				60.63
CO ₂ Emissions (t/year)	0.42	DFEE	41.35	TFEE	42.48	
Compliance Check	See BREL	% DFEE < TFEE				2.66
% DPER < TPER	20.49	DPER	47.47	TPER	59.70	
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	51.5300 (1b)	x 2.3100 (2b)	= 119.0343 (1b) - (3b)
First floor	49.1600 (1c)	x 2.6100 (2c)	= 128.3076 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	100.6900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 247.3419 (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			2.1400	1.0000	2.1400		(26)
Windows (Uw = 1.30)			22.1800	1.2357	27.4087		(27)
Ground Floor			51.5300	0.1100	5.6683		(28a)
External Wall	145.8400	24.3200	121.5200	0.1700	20.6584		(29a)
Roof - ceiling	49.1600		49.1600	0.1100	5.4076		(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618		(30)
Total net area of external elements Aum(A, m ²)			248.9100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		61.5448		(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)				12.1600	0.0500		0.6080
E3 Sill				13.8900	0.0500		0.6945

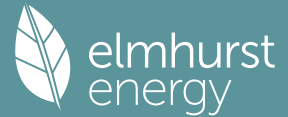
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	27.2340	26.9304	26.6269	25.1092	24.8057	23.2880	23.2880	22.9845	23.8951	24.8057	25.4128	26.0198 (38)
Heat transfer coeff												
	101.0797	100.7762	100.4726	98.9550	98.6514	97.1338	97.1338	96.8302	97.7408	98.6514	99.2585	99.8656 (39)
Average = Sum(39)m / 12 =												98.8791
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.0039	1.0009	0.9978	0.9828	0.9798	0.9647	0.9647	0.9617	0.9707	0.9798	0.9858	0.9918 (40)
HLP (average)												0.9820
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy												2.7458 (42)
Hot water usage for mixer showers	96.6050	95.1532	93.0377	88.9900	86.0029	82.6717	80.7783	82.8778	85.1793	88.7560	92.8906	96.2349 (42a)
Hot water usage for baths	31.9332	31.4590	30.7911	29.5597	28.6377	27.6153	27.0630	27.7262	28.4483	29.5423	30.7990	31.8253 (42b)
Hot water usage for other uses	45.0000	43.3636	41.7272	40.0909	38.4545	36.8182	36.8182	38.4545	40.0909	41.7272	43.3636	45.0000 (42c)
Average daily hot water use (litres/day)												159.5828 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	173.5382	169.9758	165.5560	158.6406	153.0951	147.1051	144.6594	149.0585	153.7184	160.0255	167.0532	173.0601 (44)
Energy content (annual)	274.8421	242.0433	254.4535	217.1710	206.0954	180.8829	174.9530	184.5656	189.5502	217.1530	237.9979	270.9703 (45)
Distribution loss (46)m = 0.15 x (45)m	41.2263	36.3065	38.1680	32.5757	30.9143	27.1324	26.2430	27.6848	28.4325	32.5730	35.6997	40.6455 (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	373.2237	330.9041	352.8351	312.3790	304.4770	245.5149	241.7394	251.3520	254.1822	315.5346	333.2059	369.3519 (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	373.2237	330.9041	352.8351	312.3790	304.4770	245.5149	241.7394	251.3520	254.1822	315.5346	333.2059	369.3519 (64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64a)m =				3684.6998 (64)
Electric shower(s)												3685 (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)
Heat gains from water heating, kWh/month	135.2711	120.1184	128.4919	114.6798	112.4128	78.1532	76.7818	79.9780	81.0350	116.0895	121.6047	133.9837 (65)

6. Solar gains

Page 2 of 7

Full SAP Calculation Printout



Solar gains	113.8657	216.3269	350.1669	516.1201	646.9683	670.9281	635.0503	534.1486	407.6954	254.2018	140.5860	94.6581 (83)
Total gains	747.1951	863.1759	970.3240	1112.8489	1213.0917	1181.8320	1124.9211	1025.6438	915.3034	815.2972	736.9629	714.8983 (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	27.6707	27.7540	27.8379	28.2648	28.3518	28.7948	28.7948	28.8850	28.6159	28.3518	28.1784	28.0071
alpha	2.8447	2.8503	2.8559	2.8843	2.8901	2.9197	2.9197	2.9257	2.9077	2.8901	2.8786	2.8671
util living area	0.9426	0.9151	0.8678	0.7691	0.6322	0.4845	0.3656	0.4120	0.6223	0.8212	0.9160	0.9484 (86)
Living	18.9015	19.2218	19.6855	20.2658	20.6761	20.8937	20.9652	20.9506	20.7737	20.2328	19.4869	18.8578
Non living	17.6263	18.0284	18.6056	19.3157	19.7883	20.0285	20.0924	20.0846	19.9130	19.2957	18.3755	17.5776
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	19.9265	19.2218	19.6855	20.2658	20.6761	20.8937	20.9652	20.9506	20.7737	20.2328	19.4869	19.1575 (87)
Th 2	20.0801	20.0826	20.0851	20.0977	20.1002	20.1129	20.1129	20.1154	20.1078	20.1002	20.0952	20.0902 (88)
util rest of house	0.9350	0.9042	0.8509	0.7410	0.5900	0.4274	0.2968	0.3400	0.5647	0.7922	0.9034	0.9415 (89)
MIT 2	19.1019	18.0284	18.6056	19.3157	19.7883	20.0285	20.0924	20.0846	19.9130	19.2957	18.3755	18.0304 (90)
Living area fraction	19.2632	18.2619	18.8169	19.5016	19.9620	20.1977	20.2632	20.2540	20.0814	19.4790	18.5929	18.2509 (92)
MIT	19.2632	18.2619	18.8169	19.5016	19.9620	20.1977	20.2632	20.2540	20.0814	19.4790	18.5929	18.2509 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2632	18.2619	18.8169	19.5016	19.9620	20.1977	20.2632	20.2540	20.0814	19.4790	18.5929	18.2509 (93)

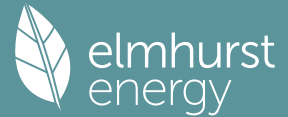
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9271	0.8767	0.8229	0.7203	0.5831	0.4330	0.3087	0.3516	0.5629	0.7690	0.8767	0.9234 (94)
Useful gains	692.7165	756.7279	798.4433	801.5378	707.4028	511.7768	347.2791	360.6203	515.2255	626.9241	646.1092	660.1422 (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	1512.4759	1346.5645	1237.5144	1049.0770	815.0606	543.7298	355.8173	373.1861	584.6255	875.9305	1140.7679	1403.2008 (97)
Space heating kWh	609.9010	396.3702	326.6689	178.2282	80.0974	0.0000	0.0000	0.0000	0.0000	185.2608	356.1543	552.8356 (98a)
Space heating requirement - total per year (kWh/year)												2685.5163
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	609.9010	396.3702	326.6689	178.2282	80.0974	0.0000	0.0000	0.0000	0.0000	185.2608	356.1543	552.8356 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2685.5163
Space heating per m2										(98c) / (4) =		26.6711 (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 %)												251.2476 (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	609.9010	396.3702	326.6689	178.2282	80.0974	0.0000	0.0000	0.0000	0.0000	185.2608	356.1543	552.8356 (98)
Space heating efficiency (main heating system 1)	251.2476	251.2476	251.2476	251.2476	251.2476	0.0000	0.0000	0.0000	0.0000	251.2476	251.2476	251.2476 (210)
Space heating fuel (main heating system)	242.7490	157.7608	130.0187	70.9373	31.8798	0.0000	0.0000	0.0000	0.0000	73.7363	141.7543	220.0362 (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	373.2237	330.9041	352.8351	312.3790	304.4770	245.5149	241.7394	251.3520	254.1822	315.5346	333.2059	369.3519 (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	138.5286	122.8209	130.9610	115.9450	113.0120	91.1272	89.7259	93.2937	94.3442	117.1163	123.6753	137.0915 (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	38.0330	34.3524	38.0330	36.8061	38.0330	36.8061	38.0330	38.0330	36.8061	38.0330	36.8061	38.0330 (231)
Lighting	26.9881	21.6509	19.4942	14.2823	11.0320	9.0133	10.0638	13.0813	16.9913	22.2935	25.1805	27.7382 (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												1068.8723 (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												1367.6415 (219)

