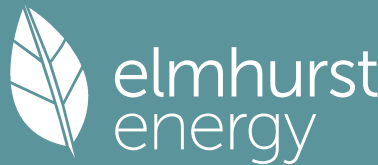


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Property Reference	Plot 8				Issued on Date	08/09/2025
Assessment Reference	As-Built	Prop Type Ref				
Property	7 Forge Close, Caversham, READING, RG4 8BG					
SAP Rating	84 B	DER	3.58	TER	10.14	
Environmental	97 A	% DER < TER				64.69
CO ₂ Emissions (t/year)	0.33	DFEE	32.86	TFEE	31.80	
Compliance Check	See BREL	% DFEE < TFEE				-3.34
% DPER < TPER	29.42	DPER	37.34	TPER	52.90	
Assessor Details	Miss Charlotte Rasinsky				Assessor ID	ED74-0001
Client	Country Estates, Country Estates					

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	35.3200 (1b)	x 2.4000 (2b)	= 84.7680 (1b) - (3b)
First floor	34.4500 (1c)	x 2.7000 (2c)	= 93.0150 (1c) - (3c)
Second floor	31.8400 (1d)	x 2.1400 (2d)	= 68.1376 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	101.6100		(4)
Dwelling volume		(3a) + (3b) + (3c) + (3d) + (3e) ... (3n) =	245.9206 (5)

2. Ventilation rate

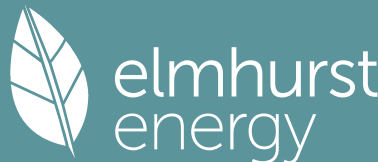
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) =	Air changes per hour 0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	4.5000 (17)
Infiltration rate	0.2250 (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) = 0.1913 (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	0.2438	0.2391	0.2343	0.2104	0.2056	0.1817	0.1817	0.1769	0.1913	0.2056	0.2152	0.2247 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation												0.5000 (23b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Window			9.1000	1.1450	10.4198		(27)
Bifold Door			9.5900	1.5038	14.4211		(27)
Front Door			1.9100	1.6000	3.0560		(26)
Heatloss Floor 1			35.3200	0.1200	4.2384	75.0000	2649.0000 (28a)
Wall Type 01	52.5000	18.2100	34.2900	0.1500	5.1435	110.0000	3771.9000 (29a)
Wall Type 06	15.6200	2.3900	13.2300	0.1200	1.5876	9.0000	119.0700 (29a)
Wall Type 5B	7.6900		7.6900	0.4100	3.1529	18.0000	138.4200 (29a)
Flat Roof	17.6400		17.6400	0.1000	1.7640	9.0000	158.7600 (30)
Slope Roof	19.7200		19.7200	0.1100	2.1692	9.0000	177.4800 (30)
Total net area of external elements Aum(A, m ²)			148.4900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	45.9525		(33)
Main dwelling							
Party Wall 1			98.9400	0.0000	0.0000	110.0000	10883.4003 (32)
Internal Wall 1			174.5400			9.0000	1570.8599 (32c)

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Internal Floor 1	34.4500	18.0000	620.1000 (32d)
Internal Floor 2	31.8400	18.0000	573.1200 (32d)
Internal Ceiling 1	35.3200	9.0000	317.8800 (32e)
Internal Ceiling 2	34.4500	9.0000	310.0500 (32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 21290.0402 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 209.5270 (35)

