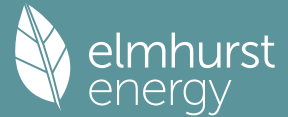


Full SAP Calculation Printout



Property Reference	OP-D320 P3ADMI				Issued on Date	29/11/2024		
Assessment Reference	P3ADMI		Prop Type Ref		P3ADMI			
Property	P3ADMI							
SAP Rating		80 C	DER		4.17	TER		9.79
Environmental		96 A	% DER < TER					57.41
CO ₂ Emissions (t/year)		0.5	DFEE		39.32	TFEE		40.38
Compliance Check		See BREL	% DFEE < TFEE					2.63
% DPER < TPER		14.16	DPER		43.91	TPER		51.16
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	66.6300 (1b)	x 2.3100 (2b)	= 153.9153 (1b) - (3b)
First floor	64.2500 (1c)	x 2.6100 (2c)	= 167.6925 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	130.8800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 321.6078 (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) =												69.6000 (23c)
Effective ac	0.3417	0.3379	0.3342	0.3156	0.3119	0.2933	0.2933	0.2896	0.3007	0.3119	0.3193	0.3268 (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)			26.1400	1.2357	32.3023		(27)
Ground Floor			66.6300	0.1100	7.3293		(28a)
External Wall	164.4400	28.2800	136.1600	0.1700	23.1472		(29a)
Roof - ceiling	64.2500		64.2500	0.1100	7.0675		(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618		(30)
Total net area of external elements Aum(A, m ²)			297.7000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		72.2481		(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)				15.2000	0.0500	0.7600	
E3 Sill				16.8200	0.0500	0.8410	

Full SAP Calculation Printout



E4 Jamb	33.6000	0.0500	1.6800
E5 Ground floor (normal)	34.2600	0.1600	5.4816
E6 Intermediate floor within a dwelling	32.6800	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	19.5000	0.0600	1.1700
E12 Gable (insulation at ceiling level)	13.1800	0.0600	0.7908
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)
 Point Thermal Bridges (36a) = 13.5810 (36)
 Total fabric heat loss (33) + (36) + (36a) = 85.8291 (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	36.2602	35.8655	35.4708	33.4975	33.1028	31.1294	31.1294	30.7348	31.9188	33.1028	33.8921	34.6815	(38)
Heat transfer coeff	122.0893	121.6946	121.2999	119.3265	118.9319	116.9585	116.9585	116.5638	117.7479	118.9319	119.7212	120.5106	(39)
Average = Sum(39)m / 12 =												119.2279	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.9328	0.9298	0.9268	0.9117	0.9087	0.8936	0.8936	0.8906	0.8997	0.9087	0.9147	0.9208	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.8972 (42)
Hot water usage for mixer showers													
Hot water usage for baths	100.0958	98.5916	96.3996	92.2056	89.1106	85.6590	83.6972	85.8725	88.2572	91.9631	96.2471	99.7123	(42a)
Hot water usage for other uses	33.0824	32.5911	31.8992	30.6235	29.6683	28.6091	28.0369	28.7240	29.4720	30.6054	31.9074	32.9706	(42b)
Average daily hot water use (litres/day)	46.6322	44.9365	43.2408	41.5450	39.8493	38.1536	38.1536	39.8493	41.5450	43.2408	44.9365	46.6322	(42c)
												165.3505	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	179.8104	176.1191	171.5395	164.3742	158.6282	152.4217	149.8877	154.4459	159.2743	165.8093	173.0910	179.3151	(44)
Energy content (annual)	284.7757	250.7913	263.6499	225.0200	213.5440	187.4203	181.2762	191.2362	196.4011	225.0016	246.5999	280.7640	(45)
Distribution loss (46)m = 0.15 x (45)m													
Water storage loss:	42.7164	37.6187	39.5475	33.7530	32.0316	28.1130	27.1914	28.6854	29.4602	33.7502	36.9900	42.1146	(46)
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													
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	(56)
Primary 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	(57)
Combi 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)
Total heat required for water heating calculated for each month	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)
WWHRS	383.1573	339.6521	362.0315	320.2280	311.9256	252.0523	248.0626	258.0226	261.0331	323.3832	341.8079	379.1456	(62)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
Output from w/h	383.1573	339.6521	362.0315	320.2280	311.9256	252.0523	248.0626	258.0226	261.0331	323.3832	341.8079	379.1456	(64)
12Total per year (kWh/year)													3780.5019 (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)
Heat gains from water heating, kWh/month	138.5740	123.0271	131.5497	117.2896	114.8895	80.3268	78.8843	82.1960	83.3130	118.6991	124.4649	137.2401	(65)

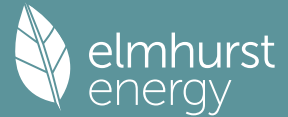
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	151.7826	168.0451	151.7826	156.8421	151.7826	156.8421	151.7826	151.7826	156.8421	151.7826	156.8421	151.7826	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	298.7780	301.8784	294.0656	277.4329	256.4372	236.7041	223.5213	220.4209	228.2337	244.8664	265.8621	285.5952	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	(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)	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	(71)
Water heating gains (Table 5)	186.2554	183.0761	176.8141	162.9022	154.4213	111.5651	106.0272	110.4785	115.7125	159.5418	172.8679	184.4625	(72)
Total internal gains	703.2746	719.4581	689.1208	663.6357	629.0997	571.5698	547.7896	549.1405	567.2468	622.6494	662.0306	688.2989	(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	7.5200	19.6403	0.6300	0.7000	0.7700	45.1374 (76)
South	1.0800	46.7521	0.6300	0.7000	0.7700	15.4311 (78)
West	7.2900	19.6403	0.6300	0.7000	0.7700	43.7569 (80)

Full SAP Calculation Printout



Solar gains	137.6349	262.8244	426.7418	627.8000	783.8362	811.0367	768.4395	648.7279	496.7551	309.3751	170.2234	114.2047 (83)
Total gains	840.9095	982.2826	1115.8626	1291.4357	1412.9359	1382.6065	1316.2291	1197.8684	1064.0019	932.0245	832.2540	802.5035 (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	29.7779	29.8744	29.9716	30.4673	30.5684	31.0841	31.0841	31.1894	30.8758	30.5684	30.3668	30.1679	
alpha	2.9852	2.9916	2.9981	3.0312	3.0379	3.0723	3.0723	3.0793	3.0584	3.0379	3.0245	3.0112	
util living area	0.9570	0.9325	0.8885	0.7922	0.6541	0.5003	0.3774	0.4260	0.6447	0.8468	0.9345	0.9619 (86)	
Living	18.9206	19.2402	19.7041	20.2853	20.6909	20.9029	20.9694	20.9557	20.7841	20.2389	19.4964	18.8798	
Non living	17.6880	18.0914	18.6717	19.3874	19.8581	20.0942	20.1543	20.1470	19.9781	19.3498	18.4277	17.6428	
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	19.9363	19.2402	19.7041	20.2853	20.6909	20.9029	20.9694	20.9557	20.7841	20.2389	19.4964	19.1764 (87)	
Th 2	20.1397	20.1422	20.1448	20.1575	20.1601	20.1729	20.1729	20.1755	20.1678	20.1601	20.1550	20.1499 (88)	
util rest of house	0.9512	0.9237	0.8740	0.7665	0.6142	0.4455	0.3110	0.3566	0.5901	0.8214	0.9245	0.9567 (89)	
MIT 2	19.1623	18.0914	18.6717	19.3874	19.8581	20.0942	20.1543	20.1470	19.9781	19.3498	18.4277	18.0946 (90)	
Living area fraction	19.3184	18.3231	18.8800	19.5685	20.0261	20.2573	20.3187	20.3101	fLA = Living area / (4) =				0.2017 (91)
MIT	19.3184	18.3231	18.8800	19.5685	20.0261	20.2573	20.3187	20.3101	20.1407	19.5291	18.6432	18.3128 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.3184	18.3231	18.8800	19.5685	20.0261	20.2573	20.3187	20.3101	20.1407	19.5291	18.6432	18.3128 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9447	0.8998	0.8482	0.7465	0.6074	0.4513	0.3230	0.3682	0.5882	0.7991	0.9014	0.9421 (94)
Useful gains	794.4047	883.8423	946.5053	964.0728	858.1993	623.9433	425.1291	441.0858	625.8017	744.7524	750.1781	756.0666 (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	1833.5856	1633.5181	1501.6883	1273.0410	990.2407	661.6744	434.9363	455.7774	711.2792	1061.9579	1381.9718	1700.7433 (97)
Space heating kWh	773.1506	503.7821	413.0561	222.4571	98.2388	0.0000	0.0000	0.0000	0.0000	236.0009	454.8915	702.8395 (98a)
Space heating requirement - total per year (kWh/year)												3404.4166
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	773.1506	503.7821	413.0561	222.4571	98.2388	0.0000	0.0000	0.0000	0.0000	236.0009	454.8915	702.8395 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3404.4166
Space heating per m2										(98c) / (4) =		26.0117 (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 %)												247.9797 (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	773.1506	503.7821	413.0561	222.4571	98.2388	0.0000	0.0000	0.0000	0.0000	236.0009	454.8915	702.8395 (98)
Space heating efficiency (main heating system 1)	247.9797	247.9797	247.9797	247.9797	247.9797	0.0000	0.0000	0.0000	0.0000	247.9797	247.9797	247.9797 (210)
Space heating fuel (main heating system)	311.7797	203.1545	166.5685	89.7078	39.6157	0.0000	0.0000	0.0000	0.0000	95.1694	183.4390	283.4262 (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	383.1573	339.6521	362.0315	320.2280	311.9256	252.0523	248.0626	258.0226	261.0331	323.3832	341.8079	379.1456 (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	142.2156	126.0679	134.3744	118.8583	115.7767	93.5537	92.0728	95.7697	96.8871	120.0294	126.8681	140.7266 (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	59.2498	53.5160	59.2498	57.3385	59.2498	57.3385	59.2498	59.2498	57.3385	59.2498	57.3385	59.2498 (231)
Lighting	31.5374	25.3005	22.7803	16.6898	12.8917	10.5326	11.7602	15.2864	19.8555	26.0515	29.4251	32.4140 (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												1372.8608 (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												1403.2002 (219)