Full SAP Calculation Printout



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)	447.8076 (230a)
Total electricity for the above, kWh/year	447.8076 (231)
Electricity for lighting (calculated in Appendix L)	217.8094 (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	3102.1308 (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	1068.8723	0.1556	166.3538 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1367.6415	0.1415	193.5687 (264)
Space and water heating			359.9224 (265)
Pumps, fans and electric keep-hot	447.8076	0.1387	62.1164 (267)
Energy for lighting	217.8094	0.1443	31.4366 (268)
Total CO2, kg/year			453.4755 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5000 (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	1068.8723	1.5761	1684.6961 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1367.6415	1.5234	2083.4483 (278)
Space and water heating			3768.1444 (279)
Pumps, fans and electric keep-hot	447.8076	1.5128	677.4433 (281)
Energy for lighting	217.8094	1.5338	334.0833 (282)
Total Primary energy kWh/year			4779.6710 (286)
Dwelling Primary energy Rate (DPER)			47.4700 (287)

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

1. Overall dwelling characteristics

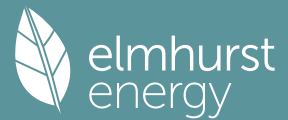
	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	51.5300 (1b)	x 2.3100 (2b)	= 119.0343 (1b) - (3b)
First floor	49.1600 (1c)	x 2.6100 (2c)	= 128.3076 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	100.6900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	247.3419 (5)

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) = 0.1617 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4117 (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) = 0.3500 (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	0.4462	0.4375	0.4287	0.3850	0.3762	0.3325	0.3325	0.3237	0.3500	0.3762	0.3937	0.4112 (22b)
Effective ac	0.5995	0.5957	0.5919	0.5741	0.5708	0.5553	0.5553	0.5524	0.5612	0.5708	0.5775	0.5845 (25)

Full SAP Calculation Printout



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			2.1400	1.0000	2.1400			(26)
TER Opening Type (Uw = 1.20)			22.1800	1.1450	25.3969			(27)
Ground Floor			51.5300	0.1300	6.6989			(28a)
External Wall	145.8400	24.3200	121.5200	0.1800	21.8736			(29a)
Roof - ceiling	49.1600		49.1600	0.1100	5.4076			(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618			(30)
Total net area of external elements Aum(A, m2)			248.9100					(31)
Fabric heat loss, W/K = Sum (A x U)								(33)
(26)...(30) + (32) =					61.7788			

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

100.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element	12.1600	0.0500	0.6080	
E2 Other lintels (including other steel lintels)	13.8900	0.0500	0.6945	
E3 Sill	30.6000	0.0500	1.5300	
E4 Jamb	30.4800	0.1600	4.8768	
E5 Ground floor (normal)	25.8900	0.0000	0.0000	
E6 Intermediate floor within a dwelling	17.9400	0.0600	1.0764	
E10 Eaves (insulation at ceiling level)	10.9600	0.0600	0.6576	
E12 Gable (insulation at ceiling level)	24.3000	0.0900	2.1870	
E16 Corner (normal)	3.0000	0.2400	0.7200	
E24 Eaves (insulation at ceiling level - inverted)	4.5800	0.0800	0.3664	
E14 Flat roof	4.6200	-0.0900	-0.4158	
E17 Corner (inverted - internal area greater than external area)				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				12.3009 (36)
Point Thermal Bridges				0.0000
Total fabric heat loss				(33) + (36) + (36a) = 74.0797 (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	48.9368	48.6213	48.3120	46.8594	46.5876	45.3224	45.3224	45.0881	45.8097	46.5876	47.1374	47.7122	(38)
Heat transfer coeff	123.0165	122.7010	122.3917	120.9391	120.6673	119.4021	119.4021	119.1678	119.8895	120.6673	121.2171	121.7919	(39)
Average = Sum(39)m / 12 =												120.9378	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2217	1.2186	1.2155	1.2011	1.1984	1.1858	1.1858	1.1835	1.1907	1.1984	1.2039	1.2096	(40)
HLP (average)												1.2011	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

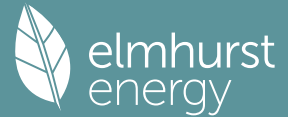
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.7458 (42)
Hot water usage for mixer showers	70.2582	69.2024	67.6638	64.7200	62.5476	60.1249	58.7478	60.2748	61.9486	64.5498	67.5568	69.9890	(42a)
Hot water usage for baths	30.3365	29.8860	29.2516	28.0817	27.2058	26.2345	25.7099	26.3399	27.0258	28.0652	29.2591	30.2340	(42b)
Hot water usage for other uses	42.7500	41.1954	39.6409	38.0863	36.5318	34.9772	34.9772	36.5318	38.0863	39.6409	41.1954	42.7500	(42c)
Average daily hot water use (litres/day)													131.7661 (43)
Daily hot water use	143.3447	140.2838	136.5562	130.8881	126.2851	121.3366	119.4349	123.1464	127.0607	132.2558	138.0113	142.9730	(44)
Energy conte	227.0230	199.7622	209.8818	179.1792	170.0041	149.1975	144.4462	152.4810	156.6786	179.4699	196.6224	223.8611	(45)
Energy content (annual)										Total = Sum(45)m =		2188.6070	
Distribution loss (46)m = 0.15 x (45)m	34.0534	29.9643	31.4823	26.8769	25.5006	22.3796	21.6669	22.8721	23.5018	26.9205	29.4934	33.5792	(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	280.3726	247.9490	263.2314	230.8079	223.3537	200.8262	197.7958	205.8306	208.3073	232.8195	248.2510	277.2107	(62)
WWHRS	-32.1191	-28.4064	-29.7456	-24.6305	-22.9547	-19.6425	-18.4117	-19.5790	-20.3229	-23.9585	-27.1421	-31.5243	(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	248.2535	219.5426	233.4859	206.1774	200.3990	181.1837	179.3841	186.2516	187.9843	208.8610	221.1090	245.6864	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2518.3184	(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	118.1648	104.9703	112.4654	100.8800	99.2061	90.9111	90.7081	93.3796	93.3986	102.3534	106.6799	117.1135	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	129.8877	143.8042	129.8877	134.2173	129.8877	134.2173	129.8877	129.8877	134.2173	129.8877	134.2173	129.8877	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	257.4384	260.1099	253.3780	239.0467	220.9559	203.9532	192.5944	189.9229	196.6548	210.9861	229.0769	246.0796	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	(71)

Full SAP Calculation Printout



Water heating gains (Table 5)	158.8237	156.2059	151.1632	140.1111	133.3415	126.2654	121.9194	125.5103	129.7202	137.5718	148.1665	157.4106 (72)
Total internal gains	613.3372	627.3073	601.6162	580.5624	551.3724	528.6233	508.5888	509.5082	524.7797	545.6330	578.6480	600.5652 (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				10.2500	10.6334		0.6300		0.7000		0.7700		33.3095 (74)
East				5.6100	19.6403		0.6300		0.7000		0.7700		33.6730 (76)
South				1.0800	46.7521		0.6300		0.7000		0.7700		15.4311 (78)
West				5.2400	19.6403		0.6300		0.7000		0.7700		31.4522 (80)