List of Thermal Bridges	Length	Psi-value	Total
K1 Element	12.6700	0.2460	3.1168
E2 Other lintels (including other steel lintels)	7.0600	0.0140	0.0988
E3 Sill	26.8600	0.0120	0.3223
E4 Jamb	10.5800	0.0610	0.6454
E5 Ground floor (normal)	26.9300	0.0010	0.0269
E6 Intermediate floor within a dwelling	6.7390	0.0180	0.1213
E11 Eaves (insulation at rafter level)	2.6610	0.0510	0.1357
E12 Gable (insulation at ceiling level)	0.9440	0.0410	0.0387
E13 Gable (insulation at rafter level)	6.6000	0.0410	0.2706
E16 Corner (normal)	2.4000	0.0000	0.0000
E17 Corner (inverted - internal area greater than external area)	20.4000	0.0510	1.0404
E18 Party wall between dwellings	13.6600	0.0500	0.6830
P1 Party wall - Ground floor	14.2300	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	11.4000	0.0400	0.4560
P4 Party wall - Roof (insulation at ceiling level)	8.9100	0.0750	0.6683
P5 Party wall - Roof (insulation at rafter level)	8.5800	0.0660	0.5663
R6 Flat ceiling	1.1100	0.1200	0.1332
R7 Flat ceiling (inverted)	1.5100	0.1200	0.1812
R8 Roof to wall (rafter)	2.4600	0.0380	0.0935
R9 Roof to wall (flat ceiling)			

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 8.5984 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 54.5509 (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	40.5769	40.5769	40.5769	40.5769	40.5769	40.5769	40.5769	40.5769	40.5769	40.5769	40.5769	40.5769 (38)
Heat transfer coeff	95.1278	95.1278	95.1278	95.1278	95.1278	95.1278	95.1278	95.1278	95.1278	95.1278	95.1278	95.1278 (39)
Average = Sum(39)m / 12 =												95.1278

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9362	0.9362	0.9362	0.9362	0.9362	0.9362	0.9362	0.9362	0.9362	0.9362	0.9362	0.9362 (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												2.7539 (42)
Hot water usage for mixer showers	70.3943	69.3364	67.7948	64.8454	62.6687	60.2413	58.8616	60.3915	62.0686	64.6748	67.6876	70.1246 (42a)
Hot water usage for baths	30.3951	29.9437	29.3080	28.1359	27.2583	26.2851	25.7594	26.3907	27.0780	28.1193	29.3155	30.2923 (42b)
Hot water usage for other uses	42.8331	41.2755	39.7179	38.1604	36.6028	35.0452	35.0452	36.6028	38.1604	39.7179	41.2755	42.8331 (42c)
Average daily hot water use (litres/day)												132.0214 (43)

Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	143.6224	140.5556	136.8208	131.1416	126.5298	121.5717	119.6663	123.3850	127.3069	132.5121	138.2787	143.2500 (44)
Energy conte	227.4628	200.1493	210.2884	179.5264	170.3334	149.4866	144.7260	152.7764	156.9822	179.8176	197.0033	224.2948 (45)
Energy content (annual)										Total = Sum(45)m =		2192.8473
Distribution loss (46)m = 0.15 x (45)m	34.1194	30.0224	31.5433	26.9290	25.5500	22.4230	21.7089	22.9165	23.5473	26.9726	29.5505	33.6442 (46)

Water storage loss:
Store volume 198.4000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)
Temperature factor from Table 2b 0.5400 (49)
Enter (49) or (54) in (55) 0.6480 (55)

Total storage loss	20.0880	18.1440	20.0880	19.4400	20.0880	19.4400	20.0880	20.0880	19.4400	20.0880	19.4400	20.0880 (56)
If cylinder contains dedicated solar storage	20.0880	18.1440	20.0880	19.4400	20.0880	19.4400	20.0880	20.0880	19.4400	20.0880	19.4400	20.0880 (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	270.8132	239.3045	253.6388	221.4784	213.6838	191.4386	188.0764	196.1268	198.9342	223.1680	238.9553	267.6452 (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 270.8132 239.3045 253.6388 221.4784 213.6838 191.4386 188.0764 196.1268 198.9342 223.1680 238.9553 267.6452 (64)
Total per year (kWh/year) = Sum(64)m = 2703.2633 (64)
12Total per year (kWh/year) 2703 (64)

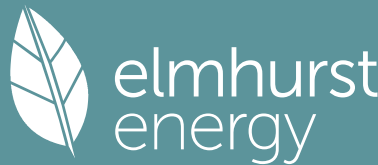
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)