Full SAP Calculation Printout



Space cooling fuel	0.0000 (221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 1.7780)	
mechanical ventilation fans (SFP = 1.7780)	697.6188 (230a)
Total electricity for the above, kWh/year	697.6188 (231)
Electricity for lighting (calculated in Appendix L)	254.5252 (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	3728.2049 (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	1372.8608	0.1557	213.7081 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1403.2002	0.1415	198.6030 (264)
Space and water heating			412.3111 (265)
Pumps, fans and electric keep-hot	697.6188	0.1387	96.7683 (267)
Energy for lighting	254.5252	0.1443	36.7358 (268)
Total CO2, kg/year			545.8153 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.1700 (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	1372.8608	1.5763	2163.9855 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1403.2002	1.5234	2137.6233 (278)
Space and water heating			4301.6087 (279)
Pumps, fans and electric keep-hot	697.6188	1.5128	1055.3577 (281)
Energy for lighting	254.5252	1.5338	390.3992 (282)
Total Primary energy kWh/year			5747.3656 (286)
Dwelling Primary energy Rate (DPER)			43.9100 (287)

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

1. Overall dwelling characteristics

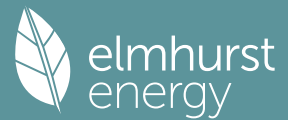
	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	66.6300 (1b)	x 2.3100 (2b)	= 153.9153 (1b) - (3b)
First floor	64.2500 (1c)	x 2.6100 (2c)	= 167.6925 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	130.8800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	321.6078 (5)

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) = 0.1244 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3744 (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) = 0.3182 (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	0.4057	0.3978	0.3898	0.3500	0.3421	0.3023	0.3023	0.2944	0.3182	0.3421	0.3580	0.3739 (22b)
Effective ac	0.5823	0.5791	0.5760	0.5613	0.5585	0.5457	0.5457	0.5433	0.5506	0.5585	0.5641	0.5699 (25)

Full SAP Calculation Printout



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	
TER Opaque door			2.1400	1.0000	2.1400			(26)
TER Opening Type (Uw = 1.20)			26.1400	1.1450	29.9313			(27)
Ground Floor			66.6300	0.1300	8.6619			(28a)
External Wall	164.4400	28.2800	136.1600	0.1800	24.5088			(29a)
Roof - ceiling	64.2500		64.2500	0.1100	7.0675			(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618			(30)
Total net area of external elements Aum(A, m ²)			297.7000					(31)
Fabric heat loss, W/K = Sum (A x U)								(33)
(26)...(30) + (32) =					72.5713			

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

100.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element	15.2000	0.0500	0.7600	
E2 Other lintels (including other steel lintels)	16.8200	0.0500	0.8410	
E3 Sill	33.6000	0.0500	1.6800	
E4 Jamb	34.2600	0.1600	5.4816	
E5 Ground floor (normal)	32.6800	0.0000	0.0000	
E6 Intermediate floor within a dwelling	19.5000	0.0600	1.1700	
E10 Eaves (insulation at ceiling level)	13.1800	0.0600	0.7908	
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)				13.5810 (36)
Point Thermal Bridges				0.0000
Total fabric heat loss				(33) + (36) + (36a) = 86.1523 (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	61.8007	61.4615	61.1290	59.5673	59.2751	57.9149	57.9149	57.6630	58.4388	59.2751	59.8662	60.4842	(38)
Heat transfer coeff	147.9530	147.6138	147.2813	145.7196	145.4274	144.0672	144.0672	143.8153	144.5911	145.4274	146.0185	146.6365	(39)
Average = Sum(39)m / 12 =												145.7182	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1304	1.1279	1.1253	1.1134	1.1112	1.1008	1.1008	1.0988	1.1048	1.1112	1.1157	1.1204	(40)
HLP (average)												1.1134	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

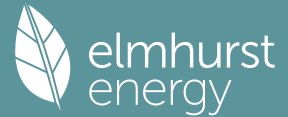
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.8972 (42)
Hot water usage for mixer showers	72.7969	71.7029	70.1088	67.0586	64.8077	62.2975	60.8707	62.4528	64.1870	66.8823	69.9979	72.5180	(42a)
Hot water usage for baths	31.4283	30.9615	30.3042	29.0923	28.1849	27.1786	26.6351	27.2878	27.9984	29.0752	30.3120	31.3220	(42b)
Hot water usage for other uses	44.3006	42.6897	41.0787	39.4678	37.8569	36.2459	36.2459	37.8569	39.4678	41.0787	42.6897	44.3006	(42c)
Average daily hot water use (litres/day)													136.5286 (43)
Daily hot water use	148.5258	145.3541	141.4917	135.6188	130.8494	125.7220	123.7517	127.5974	131.6533	137.0361	142.9996	148.1407	(44)
Energy conte	235.2286	206.9824	217.4676	185.6553	176.1485	154.5899	149.6669	157.9922	162.3417	185.9567	203.7292	231.9525	(45)
Energy content (annual)										Total = Sum(45)m =		2267.7113	
Distribution loss (46)m = 0.15 x (45)m	35.2843	31.0474	32.6201	27.8483	26.4223	23.1885	22.4500	23.6988	24.3512	27.8935	30.5594	34.7929	(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	288.5782	255.1691	270.8172	237.2840	229.4981	206.2186	203.0166	211.3419	213.9703	239.3064	255.3578	285.3021	(62)
WWHRS	-33.2797	-29.4329	-30.8204	-25.5205	-23.7842	-20.3523	-19.0770	-20.2865	-21.0573	-24.8242	-28.1228	-32.6634	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	255.2985	225.7362	239.9968	211.7635	205.7139	185.8663	183.9395	191.0553	192.9130	214.4822	227.2350	252.6387	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2586.6388	(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	120.8932	107.3710	114.9877	103.0333	101.2491	92.7041	92.4440	95.2121	95.2815	104.5103	109.0429	119.8039	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	151.7826	168.0451	151.7826	156.8421	151.7826	156.8421	151.7826	151.7826	156.8421	151.7826	156.8421	151.7826	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	298.7780	301.8784	294.0656	277.4329	256.4372	236.7041	223.5213	220.4209	228.2337	244.8664	265.8621	285.5952	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	(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)	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	(71)