Solar gains	113.8657	216.3269	350.1669	516.1201	646.9683	670.9281	635.0503	534.1486	407.6954	254.2018	140.5860		94.6581 (83)
Total gains	727.2029	843.6341	951.7831	1096.6826	1198.3407	1199.5514	1143.6391	1043.6568	932.4750	799.8348	719.2340		695.2233 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil _m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	22.7363	22.7948	22.8524	23.1269	23.1790	23.4246	23.4246	23.4706	23.3294	23.1790	23.0738	22.9649
alpha	2.5158	2.5197	2.5235	2.5418	2.5453	2.5616	2.5616	2.5647	2.5553	2.5453	2.5383	2.5310
util living area	0.9514	0.9293	0.8917	0.8119	0.6940	0.5459	0.4233	0.4721	0.6745	0.8555	0.9305	0.9561 (86)
MIT	18.3074	18.6430	19.1663	19.8598	20.4212	20.7813	20.9174	20.8889	20.6040	19.8633	18.9808	18.2588 (87)
Th 2	19.9027	19.9051	19.9076	19.9191	19.9213	19.9313	19.9313	19.9332	19.9275	19.9213	19.9169	19.9123 (88)
util rest of house	0.9441	0.9190	0.8755	0.7836	0.6474	0.4758	0.3323	0.3790	0.6092	0.8271	0.9186	0.9495 (89)
MIT 2	16.7765	17.1995	17.8552	18.7105	19.3685	19.7624	19.8858	19.8677	19.5929	18.7372	17.6389	16.7206 (90)
Living area fraction	17.0761	17.4819	18.1117	18.9354	19.5745	19.9617	20.0876	20.0675	19.7907	18.9575	17.9015	17.0216 (92)
MIT	17.0761	17.4819	18.1117	18.9354	19.5745	19.9617	20.0876	20.0675	19.7907	18.9575	17.9015	17.0216 (93)
Temperature adjustment												0.0000
adjusted MIT	17.0761	17.4819	18.1117	18.9354	19.5745	19.9617	20.0876	20.0675	19.7907	18.9575	17.9015	17.0216 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9172	0.8877	0.8412	0.7530	0.6307	0.4779	0.3462	0.3914	0.5999	0.7953	0.8880	0.9241 (94)
Useful gains	666.9805	748.8722	800.6844	825.8060	755.7811	573.2908	395.9605	408.5200	559.4074	636.1313	638.7151	642.4451 (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	1571.6653	1543.8152	1421.1766	1213.6665	950.1898	640.1998	416.4271	437.0510	682.2564	1008.4819	1309.3219	1561.5637 (97)
Space heating kWh	673.0855	534.2017	461.6462	279.2596	144.6400	0.0000	0.0000	0.0000	0.0000	277.0288	482.8369	683.8243 (98a)
Space heating requirement - total per year (kWh/year)												3536.5231
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	673.0855	534.2017	461.6462	279.2596	144.6400	0.0000	0.0000	0.0000	0.0000	277.0288	482.8369	683.8243 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3536.5231
Space heating per m ²										(98c) / (4) =		35.1229 (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	673.0855	534.2017	461.6462	279.2596	144.6400	0.0000	0.0000	0.0000	0.0000	277.0288	482.8369	683.8243 (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)	729.2368	578.7668	500.1584	302.5564	156.7064	0.0000	0.0000	0.0000	0.0000	300.1396	523.1169	740.8714 (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	248.2535	219.5426	233.4859	206.1774	200.3990	181.1837	179.3841	186.2516	187.9843	208.8610	221.1090	245.6864 (64)
Efficiency of water heater (217)m	86.1810	85.9757	85.5589	84.7408	83.3409	79.8000	79.8000	79.8000	79.8000	84.6941	85.7619	79.8000 (216)
Fuel for water heating, kWh/month	288.0604	255.3542	272.8950	243.3036	240.4571	227.0472	224.7921	233.3980	235.5694	246.6065	257.8172	284.9216 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	26.9881	21.6509	19.4942	14.2823	11.0320	9.0133	10.0638	13.0813	16.9913	22.2935	25.1805	27.7382 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-46.8241	-65.3182	-92.9074	-103.3202	-110.4326	-102.6863	-101.3572	-96.1190	-86.7926	-74.0853	-51.2055	-40.5593 (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)

Full SAP Calculation Printout



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	-28.6259	-59.9536	-118.6949	-177.6229	-234.2693	-235.2130	-232.4999	-197.1784	-144.9164	-85.5895	-38.1659	-22.6619	-22.6619	(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													3831.5526	(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													3010.2222	(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)													217.8094	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-2546.9994	(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													4598.5849	(238)

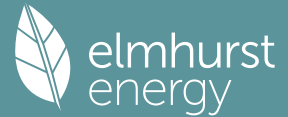
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	3831.5526	0.2100	804.6261 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3010.2222	0.2100	632.1467 (264)
Space and water heating			1436.7727 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	217.8094	0.1443	31.4366 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-971.6078	0.1348	-130.9958
PV Unit electricity exported	-1575.3915	0.1260	-198.4972
Total			-329.4930 (269)
Total CO2, kg/year			1150.6456 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.4300 (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	3831.5526	1.1300	4329.6545 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3010.2222	1.1300	3401.5511 (278)
Space and water heating			7731.2056 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	217.8094	1.5338	334.0833 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-971.6078	1.4983	-1455.7591
PV Unit electricity exported	-1575.3915	0.4625	-728.6282
Total			-2184.3872 (283)
Total Primary energy kWh/year			6011.0025 (286)
Target Primary Energy Rate (TPER)			59.7000 (287)

Full SAP Calculation Printout



Property Reference	OP-D320 P2TIGE				Issued on Date	29/11/2024				
Assessment Reference	P2TIGE		Prop Type Ref		P2TIGE					
Property	P2TIGE									
SAP Rating	80 C		DER		4.50		TER	11.43		
Environmental	96 A		% DER < TER					60.63		
CO ₂ Emissions (t/year)	0.42		DFEE		41.35		TFEE		42.48	
Compliance Check	See BREL		% DFEE < TFEE					2.66		
% DPER < TPER	20.49		DPER		47.47		TPER		59.70	
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	51.5300 (1b)	x 2.3100 (2b)	= 119.0343 (1b) - (3b)
First floor	49.1600 (1c)	x 2.6100 (2c)	= 128.3076 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	100.6900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 247.3419 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1617 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.5000 (17)
Infiltration rate	0.3367 (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) = 0.2862 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.3649	0.3578	0.3506	0.3148	0.3077	0.2719	0.2719	0.2647	0.2862	0.3077	0.3220	0.3363 (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	0.5666	0.5640	0.5615	0.5496	0.5473	0.5370	0.5370	0.5350	0.5410	0.5473	0.5518	0.5565 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Front Door			2.1400	1.0000	2.1400		(26)
Windows (Uw = 1.30)			22.1800	1.2357	27.4087		(27)
Ground Floor			51.5300	0.1100	5.6683		(28a)
External Wall	145.8400	24.3200	121.5200	0.1700	20.6584		(29a)
Roof - ceiling	49.1600		49.1600	0.1100	5.4076		(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618		(30)
Total net area of external elements Aum(A, m ²)			248.9100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	61.5448	(33)

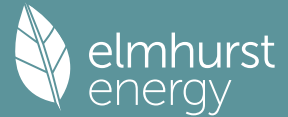
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K

100.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	12.1600	0.0500	0.6080
E3 Sill	13.8900	0.0500	0.6945
E4 Jamb	30.6000	0.0500	1.5300
E5 Ground floor (normal)	30.4800	0.1600	4.8768
E6 Intermediate floor within a dwelling	25.8900	0.0000	0.0000