Heat gains from water heating, kWh/month	110.3117	97.8738	104.6012	93.2541	91.3162	83.2659	82.8017	85.4785	85.7582	94.4697	99.0652	109.2584 (65)
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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	130.9364	144.9653	130.9364	135.3010	130.9364	135.3010	130.9364	130.9364	135.3010	130.9364	135.3010	130.9364 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	258.9046	261.5912	254.8210	240.4081	222.2143	205.1148	193.6912	191.0046	197.7748	212.1877	230.3815	247.4810 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697 (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)	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575 (71)
Water heating gains (Table 5)	148.2684	145.6455	140.5930	129.5196	122.7368	115.6471	111.2926	114.8904	119.1086	126.9754	137.5906	146.8526 (72)

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Total internal gains	602.4185	616.5111	590.6596	569.5377	540.1966	520.3719	500.2294	501.1405	516.4934	534.4086	567.5821	589.5792 (73)
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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
East	6.2000	19.6403		0.5400		0.8000	0.7700	36.4549 (76)
West	2.9000	19.6403		0.5400		0.8000	0.7700	17.0515 (80)
East	2.6500	19.6403		0.5400		0.8000	0.7700	15.5815 (76)
West	6.9400	19.6403		0.5400		0.8000	0.7700	40.8060 (80)

Solar gains	109.8939	214.9758	354.0345	516.3382	632.7919	647.7751	616.7083	529.7433	411.7568	255.0869	137.0248	90.3714 (83)
Total gains	712.3124	831.4869	944.6941	1085.8759	1172.9885	1168.1469	1116.9376	1030.8838	928.2502	789.4955	704.6069	679.9506 (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	62.1679	62.1679	62.1679	62.1679	62.1679	62.1679	62.1679	62.1679	62.1679	62.1679	62.1679	62.1679
alpha	5.1445	5.1445	5.1445	5.1445	5.1445	5.1445	5.1445	5.1445	5.1445	5.1445	5.1445	5.1445
util living area	0.9910	0.9798	0.9502	0.8606	0.7015	0.5123	0.3732	0.4215	0.6676	0.9156	0.9813	0.9929 (86)
Living	20.1014	20.2589	20.4822	20.7341	20.8810	20.9299	20.9382	20.9368	20.9049	20.6867	20.3406	20.0631
Non living	19.0818	19.2808	19.5585	19.8560	20.0110	20.0536	20.0589	20.0584	20.0357	19.8097	19.3860	19.0331
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	20.5403	20.2589	20.4822	20.7341	20.8810	20.9299	20.9382	20.9368	20.9049	20.6867	20.3406	20.1941 (87)
Th 2	20.1368	20.1368	20.1368	20.1368	20.1368	20.1368	20.1368	20.1368	20.1368	20.1368	20.1368	20.1368 (88)
util rest of house	0.9887	0.9747	0.9380	0.8306	0.6502	0.4467	0.3008	0.3439	0.5976	0.8895	0.9757	0.9910 (89)
MIT 2	19.7162	19.2808	19.5585	19.8560	20.0110	20.0536	20.0589	20.0584	20.0357	19.8097	19.3860	19.2320 (90)
Living area fraction									fLA = Living area / (4) =			0.2397 (91)
MIT	19.9138	19.5153	19.7800	20.0665	20.2196	20.2637	20.2697	20.2690	20.2441	20.0200	19.6148	19.4627 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9138	19.5153	19.7800	20.0665	20.2196	20.2637	20.2697	20.2690	20.2441	20.0200	19.6148	19.4627 (93)