Full SAP Calculation Printout



Water heating gains (Table 5)	162.4909	159.7783	154.5533	143.1018	136.0874	128.7557	124.2526	127.9733	132.3355	140.4709	151.4484	161.0267 (72)
Total internal gains	682.5101	699.1603	669.8600	646.8353	613.7658	588.7604	566.0151	566.6353	583.8698	606.5784	643.6112	667.8631 (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					7.5200	19.6403	0.6300	0.7000	0.7700		45.1374 (76)	
South					1.0800	46.7521	0.6300	0.7000	0.7700		15.4311 (78)	
West					7.2900	19.6403	0.6300	0.7000	0.7700		43.7569 (80)	
Solar gains	137.6349	262.8244	426.7418	627.8000	783.8362	811.0367	768.4395	648.7279	496.7551	309.3751	170.2234	114.2047 (83)
Total gains	820.1450	961.9848	1096.6018	1274.6353	1397.6020	1399.7971	1334.4545	1215.3632	1080.6249	915.9535	813.8346	782.0677 (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	24.5724	24.6288	24.6844	24.9490	24.9991	25.2351	25.2351	25.2793	25.1437	24.9991	24.8979	24.7930
alpha	2.6382	2.6419	2.6456	2.6633	2.6666	2.6823	2.6823	2.6853	2.6762	2.6666	2.6599	2.6529
util living area	0.9629	0.9433	0.9085	0.8321	0.7152	0.5652	0.4388	0.4901	0.6983	0.8769	0.9454	0.9670 (86)
MIT	18.3629	18.6933	19.2096	19.8912	20.4427	20.7927	20.9234	20.8955	20.6152	19.8798	19.0127	18.3124 (87)
Th 2	19.9760	19.9781	19.9802	19.9899	19.9917	20.0002	20.0002	20.0018	19.9969	19.9917	19.9881	19.9842 (88)
util rest of house	0.9574	0.9350	0.8948	0.8067	0.6717	0.4981	0.3509	0.4003	0.6372	0.8524	0.9360	0.9621 (89)
MIT 2	16.8880	17.3061	17.9554	18.7996	19.4504	19.8359	19.9562	19.9378	19.6637	18.8061	17.7215	16.8286 (90)
Living area fraction	17.1855	17.5859	18.2083	19.0198	19.6506	20.0289	20.1513	20.1310	19.8556	19.0226	17.9820	17.1279 (92)
MIT	17.1855	17.5859	18.2083	19.0198	19.6506	20.0289	20.1513	20.1310	19.8556	19.0226	17.9820	17.1279 (93)
Temperature adjustment	17.1855	17.5859	18.2083	19.0198	19.6506	20.0289	20.1513	20.1310	19.8556	19.0226	17.9820	17.1279 (93)
adjusted MIT	17.1855	17.5859	18.2083	19.0198	19.6506	20.0289	20.1513	20.1310	19.8556	19.0226	17.9820	17.1279 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9354	0.9082	0.8640	0.7776	0.6553	0.5001	0.3648	0.4126	0.6276	0.8227	0.9099	0.9416 (94)
Useful gains	767.1982	873.6758	947.4217	991.1968	915.8294	700.0748	486.7934	501.4896	678.1472	753.5907	740.5284	736.4037 (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	1906.4421	1872.6100	1724.4204	1474.6490	1156.2317	782.1222	511.6297	536.5685	832.2134	1224.8838	1588.9716	1895.7027 (97)
Space heating kWh	847.5974	671.2837	578.0870	348.0856	178.8594	0.0000	0.0000	0.0000	0.0000	350.6421	610.8791	862.5185 (98a)
Space heating requirement - total per year (kWh/year)	847.5974	671.2837	578.0870	348.0856	178.8594	0.0000	0.0000	0.0000	0.0000	350.6421	610.8791	862.5185 (98a)
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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Space heating kWh	847.5974	671.2837	578.0870	348.0856	178.8594	0.0000	0.0000	0.0000	0.0000	350.6421	610.8791	862.5185 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	847.5974	671.2837	578.0870	348.0856	178.8594	0.0000	0.0000	0.0000	0.0000	350.6421	610.8791	862.5185 (98c)
Space heating per m 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 (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	847.5974	671.2837	578.0870	348.0856	178.8594	0.0000	0.0000	0.0000	0.0000	350.6421	610.8791	862.5185 (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)	918.3071	727.2847	626.3131	377.1242	193.7804	0.0000	0.0000	0.0000	0.0000	379.8939	661.8409	934.4729 (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	255.2985	225.7362	239.9968	211.7635	205.7139	185.8663	183.9395	191.0553	192.9130	214.4822	227.2350	252.6387 (64)
Water heating requirement	255.2985	225.7362	239.9968	211.7635	205.7139	185.8663	183.9395	191.0553	192.9130	214.4822	227.2350	252.6387 (64)
Efficiency of water heater (217)m	86.5407	86.3493	85.9560	85.1668	83.7476	79.8000	79.8000	79.8000	79.8000	85.1550	86.1652	86.5876 (217)
Fuel for water heating, kWh/month	295.0040	261.4223	279.2087	248.6456	245.6355	232.9151	230.5007	239.4177	241.7457	251.8726	263.7201	291.7722 (219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.3041	7.0685	7.3041	7.3041 (231)
Lighting	31.5374	25.3005	22.7803	16.6898	12.8917	10.5326	11.7602	15.2864	19.8555	26.0515	29.4251	32.4140 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-58.7901	-81.1325	-114.1623	-125.5202	-132.9327	-123.1239	-121.4785	-115.7688	-105.4679	-91.2912	-63.9562	-51.0247 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)

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	-38.7694	-80.8480	-159.4465	-237.7486	-312.7783	-310.2099	-263.4746	-194.1396	-115.1736	-51.6040	-30.7223			(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													4819.0171	(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													3081.8603	(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)													254.5252	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-3293.3547	(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													4948.0478	(238)

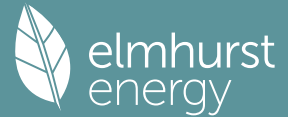
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	4819.0171	0.2100	1011.9936 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3081.8603	0.2100	647.1907 (264)
Space and water heating			1659.1842 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	254.5252	0.1443	36.7358 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1184.6489	0.1351	-160.0095
PV Unit electricity exported	-2108.7058	0.1261	-265.9140
Total			-425.9235 (269)
Total CO2, kg/year			1281.9259 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.7900 (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	4819.0171	1.1300	5445.4893 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3081.8603	1.1300	3482.5021 (278)
Space and water heating			8927.9914 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	254.5252	1.5338	390.3992 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1184.6489	1.4992	-1776.0488
PV Unit electricity exported	-2108.7058	0.4629	-976.1056
Total			-2752.1544 (283)
Total Primary energy kWh/year			6696.3370 (286)
Target Primary Energy Rate (TPER)			51.1600 (287)

Full SAP Calculation Printout



Property Reference	OP-D320 P3ADMI				Issued on Date	29/11/2024	
Assessment Reference	P3ADMI		Prop Type Ref		P3ADMI		
Property	P3ADMI						
SAP Rating		80 C	DER		4.17	TER	9.79
Environmental		96 A	% DER < TER				57.41
CO ₂ Emissions (t/year)		0.5	DFEE		39.32	TFEE	40.38
Compliance Check		See BREL	% DFEE < TFEE				2.63
% DPER < TPER		14.16	DPER		43.91	TPER	51.16
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	66.6300 (1b)	x 2.3100 (2b)	= 153.9153 (1b) - (3b)
First floor	64.2500 (1c)	x 2.6100 (2c)	= 167.6925 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	130.8800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 321.6078 (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) = 0.1244 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.5000 (17)
Infiltration rate	0.2994 (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) = 0.2545 (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	0.3244	0.3181	0.3117	0.2799	0.2736	0.2417	0.2417	0.2354	0.2545	0.2736	0.2863	0.2990 (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	0.5526	0.5506	0.5486	0.5392	0.5374	0.5292	0.5292	0.5277	0.5324	0.5374	0.5410	0.5447 (25)