Full SAP Calculation Printout



E10 Eaves (insulation at ceiling level)	17.9400	0.0600	1.0764										
E12 Gable (insulation at ceiling level)	10.9600	0.0600	0.6576										
E16 Corner (normal)	24.3000	0.0900	2.1870										
E24 Eaves (insulation at ceiling level - inverted)	3.0000	0.2400	0.7200										
E14 Flat roof	4.5800	0.0800	0.3664										
E17 Corner (inverted - internal area greater than external area)	4.6200	-0.0900	-0.4158										
Thermal bridges (Sum(L x Psi) calculated using Appendix K)												12.3009	(36)
Point Thermal bridges												0.0000	
Total fabric heat loss											(33) + (36) + (36a) =	73.8457	(37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 46.2461	Feb 46.0351	Mar 45.8282	Apr 44.8566	May 44.6748	Jun 43.8286	Jul 43.8286	Aug 43.6719	Sep 44.1546	Oct 44.6748	Nov 45.0426	Dec 45.4271	(38)
Heat transfer coeff	120.0919	119.8808	119.6740	118.7024	118.5206	117.6744	117.6744	117.5176	118.0003	118.5206	118.8883	119.2728	(39)
Average = Sum(39)m / 12 =												118.7015	
HLP	Jan 1.1927	Feb 1.1906	Mar 1.1885	Apr 1.1789	May 1.1771	Jun 1.1687	Jul 1.1687	Aug 1.1671	Sep 1.1719	Oct 1.1771	Nov 1.1807	Dec 1.1846	(40)
HLP (average)												1.1789	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.7458 (42)
Hot water usage for mixer showers												0.0000 (42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses	30.3365	29.8860	29.2516	28.0817	27.2058	26.2345	25.7099	26.3399	27.0258	28.0652	29.2591	30.2340 (42c)
Average daily hot water use (litres/day)	42.7500	41.1954	39.6409	38.0863	36.5318	34.9772	34.9772	36.5318	38.0863	39.6409	41.1954	42.7500 (43)
Daily hot water use	Jan 73.0865	Feb 71.0814	Mar 68.8924	Apr 66.1681	May 63.7376	Jun 61.2117	Jul 60.6871	Aug 62.8717	Sep 65.1122	Oct 67.7060	Nov 70.4545	Dec 72.9840 (44)
Energy content (annual)	115.7512	101.2190	105.8851	90.5808	85.8030	75.2670	73.3958	77.8482	80.2898	91.8764	100.3753	114.2752 (45)
Distribution loss	(46)m = 0.15 x (45)m											1112.5669
Water 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 (46)
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	98.3885	86.0362	90.0023	76.9937	72.9326	63.9769	62.3864	66.1710	68.2464	78.0950	85.3190	97.1339 (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	98.3885	86.0362	90.0023	76.9937	72.9326	63.9769	62.3864	66.1710	68.2464	78.0950	85.3190	97.1339 (64)
12Total per year (kWh/year)												945.6819 (64)
Electric shower(s)	56.2651	50.1327	54.7430	52.2405	53.2208	50.7675	52.4597	53.2208	52.2405	54.7430	53.7136	56.2651 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												640.0123 (64a)
Heat gains from water heating, kWh/month	38.6634	34.0422	36.1863	32.3085	31.5383	28.6861	28.7115	29.8480	30.1217	33.2095	34.7582	38.3498 (65)

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

Metabolic gains (Table 5), Watts	Jan 137.2911	Feb 137.2911	Mar 137.2911	Apr 137.2911	May 137.2911	Jun 137.2911	Jul 137.2911	Aug 137.2911	Sep 137.2911	Oct 137.2911	Nov 137.2911	Dec 137.2911 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	129.8877	143.8042	129.8877	134.2173	129.8877	134.2173	129.8877	129.8877	134.2173	129.8877	134.2173	129.8877 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	257.4384	260.1099	253.3780	239.0467	220.9559	203.9532	192.5944	189.9229	196.6548	210.9861	229.0769	246.0796 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291 (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)	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329 (71)
Water heating gains (Table 5)	51.9669	50.6580	48.6375	44.8730	42.3902	39.8418	38.5908	40.1182	41.8357	44.6364	48.2752	51.5454 (72)
Total internal gains	503.4804	518.7595	496.0906	482.3243	457.4212	442.1996	425.2602	424.1162	436.8951	449.6976	475.7567	491.7000 (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				10.2500	10.6334		0.6300		0.7000		0.7700	33.3095 (74)
East				5.6100	19.6403		0.6300		0.7000		0.7700	33.6730 (76)
South				1.0800	46.7521		0.6300		0.7000		0.7700	15.4311 (78)
West				5.2400	19.6403		0.6300		0.7000		0.7700	31.4522 (80)

Solar gains	113.8657	216.3269	350.1669	516.1201	646.9683	670.9281	635.0503	534.1486	407.6954	254.2018	140.5860	94.6581 (83)
Total gains	617.3461	735.0863	846.2574	998.4444	1104.3895	1113.1277	1060.3105	958.2648	844.5905	703.8994	616.3427	586.3580 (84)

7. Mean internal temperature (heating season)

Full SAP Calculation Printout



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	23.2900	23.3310	23.3714	23.5627	23.5988	23.7685	23.7685	23.8002	23.7029	23.5988	23.5258	23.4500
alpha	2.5527	2.5554	2.5581	2.5708	2.5733	2.5846	2.5846	2.5867	2.5802	2.5733	2.5684	2.5633
util living area	0.9653	0.9457	0.9115	0.8354	0.7194	0.5708	0.4459	0.5000	0.7074	0.8827	0.9487	0.9693 (86)
MIT	18.1868	18.5337	19.0736	19.7924	20.3826	20.7631	20.9095	20.8762	20.5643	19.7735	18.8602	18.1273 (87)
Th 2	19.9259	19.9275	19.9292	19.9369	19.9384	19.9451	19.9451	19.9464	19.9425	19.9384	19.9354	19.9324 (88)
util rest of house	0.9599	0.9375	0.8978	0.8095	0.6745	0.5005	0.3527	0.4049	0.6443	0.8583	0.9395	0.9646 (89)
MIT 2	17.3635	17.7060	18.2357	18.9305	19.4739	19.8006	19.9055	19.8884	19.6506	18.9299	18.0379	17.3090 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	17.5246	17.8679	18.3996	19.0991	19.6517	19.9889	20.1020	20.0817	19.8294	19.0949	18.1988	17.4691 (92)
Temperature adjustment	0.0000											
adjusted MIT	17.5246	17.8679	18.3996	19.0991	19.6517	19.9889	20.1020	20.0817	19.8294	19.0949	18.1988	17.4691 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9432	0.9164	0.8729	0.7853	0.6610	0.5036	0.3673	0.4179	0.6367	0.8340	0.9192	0.9491 (94)
Useful gains	582.2998	673.6468	738.6850	784.1057	729.9974	560.6127	389.4235	400.4630	537.7570	587.0679	566.5590	556.5306 (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	1588.1634	1554.6051	1424.0751	1210.6605	942.4407	634.1316	412.0907	432.6645	676.0679	1006.8236	1319.5174	1582.6406 (97)
Space heating kWh	748.3626	592.0039	509.9303	307.1194	158.0578	0.0000	0.0000	0.0000	0.0000	312.2983	542.1301	763.4258 (98a)
Space heating requirement - total per year (kWh/year)	3933.3282											
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	748.3626	592.0039	509.9303	307.1194	158.0578	0.0000	0.0000	0.0000	0.0000	312.2983	542.1301	763.4258 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	3933.3282											
Space heating per m2	(98c) / (4) = 39.0637 (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	1106.1389	870.7902	893.1341	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7633	0.8223	0.7837	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	844.2807	716.0244	699.9555	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1248.9531	1189.7288	1073.0139	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	291.3641	352.4361	277.5555	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	72.8410	88.1090	69.3889	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												230.3389 (107)
Energy for space heating												39.0637 (99)
Energy for space cooling												2.2876 (108)
Total												41.3513 (109)
Fabric Energy Efficiency (DFEE)												41.4 (109)