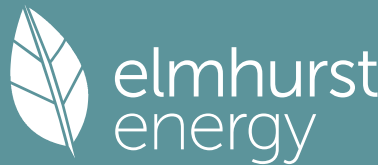
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9880	0.9702	0.9321	0.8279	0.6554	0.4565	0.3120	0.3559	0.6067	0.8853	0.9714	0.9892 (94)
Useful gains	703.7626	806.6950	880.5088	899.0030	768.7594	533.3125	348.4880	366.8611	563.1980	698.9739	684.4431	672.5828 (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	1485.3061	1390.3204	1263.2929	1062.2476	810.4469	538.7771	349.0935	368.0460	584.4759	896.1013	1190.5076	1451.9053 (97)
Space heating kWh	581.4683	392.1963	284.7913	117.5361	31.0155	0.0000	0.0000	0.0000	0.0000	146.6627	364.3665	579.8159 (98a)
Space heating requirement - total per year (kWh/year)												2497.8526
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	581.4683	392.1963	284.7913	117.5361	31.0155	0.0000	0.0000	0.0000	0.0000	146.6627	364.3665	579.8159 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2497.8526
Space heating per m2										(98c) / (4) =		24.5827 (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 %)												245.0853 (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	581.4683	392.1963	284.7913	117.5361	31.0155	0.0000	0.0000	0.0000	0.0000	146.6627	364.3665	579.8159 (98)
Space heating efficiency (main heating system 1)	245.0853	245.0853	245.0853	245.0853	245.0853	0.0000	0.0000	0.0000	0.0000	245.0853	245.0853	245.0853 (210)
Space heating fuel (main heating system)	237.2514	160.0244	116.2009	47.9572	12.6550	0.0000	0.0000	0.0000	0.0000	59.8415	148.6693	236.5772 (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	270.8132	239.3045	253.6388	221.4784	213.6838	191.4386	188.0764	196.1268	198.9342	223.1680	238.9553	267.6452 (64)
Efficiency of water heater	189.5747	189.5747	189.5747	189.5747	189.5747	189.5747	189.5747	189.5747	189.5747	189.5747	189.5747	189.5747 (216)
Fuel for water heating, kWh/month	142.8530	126.2323	133.7936	116.8291	112.7175	100.9832	99.2097	103.4562	104.9371	117.7203	126.0481	141.1819 (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	3.9930	3.6066	3.9930	3.8642	3.9930	3.8642	3.9930	3.8642	3.9930	3.8642	3.8642	3.9930 (231)
Lighting	25.6917	20.6108	18.5578	13.5962	10.5021	8.5803	9.5804	12.4529	16.1751	21.2226	23.9709	26.4058 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-6.9717	-11.9825	-21.2651	-28.8108	-35.1525	-34.2838	-33.6032	-29.2540	-22.4656	-15.1878	-8.2598	-5.7497 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												

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(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												1019.1769	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												189.5747	
Water heating fuel used												1425.9618	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(MEVDecentralised, Database: total watage = 5.7980, total flow = 37.0000, SFP = 0.1567)													
mechanical ventilation fans (SFP = 0.1567)												47.0144	(230a)
Total electricity for the above, kWh/year												47.0144	(231)
Electricity for lighting (calculated in Appendix L)												207.3467	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-252.9866	(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												2446.5133	(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	1019.1769	0.1567	159.7326	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1425.9618	0.1410	201.1134	(264)
Space and water heating			360.8460	(265)
Pumps, fans and electric keep-hot	47.0144	0.1387	6.5215	(267)
Energy for lighting	207.3467	0.1443	29.9265	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-252.9866	0.1311	-33.1785	
PV Unit electricity exported	0.0000	0.0000	0.0000	
Total			-33.1785	(269)
Total CO2, kg/year			364.1155	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.5800	(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	1019.1769	1.5802	1610.4894	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1425.9618	1.5215	2169.6161	(278)
Space and water heating			3780.1055	(279)
Pumps, fans and electric keep-hot	47.0144	1.5128	71.1234	(281)
Energy for lighting	207.3467	1.5338	318.0353	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-252.9866	1.4845	-375.5587	
PV Unit electricity exported	0.0000	0.0000	0.0000	
Total			-375.5587	(283)
Total Primary energy kWh/year			3793.7056	(286)
Dwelling Primary energy Rate (DPER)			37.3400	(287)