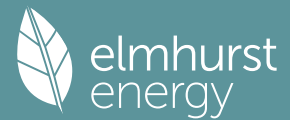
3. Heat losses and heat loss parameter

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)			26.1400	1.2357	32.3023		(27)
Ground Floor			66.6300	0.1100	7.3293		(28a)
External Wall	164.4400	28.2800	136.1600	0.1700	23.1472		(29a)
Roof - ceiling	64.2500		64.2500	0.1100	7.0675		(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618		(30)
Total net area of external elements Aum(A, m ²)			297.7000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	72.2481	(33)

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

List of Thermal Bridges	Length	Psi-value	Total
K1 Element	15.2000	0.0500	0.7600
E2 Other lintels (including other steel lintels)	16.8200	0.0500	0.8410
E3 Sill	33.6000	0.0500	1.6800
E4 Jamb	34.2600	0.1600	5.4816
E5 Ground floor (normal)	32.6800	0.0000	0.0000
E6 Intermediate floor within a dwelling			

Full SAP Calculation Printout



E10 Eaves (insulation at ceiling level)						19.5000	0.0600	1.1700				
E12 Gable (insulation at ceiling level)						13.1800	0.0600	0.7908				
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)												13.5810 (36)
Point Thermal bridges												0.0000
Total fabric heat loss												(33) + (36) + (36a) = 85.8291 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	58.6513	58.4344	58.2217	57.2231	57.0363	56.1665	56.1665	56.0054	56.5015	57.0363	57.4142	57.8094 (38)
Average = Sum(39)m / 12 =	144.4804	144.2634	144.0508	143.0522	142.8653	141.9955	141.9955	141.8345	142.3306	142.8653	143.2433	143.6385 (39)
												143.0513
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1039	1.1023	1.1006	1.0930	1.0916	1.0849	1.0849	1.0837	1.0875	1.0916	1.0945	1.0975 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												

Assumed occupancy												2.8972 (42)
Hot water usage for mixer showers												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths												
	31.4283	30.9615	30.3042	29.0923	28.1849	27.1786	26.6351	27.2878	27.9984	29.0752	30.3120	31.3220 (42b)
Hot water usage for other uses												
	44.3006	42.6897	41.0787	39.4678	37.8569	36.2459	36.2459	37.8569	39.4678	41.0787	42.6897	44.3006 (42c)
Average daily hot water use (litres/day)												69.4122 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	75.7289	73.6512	71.3830	68.5601	66.0417	63.4245	62.8810	65.1446	67.4662	70.1539	73.0017	75.6226 (44)
Energy conte	119.9360	104.8783	109.7130	93.8554	88.9048	77.9879	76.0492	80.6627	83.1926	95.1982	104.0043	118.4068 (45)
Energy content (annual)										Total = Sum(45)m =		1152.7891
Distribution loss (46)m = 0.15 x (45)m												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												
Total storage loss												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	101.9456	89.1466	93.2560	79.7771	75.5691	66.2897	64.6418	68.5633	70.7137	80.9184	88.4036	100.6457 (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	101.9456	89.1466	93.2560	79.7771	75.5691	66.2897	64.6418	68.5633	70.7137	80.9184	88.4036	100.6457 (64)
												979.8707 (64)
12Total per year (kWh/year)												980 (64)
Electric shower(s)												
	58.2982	51.9442	56.7211	54.1282	55.1439	52.6019	54.3553	55.1439	54.1282	56.7211	55.6545	58.2982 (64a)
												663.1388 (64a)
Heat gains from water heating, kWh/month												
	40.0610	35.2727	37.4943	33.4763	32.6783	29.7229	29.7493	30.9268	31.2105	34.4099	36.0145	39.7360 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	151.7826	168.0451	151.7826	156.8421	151.7826	156.8421	151.7826	151.7826	156.8421	151.7826	156.8421	151.7826 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	298.7780	301.8784	294.0656	277.4329	256.4372	236.7041	223.5213	220.4209	228.2337	244.8664	265.8621	285.5952 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862 (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)												
	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894 (71)
Water heating gains (Table 5)												
	53.8454	52.4891	50.3955	46.4949	43.9224	41.2818	39.9856	41.5683	43.3479	46.2498	50.0202	53.4086 (72)
Total internal gains												
	570.8646	588.8711	562.7023	547.2284	518.6007	501.2865	481.7480	480.2303	494.8822	509.3574	539.1829	557.2449 (73)

6. Solar gains												

[Jan]												
	Area											
	m2											
	Solar flux											
	Table 6a											
	W/m2											
	Specific data											
	or Table 6b											
	g											
	Specific data											
	or Table 6c											
	FF											
	Access											
	factor											
	Table 6d											
	Gains											
	W											
North	10.2500											33.3095 (74)
East	7.5200											45.1374 (76)
South	1.0800											15.4311 (78)
West	7.2900											43.7569 (80)

Solar gains	137.6349	262.8244	426.7418	627.8000	783.8362	811.0367	768.4395	648.7279	496.7551	309.3751	170.2234	114.2047 (83)
Total gains	708.4995	851.6956	989.4440	1175.0284	1302.4369	1312.3233	1250.1875	1128.9582	991.6373	818.7325	709.4063	671.4496 (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	25.1630	25.2008	25.2380	25.4142	25.4474	25.6033	25.6033	25.6324	25.5430	25.4474	25.3803	25.3105
alpha	2.6775	2.6801	2.6825	2.6943	2.6965	2.7069	2.7069	2.7088	2.7029	2.6965	2.6920	2.6874
util living area	0.9732	0.9559	0.9242	0.8514	0.7367	0.5866	0.4583	0.5144	0.7264	0.8988	0.9591	0.9766 (86)
MIT	18.2713	18.6100	19.1386	19.8388	20.4130	20.7785	20.9175	20.8856	20.5831	19.8074	18.9178	18.2111 (87)
Th 2	19.9976	19.9990	20.0003	20.0066	20.0077	20.0132	20.0132	20.0142	20.0111	20.0077	20.0054	20.0029 (88)
util rest of house	0.9691	0.9492	0.9126	0.8281	0.6948	0.5196	0.3688	0.4232	0.6675	0.8777	0.9518	0.9730 (89)
MIT 2	17.4937	17.8289	18.3489	19.0277	19.5593	19.8748	19.9757	19.9586	19.7254	19.0132	18.1413	17.4375 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	17.6505	17.9864	18.5082	19.1913	19.7315	20.0571	20.1656	20.1456	19.8984	19.1734	18.2979	17.5935 (92)
Temperature adjustment	0.0000											
adjusted MIT	17.6505	17.9864	18.5082	19.1913	19.7315	20.0571	20.1656	20.1456	19.8984	19.1734	18.2979	17.5935 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9556	0.9313	0.8903	0.8055	0.6818	0.5228	0.3834	0.4361	0.6600	0.8555	0.9348	0.9607 (94)
Useful gains	677.0257	793.2000	880.9409	946.4440	887.9657	686.0416	479.2763	492.3797	654.4574	700.4219	663.1253	645.0803 (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	1928.8896	1887.8947	1729.7844	1472.1983	1147.4182	774.8833	506.3045	531.2553	825.2916	1224.8377	1604.0232	1923.8235 (97)
Space heating kWh	931.3868	735.6348	631.5396	378.5431	193.0327	0.0000	0.0000	0.0000	0.0000	390.1654	677.4465	951.3849 (98a)
Space heating requirement - total per year (kWh/year)	4889.1337											
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	931.3868	735.6348	631.5396	378.5431	193.0327	0.0000	0.0000	0.0000	0.0000	390.1654	677.4465	951.3849 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	4889.1337											
Space heating per m2	(98c) / (4) = 37.3559 (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	1334.7582	1050.7671	1077.9420	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7642	0.8247	0.7847	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1020.0335	866.5347	845.8823	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1469.0423	1399.3507	1260.6860	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	323.2864	396.4151	308.6139	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	80.8216	99.1038	77.1535	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	257.0788 (107)											
Energy for space heating	37.3559 (99)											
Energy for space cooling	1.9642 (108)											
Total	39.3201 (109)											
Fabric Energy Efficiency (DFEE)	39.3 (109)											