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

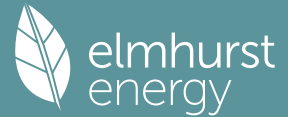
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	51.5300 (1b)	x 2.3100 (2b)	= 119.0343 (1b) - (3b)
First floor	49.1600 (1c)	x 2.6100 (2c)	= 128.3076 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	100.6900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 247.3419 (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)
Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.1617 (8)

Full SAP Calculation Printout



Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.4117 (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) =	0.3500 (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	0.4462	0.4375	0.4287	0.3850	0.3762	0.3325	0.3325	0.3237	0.3500	0.3762	0.3937	0.4112 (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	0.5995	0.5957	0.5919	0.5741	0.5708	0.5553	0.5553	0.5524	0.5612	0.5708	0.5775	0.5845 (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			2.1400	1.0000	2.1400		(26)
TER Opening Type (Uw = 1.20)			22.1800	1.1450	25.3969		(27)
Ground Floor			51.5300	0.1300	6.6989		(28a)
External Wall	145.8400	24.3200	121.5200	0.1800	21.8736		(29a)
Roof - ceiling	49.1600		49.1600	0.1100	5.4076		(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618		(30)
Total net area of external elements Aum (A, m2)			248.9100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	61.7788	(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)	12.1600	0.0500	0.6080
E3 Sill	13.8900	0.0500	0.6945
E4 Jamb	30.6000	0.0500	1.5300
E5 Ground floor (normal)	30.4800	0.1600	4.8768
E6 Intermediate floor within a dwelling	25.8900	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	17.9400	0.0600	1.0764
E12 Gable (insulation at ceiling level)	10.9600	0.0600	0.6576
E16 Corner (normal)	24.3000	0.0900	2.1870
E24 Eaves (insulation at ceiling level - inverted)	3.0000	0.2400	0.7200
E14 Flat roof	4.5800	0.0800	0.3664
E17 Corner (inverted - internal area greater than external area)	4.6200	-0.0900	-0.4158

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

12.3009 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 74.0797 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

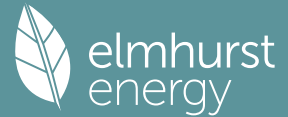
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	48.9368	48.6213	48.3120	46.8594	46.5876	45.3224	45.3224	45.0881	45.8097	46.5876	47.1374	47.7122 (38)
Heat transfer coeff	123.0165	122.7010	122.3917	120.9391	120.6673	119.4021	119.4021	119.1678	119.8895	120.6673	121.2171	121.7919 (39)
Average = Sum(39)m / 12 =												120.9378

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2217	1.2186	1.2155	1.2011	1.1984	1.1858	1.1858	1.1835	1.1907	1.1984	1.2039	1.2096 (40)
HLP (average)												1.2011
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.7458 (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	0.0000	(42a)
Hot water usage for baths													
30.3365	29.8860	29.2516	28.0817	27.2058	26.2345	25.7099	26.3399	27.0258	28.0652	29.2591	30.2340		(42b)
Hot water usage for other uses													
42.7500	41.1954	39.6409	38.0863	36.5318	34.9772	34.9772	36.5318	38.0863	39.6409	41.1954	42.7500		(42c)
Average daily hot water use (litres/day)													66.9904 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	73.0865	71.0814	68.8924	66.1681	63.7376	61.2117	60.6871	62.8717	65.1122	67.7060	70.4545	72.9840	(44)
Energy conte	115.7512	101.2190	105.8851	90.5808	85.8030	75.2670	73.3958	77.8482	80.2898	91.8764	100.3753	114.2752	(45)
Energy content (annual)										Total = Sum(45)m =		1112.5669	
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	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	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	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													
98.3885	86.0362	90.0023	76.9937	72.9326	63.9769	62.3864	66.1710	68.2464	78.0950	85.3190	97.1339		(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	98.3885	86.0362	90.0023	76.9937	72.9326	63.9769	62.3864	66.1710	68.2464	78.0950	85.3190	97.1339	(64)
12Total per year (kWh/year)													946 (64)
Electric shower(s)	56.2651	50.1327	54.7430	52.2405	53.2208	50.7675	52.4597	53.2208	52.2405	54.7430	53.7136	56.2651	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												640.0123	(64a)
Heat gains from water heating, kWh/month	38.6634	34.0422	36.1863	32.3085	31.5383	28.6861	28.7115	29.8480	30.1217	33.2095	34.7582	38.3498	(65)

Full SAP Calculation Printout



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	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	129.8877	143.8042	129.8877	134.2173	129.8877	134.2173	129.8877	129.8877	134.2173	129.8877	134.2173	129.8877	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	257.4384	260.1099	253.3780	239.0467	220.9559	203.9532	192.5944	189.9229	196.6548	210.9861	229.0769	246.0796	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	(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)	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	(71)
Water heating gains (Table 5)	51.9669	50.6580	48.6375	44.8730	42.3902	39.8418	38.5908	40.1182	41.8357	44.6364	48.2752	51.5454	(72)
Total internal gains	503.4804	518.7595	496.0906	482.3243	457.4212	442.1996	425.2602	424.1162	436.8951	449.6976	475.7567	491.7000	(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					10.2500	10.6334	0.6300	0.7000			0.7700	33.3095 (74)
East					5.6100	19.6403	0.6300	0.7000			0.7700	33.6730 (76)
South					1.0800	46.7521	0.6300	0.7000			0.7700	15.4311 (78)
West					5.2400	19.6403	0.6300	0.7000			0.7700	31.4522 (80)

Solar gains	113.8657	216.3269	350.1669	516.1201	646.9683	670.9281	635.0503	534.1486	407.6954	254.2018	140.5860	94.6581 (83)
Total gains	617.3461	735.0863	846.2574	998.4444	1104.3895	1113.1277	1060.3105	958.2648	844.5905	703.8994	616.3427	586.3580 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	22.7363	22.7948	22.8524	23.1269	23.1790	23.4246	23.4246	23.4706	23.3294	23.1790	23.0738	22.9649	
alpha	2.5158	2.5197	2.5235	2.5418	2.5453	2.5616	2.5616	2.5647	2.5553	2.5453	2.5383	2.5310	
util living area	0.9655	0.9463	0.9129	0.8379	0.7237	0.5753	0.4504	0.5044	0.7112	0.8843	0.9492	0.9695	(86)
MIT	18.1182	18.4682	19.0154	19.7528	20.3566	20.7523	20.9044	20.8702	20.5476	19.7402	18.8132	18.0679	(87)
Th 2	19.9027	19.9051	19.9076	19.9191	19.9213	19.9313	19.9313	19.9275	19.9275	19.9213	19.9169	19.9123	(88)
util rest of house	0.9602	0.9381	0.8992	0.8120	0.6785	0.5041	0.3555	0.4078	0.6478	0.8599	0.9400	0.9647	(89)
MIT 2	17.2811	17.6271	18.1648	18.8805	19.4377	19.7805	19.8897	19.8726	19.6248	18.8865	17.9799	17.2376	(90)
Living area fraction									fLA = Living area /	(4) =		0.1957	(91)
MIT	17.4448	17.7917	18.3312	19.0512	19.6175	19.9706	20.0883	20.0678	19.8053	19.0536	18.1430	17.4000	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4448	17.7917	18.3312	19.0512	19.6175	19.9706	20.0883	20.0678	19.8053	19.0536	18.1430	17.4000	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9432	0.9168	0.8738	0.7873	0.6642	0.5069	0.3702	0.4208	0.6396	0.8352	0.9195	0.9491	(94)
Useful gains	582.3055	673.9022	739.4972	786.0486	733.5460	564.2755	392.5579	403.2780	540.1776	587.9043	566.7095	556.5055	(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	1617.0330	1581.8233	1448.0466	1227.6733	955.3854	641.2603	416.5053	437.0846	684.0093	1020.0697	1338.5964	1607.6580	(97)
Space heating kWh	769.8373	610.1229	527.1607	317.9698	165.0485	0.0000	0.0000	0.0000	0.0000	321.5310	555.7586	782.0575	(98a)
Space heating requirement - total per year (kWh/year)												4049.4863	
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	769.8373	610.1229	527.1607	317.9698	165.0485	0.0000	0.0000	0.0000	0.0000	321.5310	555.7586	782.0575	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4049.4863	
Space heating per m2										(98c) / (4) =		40.2174	(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	1122.3800	883.5757	905.6755	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7565	0.8162	0.7774	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	849.0792	721.1791	704.0918	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1248.9531	1189.7288	1073.0139	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	287.9092	348.6010	274.4781	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	71.9773	87.1502	68.6195	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												227.7471	(107)
Energy for space heating												40.2174	(99)
Energy for space cooling												2.2619	(108)
Total												42.4792	(109)
Fabric Energy Efficiency (TFEE)												42.5	(109)