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

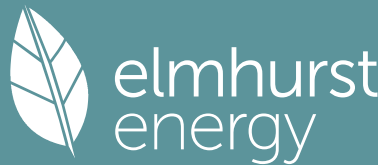
1. Overall dwelling characteristics

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)	
Ground floor	35.3200 (1b)	x 2.4000 (2b)	= 84.7680 (1b)	- (3b)
First floor	34.4500 (1c)	x 2.7000 (2c)	= 93.0150 (1c)	- (3c)
Second floor	31.8400 (1d)	x 2.1400 (2d)	= 68.1376 (1d)	- (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	101.6100		(4)	
Dwelling volume		(3a) + (3b) + (3c) + (3d) + (3e) ... (3n)	= 245.9206 (5)	

2. Ventilation rate

m3 per hour

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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	Air changes per hour	40.0000 / (5) =	0.1627 (8)
Pressure test			Yes		
Pressure Test Method			Blower Door		
Measured/design AP50			5.0000		(17)
Infiltration rate			0.4127		(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) =		0.3508		(21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Effective ac	0.4472	0.4384	0.4297	0.3858	0.3771	0.3332	0.3332	0.3244	0.3508	0.3771	0.3946	0.4121	(22b)
	0.6000	0.5961	0.5923	0.5744	0.5711	0.5555	0.5555	0.5526	0.5615	0.5711	0.5779	0.5849	(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
Main dwelling							
TER Opaque door			1.9100	1.0000	1.9100		(26)
TER Opening Type			18.6900	1.1450	21.4008		(27)
Heatloss Floor 1			35.3200	0.1300	4.5916		(28a)
Wall Type 01	52.5000	18.2100	34.2900	0.1800	6.1722		(29a)
Wall Type 06	15.6200	2.3900	13.2300	0.1800	2.3814		(29a)
Wall Type 5B	7.6900		7.6900	0.1800	1.3842		(29a)
Flat Roof	17.6400		17.6400	0.1100	1.9404		(30)
Slope Roof	19.7200		19.7200	0.1100	2.1692		(30)
Total net area of external elements Aum(A, m2)			148.4900				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	41.9498	(33)
Main dwelling							
Party Wall 1			98.9400	0.0000	0.0000		(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 209.5270 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element	12.6700	0.0500	0.6335
E2 Other lintels (including other steel lintels)	7.0600	0.0500	0.3530
E3 Sill	26.8600	0.0500	1.3430
E4 Jamb	10.5800	0.1600	1.6928
E5 Ground floor (normal)	26.9300	0.0000	0.0000
E6 Intermediate floor within a dwelling	6.7390	0.0400	0.2696
E11 Eaves (insulation at rafter level)	2.6610	0.0600	0.1597
E12 Gable (insulation at ceiling level)	0.9440	0.0800	0.0755
E13 Gable (insulation at rafter level)	6.6000	0.0900	0.5940
E16 Corner (normal)	2.4000	-0.0900	-0.2160
E17 Corner (inverted - internal area greater than external area)	20.4000	0.0600	1.2240
E18 Party wall between dwellings	13.6600	0.0800	1.0928
P1 Party wall - Ground floor	14.2300	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	11.4000	0.1200	1.3680
P4 Party wall - Roof (insulation at ceiling level)	8.9100	0.0800	0.7128
P5 Party wall - Roof (insulation at rafter level)	8.5800	0.0600	0.5148
R6 Flat ceiling	1.1100	0.0400	0.0444
R7 Flat ceiling (inverted)	1.5100	0.0600	0.0906
R8 Roof to wall (rafter)	2.4600	0.0400	0.0984
R9 Roof to wall (flat ceiling)			

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 10.0508 (36)

Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 52.0006 (37)