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY

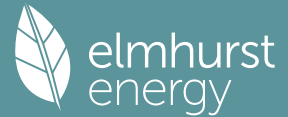
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	66.6300 (1b)	x 2.3100 (2b)	= 153.9153 (1b) - (3b)
First floor	64.2500 (1c)	x 2.6100 (2c)	= 167.6925 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	130.8800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 321.6078 (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) = 0.1244 (8)

Full SAP Calculation Printout



Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.3744 (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) =	0.3182 (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	0.4057	0.3978	0.3898	0.3500	0.3421	0.3023	0.3023	0.2944	0.3182	0.3421	0.3580	0.3739 (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	0.5823	0.5791	0.5760	0.5613	0.5585	0.5457	0.5457	0.5433	0.5506	0.5585	0.5641	0.5699 (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)			26.1400	1.1450	29.9313		(27)
Ground Floor			66.6300	0.1300	8.6619		(28a)
External Wall	164.4400	28.2800	136.1600	0.1800	24.5088		(29a)
Roof - ceiling	64.2500		64.2500	0.1100	7.0675		(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618		(30)
Total net area of external elements Aum (A, m2)			297.7000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	72.5713	(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)	15.2000	0.0500	0.7600
E3 Sill	16.8200	0.0500	0.8410
E4 Jamb	33.6000	0.0500	1.6800
E5 Ground floor (normal)	34.2600	0.1600	5.4816
E6 Intermediate floor within a dwelling	32.6800	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	19.5000	0.0600	1.1700
E12 Gable (insulation at ceiling level)	13.1800	0.0600	0.7908
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)

13.5810 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 86.1523 (37)

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

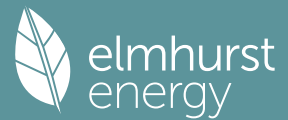
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	61.8007	61.4615	61.1290	59.5673	59.2751	57.9149	57.9149	57.6630	58.4388	59.2751	59.8662	60.4842 (38)
Heat transfer coeff	147.9530	147.6138	147.2813	145.7196	145.4274	144.0672	144.0672	143.8153	144.5911	145.4274	146.0185	146.6365 (39)
Average = Sum(39)m / 12 =												145.7182

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1304	1.1279	1.1253	1.1134	1.1112	1.1008	1.1008	1.0988	1.1048	1.1112	1.1157	1.1204 (40)
HLP (average)												1.1134
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.8972 (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													
31.4283	30.9615	30.3042	29.0923	28.1849	27.1786	26.6351	27.2878	27.9984	29.0752	30.3120	31.3220	31.3220	(42b)
Hot water usage for other uses													
44.3006	42.6897	41.0787	39.4678	37.8569	36.2459	36.2459	37.8569	39.4678	41.0787	42.6897	44.3006	44.3006	(42c)
Average daily hot water use (litres/day)													69.4122 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	75.7289	73.6512	71.3830	68.5601	66.0417	63.4245	62.8810	65.1446	67.4662	70.1539	73.0017	75.6226	(44)
Energy content (annual)	119.9360	104.8783	109.7130	93.8554	88.9048	77.9879	76.0492	80.6627	83.1926	95.1982	104.0043	118.4068	(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1152.7891	
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													
101.9456	89.1466	93.2560	79.7771	75.5691	66.2897	64.6418	68.5633	70.7137	80.9184	88.4036	100.6457	100.6457	(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	101.9456	89.1466	93.2560	79.7771	75.5691	66.2897	64.6418	68.5633	70.7137	80.9184	88.4036	100.6457	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		979.8707	(64)
Electric shower(s)	58.2982	51.9442	56.7211	54.1282	55.1439	52.6019	54.3553	55.1439	54.1282	56.7211	55.6545	58.2982	(64a)
												663.1388	(64a)
Heat gains from water heating, kWh/month													
40.0610	35.2727	37.4943	33.4763	32.6783	29.7229	29.7493	30.9268	31.2105	34.4099	36.0145	39.7360	39.7360	(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	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	151.7826	168.0451	151.7826	156.8421	151.7826	156.8421	151.7826	151.7826	156.8421	151.7826	156.8421	151.7826	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	298.7780	301.8784	294.0656	277.4329	256.4372	236.7041	223.5213	220.4209	228.2337	244.8664	265.8621	285.5952	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	(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)	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	(71)
Water heating gains (Table 5)	53.8454	52.4891	50.3955	46.4949	43.9224	41.2818	39.9856	41.5683	43.3479	46.2498	50.0202	53.4086	(72)
Total internal gains	570.8646	588.8711	562.7023	547.2284	518.6007	501.2865	481.7480	480.2303	494.8822	509.3574	539.1829	557.2449	(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					7.5200	19.6403	0.6300	0.7000	0.7700			45.1374 (76)	
South					1.0800	46.7521	0.6300	0.7000	0.7700			15.4311 (78)	
West					7.2900	19.6403	0.6300	0.7000	0.7700			43.7569 (80)	
Solar gains	137.6349	262.8244	426.7418	627.8000	783.8362	811.0367	768.4395	648.7279	496.7551	309.3751	170.2234	114.2047 (83)	
Total gains	708.4995	851.6956	989.4440	1175.0284	1302.4369	1312.3233	1250.1875	1128.9582	991.6373	818.7325	709.4063	671.4496 (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	24.5724	24.6288	24.6844	24.9490	24.9991	25.2351	25.2351	25.2793	25.1437	24.9991	24.8979	24.7930	
alpha	2.6382	2.6419	2.6456	2.6633	2.6666	2.6823	2.6823	2.6853	2.6762	2.6666	2.6599	2.6529	
util living area	0.9733	0.9563	0.9254	0.8537	0.7408	0.5911	0.4630	0.5189	0.7302	0.9002	0.9594	0.9767	(86)
MIT	18.2057	18.5473	19.0828	19.8006	20.3879	20.7682	20.9127	20.8798	20.5669	19.7754	18.8728	18.1542	(87)
Th 2	19.9760	19.9781	19.9802	19.9899	19.9917	20.0002	20.0002	20.0018	19.9969	19.9917	19.9881	19.9842	(88)
util rest of house	0.9692	0.9497	0.9137	0.8305	0.6987	0.5233	0.3719	0.4263	0.6710	0.8792	0.9521	0.9731	(89)
MIT 2	17.4149	17.7534	18.2809	18.9796	19.5245	19.8556	19.9607	19.9436	19.7005	18.9715	18.0857	17.3691	(90)
Living area fraction	17.5744	17.9136	18.4427	19.1452	19.6986	20.0397	20.1527	20.1324	19.8753	19.1336	18.2445	17.5275	(91)
MIT	17.5744	17.9136	18.4427	19.1452	19.6986	20.0397	20.1527	20.1324	19.8753	19.1336	18.2445	17.5275	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5744	17.9136	18.4427	19.1452	19.6986	20.0397	20.1527	20.1324	19.8753	19.1336	18.2445	17.5275	(93)