Full SAP Calculation Printout



Property Reference	OP-D320 P2TIGE				Issued on Date	29/11/2024
Assessment Reference	P2TIGE	Prop Type Ref	P2TIGE			
Property	P2TIGE					
SAP Rating	80 C	DER	4.50	TER	11.43	
Environmental	96 A	% DER < TER				60.63
CO ₂ Emissions (t/year)	0.42	DFEE	41.35	TFEE	42.48	
Compliance Check	See BREL	% DFEE < TFEE				2.66
% DPER < TPER	20.49	DPER	47.47	TPER	59.70	
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	51.5300 (1b)	x 2.3100 (2b)	= 119.0343 (1b) - (3b)
First floor	49.1600 (1c)	x 2.6100 (2c)	= 128.3076 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	100.6900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 247.3419 (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			2.1400	1.0000	2.1400		(26)
Windows (Uw = 1.30)			22.1800	1.2357	27.4087		(27)
Ground Floor			51.5300	0.1100	5.6683		(28a)
External Wall	145.8400	24.3200	121.5200	0.1700	20.6584		(29a)
Roof - ceiling	49.1600		49.1600	0.1100	5.4076		(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618		(30)
Total net area of external elements Aum(A, m ²)			248.9100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	61.5448		(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)				12.1600	0.0500	0.6080	
E3 Sill				13.8900	0.0500	0.6945	

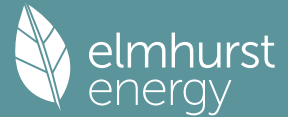
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	27.2340	26.9304	26.6269	25.1092	24.8057	23.2880	23.2880	22.9845	23.8951	24.8057	25.4128	26.0198 (38)
Heat transfer coeff												
	101.0797	100.7762	100.4726	98.9550	98.6514	97.1338	97.1338	96.8302	97.7408	98.6514	99.2585	99.8656 (39)
Average = Sum(39)m / 12 =												98.8791
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.0039	1.0009	0.9978	0.9828	0.9798	0.9647	0.9647	0.9617	0.9707	0.9798	0.9858	0.9918 (40)
HLP (average)												0.9820
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy												2.7458 (42)
Hot water usage for mixer showers	96.6050	95.1532	93.0377	88.9900	86.0029	82.6717	80.7783	82.8778	85.1793	88.7560	92.8906	96.2349 (42a)
Hot water usage for baths	31.9332	31.4590	30.7911	29.5597	28.6377	27.6153	27.0630	27.7262	28.4483	29.5423	30.7990	31.8253 (42b)
Hot water usage for other uses	45.0000	43.3636	41.7272	40.0909	38.4545	36.8182	36.8182	38.4545	40.0909	41.7272	43.3636	45.0000 (42c)
Average daily hot water use (litres/day)												159.5828 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	173.5382	169.9758	165.5560	158.6406	153.0951	147.1051	144.6594	149.0585	153.7184	160.0255	167.0532	173.0601 (44)
Energy content (annual)	274.8421	242.0433	254.4535	217.1710	206.0954	180.8829	174.9530	184.5656	189.5502	217.1530	237.9979	270.9703 (45)
Distribution loss (46)m = 0.15 x (45)m	41.2263	36.3065	38.1680	32.5757	30.9143	27.1324	26.2430	27.6848	28.4325	32.5730	35.6997	40.6455 (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	373.2237	330.9041	352.8351	312.3790	304.4770	245.5149	241.7394	251.3520	254.1822	315.5346	333.2059	369.3519 (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	373.2237	330.9041	352.8351	312.3790	304.4770	245.5149	241.7394	251.3520	254.1822	315.5346	333.2059	369.3519 (64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				3684.6998 (64)
Electric shower(s)												3685 (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)
Heat gains from water heating, kWh/month												
	135.2711	120.1184	128.4919	114.6798	112.4128	78.1532	76.7818	79.9780	81.0350	116.0895	121.6047	133.9837 (65)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	129.8877	143.8042	129.8877	134.2173	129.8877	134.2173	129.8877	129.8877	134.2173	129.8877	134.2173	129.8877	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	257.4384	260.1099	253.3780	239.0467	220.9559	203.9532	192.5944	189.9229	196.6548	210.9861	229.0769	246.0796	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	(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)	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	(71)
Water heating gains (Table 5)	181.8160	178.7477	172.7041	159.2775	151.0925	108.5461	103.2014	107.4973	112.5487	156.0342	168.8954	180.0856	(72)
Total internal gains	633.3294	646.8491	620.1571	596.7288	566.1235	510.9039	489.8707	491.4952	507.6081	561.0954	596.3769	620.2402	(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	10.2500	10.6334	0.6300	0.7000	0.7700	33.3095 (74)
East	5.6100	19.6403	0.6300	0.7000	0.7700	33.6730 (76)
South	1.0800	46.7521	0.6300	0.7000	0.7700	15.4311 (78)
West	5.2400	19.6403	0.6300	0.7000	0.7700	31.4522 (80)

Full SAP Calculation Printout



Solar gains	113.8657	216.3269	350.1669	516.1201	646.9683	670.9281	635.0503	534.1486	407.6954	254.2018	140.5860	94.6581 (83)
Total gains	747.1951	863.1759	970.3240	1112.8489	1213.0917	1181.8320	1124.9211	1025.6438	915.3034	815.2972	736.9629	714.8983 (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	27.6707	27.7540	27.8379	28.2648	28.3518	28.7948	28.7948	28.8850	28.6159	28.3518	28.1784	28.0071
alpha	2.8447	2.8503	2.8559	2.8843	2.8901	2.9197	2.9197	2.9257	2.9077	2.8901	2.8786	2.8671
util living area	0.9426	0.9151	0.8678	0.7691	0.6322	0.4845	0.3656	0.4120	0.6223	0.8212	0.9160	0.9484 (86)
Living	18.9015	19.2218	19.6855	20.2658	20.6761	20.8937	20.9652	20.9506	20.7737	20.2328	19.4869	18.8578
Non living	17.6263	18.0284	18.6056	19.3157	19.7883	20.0285	20.0924	20.0846	19.9130	19.2957	18.3755	17.5776
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	19.9265	19.2218	19.6855	20.2658	20.6761	20.8937	20.9652	20.9506	20.7737	20.2328	19.4869	19.1575 (87)
Th 2	20.0801	20.0826	20.0851	20.0977	20.1002	20.1129	20.1129	20.1154	20.1078	20.1002	20.0952	20.0902 (88)
util rest of house	0.9350	0.9042	0.8509	0.7410	0.5900	0.4274	0.2968	0.3400	0.5647	0.7922	0.9034	0.9415 (89)
MIT 2	19.1019	18.0284	18.6056	19.3157	19.7883	20.0285	20.0924	20.0846	19.9130	19.2957	18.3755	18.0304 (90)
Living area fraction	19.2632	18.2619	18.8169	19.5016	19.9620	20.1977	20.2632	20.2540	20.0814	19.4790	18.5929	18.2509 (92)
MIT	19.2632	18.2619	18.8169	19.5016	19.9620	20.1977	20.2632	20.2540	20.0814	19.4790	18.5929	18.2509 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2632	18.2619	18.8169	19.5016	19.9620	20.1977	20.2632	20.2540	20.0814	19.4790	18.5929	18.2509 (93)

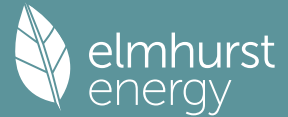
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9271	0.8767	0.8229	0.7203	0.5831	0.4330	0.3087	0.3516	0.5629	0.7690	0.8767	0.9234 (94)
Useful gains	692.7165	756.7279	798.4433	801.5378	707.4028	511.7768	347.2791	360.6203	515.2255	626.9241	646.1092	660.1422 (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	1512.4759	1346.5645	1237.5144	1049.0770	815.0606	543.7298	355.8173	373.1861	584.6255	875.9305	1140.7679	1403.2008 (97)
Space heating kWh	609.9010	396.3702	326.6689	178.2282	80.0974	0.0000	0.0000	0.0000	0.0000	185.2608	356.1543	552.8356 (98a)
Space heating requirement - total per year (kWh/year)												2685.5163
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	609.9010	396.3702	326.6689	178.2282	80.0974	0.0000	0.0000	0.0000	0.0000	185.2608	356.1543	552.8356 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2685.5163
Space heating per m2										(98c) / (4) =		26.6711 (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 %)												251.2476 (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	609.9010	396.3702	326.6689	178.2282	80.0974	0.0000	0.0000	0.0000	0.0000	185.2608	356.1543	552.8356 (98)
Space heating efficiency (main heating system 1)	251.2476	251.2476	251.2476	251.2476	251.2476	0.0000	0.0000	0.0000	0.0000	251.2476	251.2476	251.2476 (210)
Space heating fuel (main heating system)	242.7490	157.7608	130.0187	70.9373	31.8798	0.0000	0.0000	0.0000	0.0000	73.7363	141.7543	220.0362 (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	373.2237	330.9041	352.8351	312.3790	304.4770	245.5149	241.7394	251.3520	254.1822	315.5346	333.2059	369.3519 (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	138.5286	122.8209	130.9610	115.9450	113.0120	91.1272	89.7259	93.2937	94.3442	117.1163	123.6753	137.0915 (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	38.0330	34.3524	38.0330	36.8061	38.0330	36.8061	38.0330	38.0330	36.8061	38.0330	36.8061	38.0330 (231)
Lighting	26.9881	21.6509	19.4942	14.2823	11.0320	9.0133	10.0638	13.0813	16.9913	22.2935	25.1805	27.7382 (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												1068.8723 (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												1367.6415 (219)

Full SAP Calculation Printout



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)	447.8076 (230a)
Total electricity for the above, kWh/year	447.8076 (231)
Electricity for lighting (calculated in Appendix L)	217.8094 (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	3102.1308 (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	1068.8723	0.1556	166.3538	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1367.6415	0.1415	193.5687	(264)
Space and water heating			359.9224	(265)
Pumps, fans and electric keep-hot	447.8076	0.1387	62.1164	(267)
Energy for lighting	217.8094	0.1443	31.4366	(268)
Total CO2, kg/year			453.4755	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5000	(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	1068.8723	1.5761	1684.6961	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1367.6415	1.5234	2083.4483	(278)
Space and water heating			3768.1444	(279)
Pumps, fans and electric keep-hot	447.8076	1.5128	677.4433	(281)
Energy for lighting	217.8094	1.5338	334.0833	(282)
Total Primary energy kWh/year			4779.6710	(286)
Dwelling Primary energy Rate (DPER)			47.4700	(287)

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

1. Overall dwelling characteristics

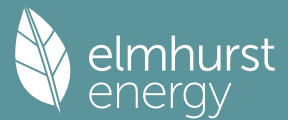
	Area (m2)	Storey height (m)	Volume (m3)	
Ground floor	51.5300 (1b)	x 2.3100 (2b)	= 119.0343 (1b) - (3b)	
First floor	49.1600 (1c)	x 2.6100 (2c)	= 128.3076 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	100.6900		(4)	
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e) ... (3n) =	247.3419 (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) =	0.1617 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.4117	(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) =	0.3500 (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	0.4462	0.4375	0.4287	0.3850	0.3762	0.3325	0.3325	0.3237	0.3500	0.3762	0.3937	0.4112 (22b)
Effective ac	0.5995	0.5957	0.5919	0.5741	0.5708	0.5553	0.5553	0.5524	0.5612	0.5708	0.5775	0.5845 (25)

Full SAP Calculation Printout



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			2.1400	1.0000	2.1400			(26)
TER Opening Type (Uw = 1.20)			22.1800	1.1450	25.3969			(27)
Ground Floor			51.5300	0.1300	6.6989			(28a)
External Wall	145.8400	24.3200	121.5200	0.1800	21.8736			(29a)
Roof - ceiling	49.1600		49.1600	0.1100	5.4076			(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618			(30)
Total net area of external elements Aum(A, m2)			248.9100					(31)
Fabric heat loss, W/K = Sum (A x U)								(33)
				(26)...(30) + (32) =		61.7788		

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

100.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element	12.1600	0.0500	0.6080	
E2 Other lintels (including other steel lintels)	13.8900	0.0500	0.6945	
E3 Sill	30.6000	0.0500	1.5300	
E4 Jamb	30.4800	0.1600	4.8768	
E5 Ground floor (normal)	25.8900	0.0000	0.0000	
E6 Intermediate floor within a dwelling	17.9400	0.0600	1.0764	
E10 Eaves (insulation at ceiling level)	10.9600	0.0600	0.6576	
E12 Gable (insulation at ceiling level)	24.3000	0.0900	2.1870	
E16 Corner (normal)	3.0000	0.2400	0.7200	
E24 Eaves (insulation at ceiling level - inverted)	4.5800	0.0800	0.3664	
E14 Flat roof	4.6200	-0.0900	-0.4158	
E17 Corner (inverted - internal area greater than external area)				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				12.3009 (36)
Point Thermal Bridges				0.0000
Total fabric heat loss				(33) + (36) + (36a) = 74.0797 (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	48.9368	48.6213	48.3120	46.8594	46.5876	45.3224	45.3224	45.0881	45.8097	46.5876	47.1374	47.7122	(38)
Heat transfer coeff	123.0165	122.7010	122.3917	120.9391	120.6673	119.4021	119.4021	119.1678	119.8895	120.6673	121.2171	121.7919	(39)
Average = Sum(39)m / 12 =												120.9378	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2217	1.2186	1.2155	1.2011	1.1984	1.1858	1.1858	1.1835	1.1907	1.1984	1.2039	1.2096	(40)
HLP (average)												1.2011	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