8. Space heating requirement

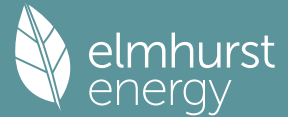
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9555	0.9315	0.8912	0.8073	0.6850	0.5262	0.3865	0.4393	0.6629	0.8565	0.9349	0.9606	(94)
Useful gains	676.9779	793.3938	881.7471	948.6131	892.1603	690.5346	483.2181	495.9005	657.3212	701.2807	663.2250	645.0142	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1963.9884	1920.9818	1758.9293	1492.9265	1163.2214	783.6790	511.8330	536.7834	835.0559	1241.0209	1627.2976	1954.2982	(97)
Space heating kWh	957.5358	757.7391	652.6236	391.9057	201.6695	0.0000	0.0000	0.0000	0.0000	401.5667	694.1323	974.1074	(98a)
Space heating requirement - total per year (kWh/year)												5031.2800	
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	957.5358	757.7391	652.6236	391.9057	201.6695	0.0000	0.0000	0.0000	0.0000	401.5667	694.1323	974.1074	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5031.2800	
Space heating per m2												38.4419	(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	1354.2319	1066.0975	1092.9966	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7574	0.8185	0.7783	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	1025.6328	872.6450	850.7305	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	1469.0423	1399.3507	1260.6860	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	319.2549	391.8690	305.0068	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	79.8137	97.9672	76.2517	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												254.0327	(107)
Energy for space heating												38.4419	(99)
Energy for space cooling												1.9410	(108)
Total												40.3829	(109)
Fabric Energy Efficiency (TFEE)												40.4	(109)

Full SAP Calculation Printout



Property Reference	OP-D320 P3ADMI				Issued on Date	29/11/2024	
Assessment Reference	P3ADMI			Prop Type Ref	P3ADMI		
Property	P3ADMI						
SAP Rating	80 C		DER	4.17		TER	9.79
Environmental	96 A		% DER < TER				57.41
CO ₂ Emissions (t/year)	0.5		DFEE	39.32		TFEE	40.38
Compliance Check	See BREL		% DFEE < TFEE				2.63
% DPER < TPER	14.16		DPER	43.91		TPER	51.16
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	66.6300 (1b)	x 2.3100 (2b)	= 153.9153 (1b) - (3b)
First floor	64.2500 (1c)	x 2.6100 (2c)	= 167.6925 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	130.8800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 321.6078 (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	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) =	69.6000 (23c)											
Effective ac	0.3417	0.3379	0.3342	0.3156	0.3119	0.2933	0.2933	0.2896	0.3007	0.3119	0.3193	0.3268 (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)			26.1400	1.2357	32.3023		(27)
Ground Floor			66.6300	0.1100	7.3293		(28a)
External Wall	164.4400	28.2800	136.1600	0.1700	23.1472		(29a)
Roof - ceiling	64.2500		64.2500	0.1100	7.0675		(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618		(30)
Total net area of external elements Aum(A, m ²)			297.7000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		72.2481		(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)				15.2000	0.0500	0.7600	
E3 Sill				16.8200	0.0500	0.8410	

Full SAP Calculation Printout



E4 Jamb	33.6000	0.0500	1.6800	
E5 Ground floor (normal)	34.2600	0.1600	5.4816	
E6 Intermediate floor within a dwelling	32.6800	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	19.5000	0.0600	1.1700	
E12 Gable (insulation at ceiling level)	13.1800	0.0600	0.7908	
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)				13.5810 (36)
Point Thermal Bridges				0.0000
Total fabric heat loss				(33) + (36) + (36a) = 85.8291 (37)

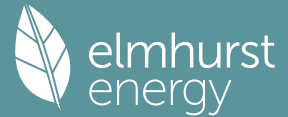
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	36.2602	35.8655	35.4708	33.4975	33.1028	31.1294	31.1294	30.7348	31.9188	33.1028	33.8921	34.6815 (38)
Average = Sum(39)m / 12 =	122.0893	121.6946	121.2999	119.3265	118.9319	116.9585	116.9585	116.5638	117.7479	118.9319	119.7212	120.5106 (39)
												119.2279
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9328	0.9298	0.9268	0.9117	0.9087	0.8936	0.8936	0.8906	0.8997	0.9087	0.9147	0.9208 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.8972 (42)
Hot water usage for mixer showers												
Hot water usage for baths	100.0958	98.5916	96.3996	92.2056	89.1106	85.6590	83.6972	85.8725	88.2572	91.9631	96.2471	99.7123 (42a)
Hot water usage for other uses	33.0824	32.5911	31.8992	30.6235	29.6683	28.6091	28.0369	28.7240	29.4720	30.6054	31.9074	32.9706 (42b)
Average daily hot water use (litres/day)	46.6322	44.9365	43.2408	41.5450	39.8493	38.1536	38.1536	39.8493	41.5450	43.2408	44.9365	46.6322 (42c)
												165.3505 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	179.8104	176.1191	171.5395	164.3742	158.6282	152.4217	149.8877	154.4459	159.2743	165.8093	173.0910	179.3151 (44)
Energy content (annual)	284.7757	250.7913	263.6499	225.0200	213.5440	187.4203	181.2762	191.2362	196.4011	225.0016	246.5999	280.7640 (45)
Distribution loss (46)m = 0.15 x (45)m												
42.7164	37.6187	39.5475	33.7530	32.0316	28.1130	27.1914	28.6854	29.4602	33.7502	36.9900	42.1146 (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	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 (61)	
Total heat required for water heating calculated for each month												
383.1573	339.6521	362.0315	320.2280	311.9256	252.0523	248.0626	258.0226	261.0331	323.3832	341.8079	379.1456 (62)	
WWHRS	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 (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 (63c)	
FGHRS	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	383.1573	339.6521	362.0315	320.2280	311.9256	252.0523	248.0626	258.0226	261.0331	323.3832	341.8079	379.1456 (64)
Total per year (kWh/year)												3780.5019 (64)
Electric shower(s)												3781 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)	
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
138.5740	123.0271	131.5497	117.2896	114.8895	80.3268	78.8843	82.1960	83.3130	118.6991	124.4649	137.2401 (65)	

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618 (66)
(calculated in Appendix L, equation L9 or L9a), also see Table 5												
151.7826	168.0451	151.7826	156.8421	151.7826	156.8421	151.7826	151.7826	151.7826	156.8421	151.7826	156.8421	151.7826 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
298.7780	301.8784	294.0656	277.4329	256.4372	236.7041	223.5213	220.4209	228.2337	244.8664	265.8621	285.5952	285.5952 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862 (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)												
-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894 (71)
Water heating gains (Table 5)												
186.2554	183.0761	176.8141	162.9022	154.4213	111.5651	106.0272	110.4785	115.7125	159.5418	172.8679	184.4625	184.4625 (72)
Total internal gains	703.2746	719.4581	689.1208	663.6357	629.0997	571.5698	547.7896	549.1405	567.2468	622.6494	662.0306	688.2989 (73)

6. Solar gains												
[Jan]												
	Area	Solar flux	g	FF	Access	Gains						
	m2	Table 6a	Specific data	Specific data	factor	W						
		W/m2	or Table 6b	or Table 6c	Table 6d							
North	10.2500	10.6334	0.6300	0.7000	0.7700	33.3095 (74)						
East	7.5200	19.6403	0.6300	0.7000	0.7700	45.1374 (76)						
South	1.0800	46.7521	0.6300	0.7000	0.7700	15.4311 (78)						
West	7.2900	19.6403	0.6300	0.7000	0.7700	43.7569 (80)						

Full SAP Calculation Printout



Solar gains	137.6349	262.8244	426.7418	627.8000	783.8362	811.0367	768.4395	648.7279	496.7551	309.3751	170.2234	114.2047 (83)
Total gains	840.9095	982.2826	1115.8626	1291.4357	1412.9359	1382.6065	1316.2291	1197.8684	1064.0019	932.0245	832.2540	802.5035 (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	29.7779	29.8744	29.9716	30.4673	30.5684	31.0841	31.0841	31.1894	30.8758	30.5684	30.3668	30.1679
alpha	2.9852	2.9916	2.9981	3.0312	3.0379	3.0723	3.0723	3.0793	3.0584	3.0379	3.0245	3.0112
util living area	0.9570	0.9325	0.8885	0.7922	0.6541	0.5003	0.3774	0.4260	0.6447	0.8468	0.9345	0.9619 (86)
Living	18.9206	19.2402	19.7041	20.2853	20.6909	20.9029	20.9694	20.9557	20.7841	20.2389	19.4964	18.8798
Non living	17.6880	18.0914	18.6717	19.3874	19.8581	20.0942	20.1543	20.1470	19.9781	19.3498	18.4277	17.6428
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	19.9363	19.2402	19.7041	20.2853	20.6909	20.9029	20.9694	20.9557	20.7841	20.2389	19.4964	19.1764 (87)
Th 2	20.1397	20.1422	20.1448	20.1575	20.1601	20.1729	20.1729	20.1755	20.1678	20.1601	20.1550	20.1499 (88)
util rest of house	0.9512	0.9237	0.8740	0.7665	0.6142	0.4455	0.3110	0.3566	0.5901	0.8214	0.9245	0.9567 (89)
MIT 2	19.1623	18.0914	18.6717	19.3874	19.8581	20.0942	20.1543	20.1470	19.9781	19.3498	18.4277	18.0946 (90)
Living area fraction	19.3184	18.3231	18.8800	19.5685	20.0261	20.2573	20.3187	20.3101	20.1407	19.5291	18.6432	0.2017 (91)
MIT	19.3184	18.3231	18.8800	19.5685	20.0261	20.2573	20.3187	20.3101	20.1407	19.5291	18.6432	18.3128 (92)
Temperature adjustment												0.0000
adjusted MIT	19.3184	18.3231	18.8800	19.5685	20.0261	20.2573	20.3187	20.3101	20.1407	19.5291	18.6432	18.3128 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9447	0.8998	0.8482	0.7465	0.6074	0.4513	0.3230	0.3682	0.5882	0.7991	0.9014	0.9421 (94)
Useful gains	794.4047	883.8423	946.5053	964.0728	858.1993	623.9433	425.1291	441.0858	625.8017	744.7524	750.1781	756.0666 (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	1833.5856	1633.5181	1501.6883	1273.0410	990.2407	661.6744	434.9363	455.7774	711.2792	1061.9579	1381.9718	1700.7433 (97)
Space heating kWh	773.1506	503.7821	413.0561	222.4571	98.2388	0.0000	0.0000	0.0000	0.0000	236.0009	454.8915	702.8395 (98a)
Space heating requirement - total per year (kWh/year)												3404.4166
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	773.1506	503.7821	413.0561	222.4571	98.2388	0.0000	0.0000	0.0000	0.0000	236.0009	454.8915	702.8395 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3404.4166
Space heating per m2										(98c) / (4) =		26.0117 (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 %)												247.9797 (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	773.1506	503.7821	413.0561	222.4571	98.2388	0.0000	0.0000	0.0000	0.0000	236.0009	454.8915	702.8395 (98)
Space heating efficiency (main heating system 1)	247.9797	247.9797	247.9797	247.9797	247.9797	0.0000	0.0000	0.0000	0.0000	247.9797	247.9797	247.9797 (210)
Space heating fuel (main heating system)	311.7797	203.1545	166.5685	89.7078	39.6157	0.0000	0.0000	0.0000	0.0000	95.1694	183.4390	283.4262 (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	383.1573	339.6521	362.0315	320.2280	311.9256	252.0523	248.0626	258.0226	261.0331	323.3832	341.8079	379.1456 (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	142.2156	126.0679	134.3744	118.8583	115.7767	93.5537	92.0728	95.7697	96.8871	120.0294	126.8681	140.7266 (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	59.2498	53.5160	59.2498	57.3385	59.2498	57.3385	59.2498	59.2498	57.3385	59.2498	57.3385	59.2498 (231)
Lighting	31.5374	25.3005	22.7803	16.6898	12.8917	10.5326	11.7602	15.2864	19.8555	26.0515	29.4251	32.4140 (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												1372.8608 (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												1403.2002 (219)

Full SAP Calculation Printout



Space cooling fuel	0.0000 (221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 1.7780)	
mechanical ventilation fans (SFP = 1.7780)	697.6188 (230a)
Total electricity for the above, kWh/year	697.6188 (231)
Electricity for lighting (calculated in Appendix L)	254.5252 (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	3728.2049 (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	1372.8608	0.1557	213.7081 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1403.2002	0.1415	198.6030 (264)
Space and water heating			412.3111 (265)
Pumps, fans and electric keep-hot	697.6188	0.1387	96.7683 (267)
Energy for lighting	254.5252	0.1443	36.7358 (268)
Total CO2, kg/year			545.8153 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.1700 (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	1372.8608	1.5763	2163.9855 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1403.2002	1.5234	2137.6233 (278)
Space and water heating			4301.6087 (279)
Pumps, fans and electric keep-hot	697.6188	1.5128	1055.3577 (281)
Energy for lighting	254.5252	1.5338	390.3992 (282)
Total Primary energy kWh/year			5747.3656 (286)
Dwelling Primary energy Rate (DPER)			43.9100 (287)

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

1. Overall dwelling characteristics

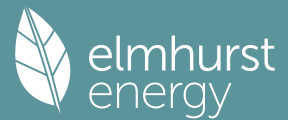
	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	66.6300 (1b)	x 2.3100 (2b)	= 153.9153 (1b) - (3b)
First floor	64.2500 (1c)	x 2.6100 (2c)	= 167.6925 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	130.8800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	321.6078 (5)

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) = 0.1244 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3744 (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) = 0.3182 (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	0.4057	0.3978	0.3898	0.3500	0.3421	0.3023	0.3023	0.2944	0.3182	0.3421	0.3580	0.3739 (22b)
Effective ac	0.5823	0.5791	0.5760	0.5613	0.5585	0.5457	0.5457	0.5433	0.5506	0.5585	0.5641	0.5699 (25)

Full SAP Calculation Printout



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	
TER Opaque door			2.1400	1.0000	2.1400			(26)
TER Opening Type (Uw = 1.20)			26.1400	1.1450	29.9313			(27)
Ground Floor			66.6300	0.1300	8.6619			(28a)
External Wall	164.4400	28.2800	136.1600	0.1800	24.5088			(29a)
Roof - ceiling	64.2500		64.2500	0.1100	7.0675			(30)
Bay Roof	2.3800		2.3800	0.1100	0.2618			(30)
Total net area of external elements Aum(A, m ²)			297.7000					(31)
Fabric heat loss, W/K = Sum (A x U)								(33)
(26)...(30) + (32) =					72.5713			

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

100.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element	15.2000	0.0500	0.7600	
E2 Other lintels (including other steel lintels)	16.8200	0.0500	0.8410	
E3 Sill	33.6000	0.0500	1.6800	
E4 Jamb	34.2600	0.1600	5.4816	
E5 Ground floor (normal)	32.6800	0.0000	0.0000	
E6 Intermediate floor within a dwelling	19.5000	0.0600	1.1700	
E10 Eaves (insulation at ceiling level)	13.1800	0.0600	0.7908	
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)				13.5810 (36)
Point Thermal Bridges				0.0000
Total fabric heat loss				(33) + (36) + (36a) = 86.1523 (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	61.8007	61.4615	61.1290	59.5673	59.2751	57.9149	57.9149	57.6630	58.4388	59.2751	59.8662	60.4842	(38)
Heat transfer coeff	147.9530	147.6138	147.2813	145.7196	145.4274	144.0672	144.0672	143.8153	144.5911	145.4274	146.0185	146.6365	(39)
Average = Sum(39)m / 12 =												145.7182	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1304	1.1279	1.1253	1.1134	1.1112	1.1008	1.1008	1.0988	1.1048	1.1112	1.1157	1.1204	(40)
HLP (average)												1.1134	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