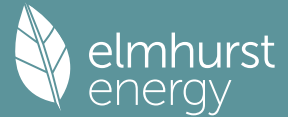
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.7458 (42)
Hot water usage for mixer showers	70.2582	69.2024	67.6638	64.7200	62.5476	60.1249	58.7478	60.2748	61.9486	64.5498	67.5568	69.9890	(42a)
Hot water usage for baths	30.3365	29.8860	29.2516	28.0817	27.2058	26.2345	25.7099	26.3399	27.0258	28.0652	29.2591	30.2340	(42b)
Hot water usage for other uses	42.7500	41.1954	39.6409	38.0863	36.5318	34.9772	34.9772	36.5318	38.0863	39.6409	41.1954	42.7500	(42c)
Average daily hot water use (litres/day)													131.7661 (43)
Daily hot water use	143.3447	140.2838	136.5562	130.8881	126.2851	121.3366	119.4349	123.1464	127.0607	132.2558	138.0113	142.9730	(44)
Energy conte	227.0230	199.7622	209.8818	179.1792	170.0041	149.1975	144.4462	152.4810	156.6786	179.4699	196.6224	223.8611	(45)
Energy content (annual)										Total = Sum(45)m =		2188.6070	
Distribution loss (46)m = 0.15 x (45)m	34.0534	29.9643	31.4823	26.8769	25.5006	22.3796	21.6669	22.8721	23.5018	26.9205	29.4934	33.5792	(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	280.3726	247.9490	263.2314	230.8079	223.3537	200.8262	197.7958	205.8306	208.3073	232.8195	248.2510	277.2107	(62)
WWHRS	-32.1191	-28.4064	-29.7456	-24.6305	-22.9547	-19.6425	-18.4117	-19.5790	-20.3229	-23.9585	-27.1421	-31.5243	(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	248.2535	219.5426	233.4859	206.1774	200.3990	181.1837	179.3841	186.2516	187.9843	208.8610	221.1090	245.6864	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2518.3184	(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	118.1648	104.9703	112.4654	100.8800	99.2061	90.9111	90.7081	93.3796	93.3986	102.3534	106.6799	117.1135	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	137.2911	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	129.8877	143.8042	129.8877	134.2173	129.8877	134.2173	129.8877	129.8877	134.2173	129.8877	134.2173	129.8877	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	257.4384	260.1099	253.3780	239.0467	220.9559	203.9532	192.5944	189.9229	196.6548	210.9861	229.0769	246.0796	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	36.7291	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	-109.8329	(71)

Full SAP Calculation Printout



Water heating gains (Table 5)	158.8237	156.2059	151.1632	140.1111	133.3415	126.2654	121.9194	125.5103	129.7202	137.5718	148.1665	157.4106 (72)
Total internal gains	613.3372	627.3073	601.6162	580.5624	551.3724	528.6233	508.5888	509.5082	524.7797	545.6330	578.6480	600.5652 (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				10.2500	10.6334	0.6300	0.7000			0.7700		33.3095 (74)
East				5.6100	19.6403	0.6300	0.7000			0.7700		33.6730 (76)
South				1.0800	46.7521	0.6300	0.7000			0.7700		15.4311 (78)
West				5.2400	19.6403	0.6300	0.7000			0.7700		31.4522 (80)
Solar gains	113.8657	216.3269	350.1669	516.1201	646.9683	670.9281	635.0503	534.1486	407.6954	254.2018	140.5860	94.6581 (83)
Total gains	727.2029	843.6341	951.7831	1096.6826	1198.3407	1199.5514	1143.6391	1043.6568	932.4750	799.8348	719.2340	695.2233 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil _m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	22.7363	22.7948	22.8524	23.1269	23.1790	23.4246	23.4246	23.4706	23.3294	23.1790	23.0738	22.9649
alpha	2.5158	2.5197	2.5235	2.5418	2.5453	2.5616	2.5616	2.5647	2.5553	2.5453	2.5383	2.5310
util living area	0.9514	0.9293	0.8917	0.8119	0.6940	0.5459	0.4233	0.4721	0.6745	0.8555	0.9305	0.9561 (86)
MIT	18.3074	18.6430	19.1663	19.8598	20.4212	20.7813	20.9174	20.8889	20.6040	19.8633	18.9808	18.2588 (87)
Th 2	19.9027	19.9051	19.9076	19.9191	19.9213	19.9313	19.9313	19.9332	19.9275	19.9213	19.9169	19.9123 (88)
util rest of house	0.9441	0.9190	0.8755	0.7836	0.6474	0.4758	0.3323	0.3790	0.6092	0.8271	0.9186	0.9495 (89)
MIT 2	16.7765	17.1995	17.8552	18.7105	19.3685	19.7624	19.8858	19.8677	19.5929	18.7372	17.6389	16.7206 (90)
Living area fraction	17.0761	17.4819	18.1117	18.9354	19.5745	19.9617	20.0876	20.0675	19.7907	18.9575	17.9015	17.0216 (92)
MIT	17.0761	17.4819	18.1117	18.9354	19.5745	19.9617	20.0876	20.0675	19.7907	18.9575	17.9015	17.0216 (93)
Temperature adjustment												0.0000
adjusted MIT	17.0761	17.4819	18.1117	18.9354	19.5745	19.9617	20.0876	20.0675	19.7907	18.9575	17.9015	17.0216 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9172	0.8877	0.8412	0.7530	0.6307	0.4779	0.3462	0.3914	0.5999	0.7953	0.8880	0.9241 (94)
Useful gains	666.9805	748.8722	800.6844	825.8060	755.7811	573.2908	395.9605	408.5200	559.4074	636.1313	638.7151	642.4451 (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	1571.6653	1543.8152	1421.1766	1213.6665	950.1898	640.1998	416.4271	437.0510	682.2564	1008.4819	1309.3219	1561.5637 (97)
Space heating kWh	673.0855	534.2017	461.6462	279.2596	144.6400	0.0000	0.0000	0.0000	0.0000	277.0288	482.8369	683.8243 (98a)
Space heating requirement - total per year (kWh/year)												3536.5231
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	673.0855	534.2017	461.6462	279.2596	144.6400	0.0000	0.0000	0.0000	0.0000	277.0288	482.8369	683.8243 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3536.5231
Space heating per m ²										(98c) / (4) =		35.1229 (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	673.0855	534.2017	461.6462	279.2596	144.6400	0.0000	0.0000	0.0000	0.0000	277.0288	482.8369	683.8243 (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)	729.2368	578.7668	500.1584	302.5564	156.7064	0.0000	0.0000	0.0000	0.0000	300.1396	523.1169	740.8714 (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	248.2535	219.5426	233.4859	206.1774	200.3990	181.1837	179.3841	186.2516	187.9843	208.8610	221.1090	245.6864 (64)
Efficiency of water heater (217)m	86.1810	85.9757	85.5589	84.7408	83.3409	79.8000	79.8000	79.8000	79.8000	84.6941	85.7619	79.8000 (216)
Fuel for water heating, kWh/month	288.0604	255.3542	272.8950	243.3036	240.4571	227.0472	224.7921	233.3980	235.5694	246.6065	257.8172	284.9216 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	26.9881	21.6509	19.4942	14.2823	11.0320	9.0133	10.0638	13.0813	16.9913	22.2935	25.1805	27.7382 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-46.8241	-65.3182	-92.9074	-103.3202	-110.4326	-102.6863	-101.3572	-96.1190	-86.7926	-74.0853	-51.2055	-40.5593 (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)

Full SAP Calculation Printout



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	-28.6259	-59.9536	-118.6949	-177.6229	-234.2693	-235.2130	-232.4999	-197.1784	-144.9164	-85.5895	-38.1659	-22.6619	(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												3831.5526	(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												3010.2222	(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)												217.8094	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-2546.9994	(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												4598.5849	(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	3831.5526	0.2100	804.6261 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3010.2222	0.2100	632.1467 (264)
Space and water heating			1436.7727 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	217.8094	0.1443	31.4366 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-971.6078	0.1348	-130.9958
PV Unit electricity exported	-1575.3915	0.1260	-198.4972
Total			-329.4930 (269)
Total CO2, kg/year			1150.6456 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.4300 (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	3831.5526	1.1300	4329.6545 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3010.2222	1.1300	3401.5511 (278)
Space and water heating			7731.2056 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	217.8094	1.5338	334.0833 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-971.6078	1.4983	-1455.7591
PV Unit electricity exported	-1575.3915	0.4625	-728.6282
Total			-2184.3872 (283)
Total Primary energy kWh/year			6011.0025 (286)
Target Primary Energy Rate (TPER)			59.7000 (287)