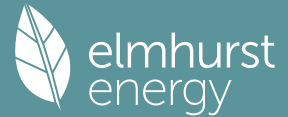
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.8972 (42)
Hot water usage for mixer showers	72.7969	71.7029	70.1088	67.0586	64.8077	62.2975	60.8707	62.4528	64.1870	66.8823	69.9979	72.5180	(42a)
Hot water usage for baths	31.4283	30.9615	30.3042	29.0923	28.1849	27.1786	26.6351	27.2878	27.9984	29.0752	30.3120	31.3220	(42b)
Hot water usage for other uses	44.3006	42.6897	41.0787	39.4678	37.8569	36.2459	36.2459	37.8569	39.4678	41.0787	42.6897	44.3006	(42c)
Average daily hot water use (litres/day)												136.5286	(43)
Daily hot water use	148.5258	145.3541	141.4917	135.6188	130.8494	125.7220	123.7517	127.5974	131.6533	137.0361	142.9996	148.1407	(44)
Energy conte	235.2286	206.9824	217.4676	185.6553	176.1485	154.5899	149.6669	157.9922	162.3417	185.9567	203.7292	231.9525	(45)
Energy content (annual)										Total = Sum(45)m =		2267.7113	
Distribution loss (46)m = 0.15 x (45)m	35.2843	31.0474	32.6201	27.8483	26.4223	23.1885	22.4500	23.6988	24.3512	27.8935	30.5594	34.7929	(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	288.5782	255.1691	270.8172	237.2840	229.4981	206.2186	203.0166	211.3419	213.9703	239.3064	255.3578	285.3021	(62)
WWHRS	-33.2797	-29.4329	-30.8204	-25.5205	-23.7842	-20.3523	-19.0770	-20.2865	-21.0573	-24.8242	-28.1228	-32.6634	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	255.2985	225.7362	239.9968	211.7635	205.7139	185.8663	183.9395	191.0553	192.9130	214.4822	227.2350	252.6387	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2586.6388	(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	120.8932	107.3710	114.9877	103.0333	101.2491	92.7041	92.4440	95.2121	95.2815	104.5103	109.0429	119.8039	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	144.8618	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	151.7826	168.0451	151.7826	156.8421	151.7826	156.8421	151.7826	151.7826	156.8421	151.7826	156.8421	151.7826	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	298.7780	301.8784	294.0656	277.4329	256.4372	236.7041	223.5213	220.4209	228.2337	244.8664	265.8621	285.5952	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	37.4862	(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)	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	-115.8894	(71)

Full SAP Calculation Printout



Water heating gains (Table 5)	162.4909	159.7783	154.5533	143.1018	136.0874	128.7557	124.2526	127.9733	132.3355	140.4709	151.4484	161.0267 (72)
Total internal gains	682.5101	699.1603	669.8600	646.8353	613.7658	588.7604	566.0151	566.6353	583.8698	606.5784	643.6112	667.8631 (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					7.5200	19.6403	0.6300	0.7000			0.7700	45.1374 (76)	
South					1.0800	46.7521	0.6300	0.7000			0.7700	15.4311 (78)	
West					7.2900	19.6403	0.6300	0.7000			0.7700	43.7569 (80)	

Solar gains	137.6349	262.8244	426.7418	627.8000	783.8362	811.0367	768.4395	648.7279	496.7551	309.3751	170.2234	114.2047 (83)	
Total gains	820.1450	961.9848	1096.6018	1274.6353	1397.6020	1399.7971	1334.4545	1215.3632	1080.6249	915.9535	813.8346	782.0677 (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	24.5724	24.6288	24.6844	24.9490	24.9991	25.2351	25.2351	25.2793	25.1437	24.9991	24.8979	24.7930
alpha	2.6382	2.6419	2.6456	2.6633	2.6666	2.6823	2.6823	2.6853	2.6762	2.6666	2.6599	2.6529
util living area	0.9629	0.9433	0.9085	0.8321	0.7152	0.5652	0.4388	0.4901	0.6983	0.8769	0.9454	0.9670 (86)
MIT	18.3629	18.6933	19.2096	19.8912	20.4427	20.7927	20.9234	20.8955	20.6152	19.8798	19.0127	18.3124 (87)
Th 2	19.9760	19.9781	19.9802	19.9899	19.9917	20.0002	20.0002	20.0018	19.9969	19.9917	19.9881	19.9842 (88)
util rest of house	0.9574	0.9350	0.8948	0.8067	0.6717	0.4981	0.3509	0.4003	0.6372	0.8524	0.9360	0.9621 (89)
MIT 2	16.8880	17.3061	17.9554	18.7996	19.4504	19.8359	19.9562	19.9378	19.6637	18.8061	17.7215	16.8286 (90)
Living area fraction	17.1855	17.5859	18.2083	19.0198	19.6506	20.0289	20.1513	20.1310	19.8556	19.0226	17.9820	17.1279 (92)
MIT	17.1855	17.5859	18.2083	19.0198	19.6506	20.0289	20.1513	20.1310	19.8556	19.0226	17.9820	17.1279 (93)
Temperature adjustment	17.1855	17.5859	18.2083	19.0198	19.6506	20.0289	20.1513	20.1310	19.8556	19.0226	17.9820	17.1279 (93)
adjusted MIT	17.1855	17.5859	18.2083	19.0198	19.6506	20.0289	20.1513	20.1310	19.8556	19.0226	17.9820	17.1279 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9354	0.9082	0.8640	0.7776	0.6553	0.5001	0.3648	0.4126	0.6276	0.8227	0.9099	0.9416 (94)
Useful gains	767.1982	873.6758	947.4217	991.1968	915.8294	700.0748	486.7934	501.4896	678.1472	753.5907	740.5284	736.4037 (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	1906.4421	1872.6100	1724.4204	1474.6490	1156.2317	782.1222	511.6297	536.5685	832.2134	1224.8838	1588.9716	1895.7027 (97)
Space heating kWh	847.5974	671.2837	578.0870	348.0856	178.8594	0.0000	0.0000	0.0000	0.0000	350.6421	610.8791	862.5185 (98a)
Space heating requirement - total per year (kWh/year)												4447.9528
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	847.5974	671.2837	578.0870	348.0856	178.8594	0.0000	0.0000	0.0000	0.0000	350.6421	610.8791	862.5185 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4447.9528
Space heating per m2										(98c) / (4) =		33.9850 (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	847.5974	671.2837	578.0870	348.0856	178.8594	0.0000	0.0000	0.0000	0.0000	350.6421	610.8791	862.5185 (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)	918.3071	727.2847	626.3131	377.1242	193.7804	0.0000	0.0000	0.0000	0.0000	379.8939	661.8409	934.4729 (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	255.2985	225.7362	239.9968	211.7635	205.7139	185.8663	183.9395	191.0553	192.9130	214.4822	227.2350	252.6387 (64)
Water heating requirement	255.2985	225.7362	239.9968	211.7635	205.7139	185.8663	183.9395	191.0553	192.9130	214.4822	227.2350	252.6387 (64)
Efficiency of water heater (217)m	86.5407	86.3493	85.9560	85.1668	83.7476	79.8000	79.8000	79.8000	79.8000	85.1550	86.1652	86.5876 (217)
Fuel for water heating, kWh/month	295.0040	261.4223	279.2087	248.6456	245.6355	232.9151	230.5007	239.4177	241.7457	251.8726	263.7201	291.7722 (219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.3041	7.0685	7.3041	7.3041 (231)
Lighting	31.5374	25.3005	22.7803	16.6898	12.8917	10.5326	11.7602	15.2864	19.8555	26.0515	29.4251	32.4140 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-58.7901	-81.1325	-114.1623	-125.5202	-132.9327	-123.1239	-121.4785	-115.7688	-105.4679	-91.2912	-63.9562	-51.0247 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)

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	-38.7694	-80.8480	-159.4465	-237.7486	-312.7783	-310.2099	-263.4746	-194.1396	-115.1736	-51.6040	-30.7223			(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													4819.0171	(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													3081.8603	(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)													254.5252	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-3293.3547	(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													4948.0478	(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	4819.0171	0.2100	1011.9936 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3081.8603	0.2100	647.1907 (264)
Space and water heating			1659.1842 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	254.5252	0.1443	36.7358 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1184.6489	0.1351	-160.0095
PV Unit electricity exported	-2108.7058	0.1261	-265.9140
Total			-425.9235 (269)
Total CO2, kg/year			1281.9259 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.7900 (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	4819.0171	1.1300	5445.4893 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3081.8603	1.1300	3482.5021 (278)
Space and water heating			8927.9914 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	254.5252	1.5338	390.3992 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1184.6489	1.4992	-1776.0488
PV Unit electricity exported	-2108.7058	0.4629	-976.1056
Total			-2752.1544 (283)
Total Primary energy kWh/year			6696.3370 (286)
Target Primary Energy Rate (TPER)			51.1600 (287)