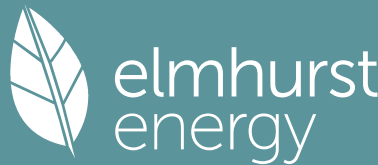
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	48.6923	48.3772	48.0683	46.6174	46.3460	45.0823	45.0823	44.8483	45.5691	46.3460	46.8951	47.4692	(38)
Average = Sum(39)m / 12 =	100.6929	100.3778	100.0689	98.6180	98.3466	97.0829	97.0829	96.8489	97.5697	98.3466	98.8957	99.4698	(39)
												98.6167	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.9910	0.9879	0.9848	0.9706	0.9679	0.9554	0.9554	0.9531	0.9602	0.9679	0.9733	0.9789	(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												2.7539 (42)
Hot water usage for mixer showers	70.3943	69.3364	67.7948	64.8454	62.6687	60.2413	58.8616	60.3915	62.0686	64.6748	67.6876	70.1246 (42a)
Hot water usage for baths	30.3951	29.9437	29.3080	28.1359	27.2583	26.2851	25.7594	26.3907	27.0780	28.1193	29.3155	30.2923 (42b)
Hot water usage for other uses	42.8331	41.2755	39.7179	38.1604	36.6028	35.0452	35.0452	36.6028	38.1604	39.7179	41.2755	42.8331 (42c)
Average daily hot water use (litres/day)												132.0214 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	143.6224	140.5556	136.8208	131.1416	126.5298	121.5717	119.6663	123.3850	127.3069	132.5121	138.2787	143.2500 (44)
Energy content (annual)	227.4628	200.1493	210.2884	179.5264	170.3334	149.4866	144.7260	152.7764	156.9822	179.8176	197.0033	224.2948 (45)
Distribution loss (46)m = 0.15 x (45)m	Total = Sum(45)m =											2192.8473
	34.1194	30.0224	31.5433	26.9290	25.5500	22.4230	21.7089	22.9165	23.5473	26.9726	29.5505	33.6442 (46)
Water storage loss:												
Store volume												198.4000 (47)

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a) If manufacturer declared loss factor is known (kWh/day):												1.6446 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8881 (55)
Total storage loss	27.5311	24.8668	27.5311	26.6430	27.5311	26.6430	27.5311	27.5311	26.6430	27.5311	26.6430	27.5311 (56)
If cylinder contains dedicated solar storage	27.5311	24.8668	27.5311	26.6430	27.5311	26.6430	27.5311	27.5311	26.6430	27.5311	26.6430	27.5311 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	278.2564	246.0273	261.0820	228.6814	221.1270	198.6416	195.5196	203.5699	206.1372	230.6111	246.1584	275.0884 (62)
WWHRS	-32.1813	-28.4614	-29.8032	-24.6782	-22.9992	-19.6806	-18.4474	-19.6170	-20.3623	-24.0049	-27.1946	-31.5854 (63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	246.0750	217.5659	231.2788	204.0032	198.1278	178.9610	177.0722	183.9530	185.7749	206.6063	218.9637	243.5030 (64)
	Total per year (kWh/year) = Sum(64)m =											2491.8847 (64)
12Total per year (kWh/year)												2492 (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	116.2662	103.2521	110.5557	99.0165	97.2707	89.0283	88.7562	91.4330	91.5206	100.4242	104.8276	115.2129 (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	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969	137.6969 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	132.9298	147.1723	132.9298	137.3608	132.9298	137.3608	132.9298	132.9298	137.3608	132.9298	137.3608	132.9298 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	258.9046	261.5912	254.8210	240.4081	222.2143	205.1148	193.6912	191.0046	197.7748	212.1877	230.3815	247.4810 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697	36.7697 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575	-110.1575 (71)
Water heating gains (Table 5)	156.2718	153.6489	148.5964	137.5230	130.7402	123.6504	119.2960	122.8938	127.1119	134.9787	145.5939	154.8560 (72)
Total internal gains	615.4152	629.7214	603.6563	582.6009	553.1934	530.4351	510.2261	511.1372	526.5566	547.4053	580.6453	602.5759 (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			
East				8.8500	19.6403	0.6300	0.7000	0.7700	53.1205 (76)			
West				9.8400	19.6403	0.6300	0.7000	0.7700	59.0628 (80)			
Solar gains	112.1834	219.4544	361.4102	527.0953	645.9750	661.2704	629.5564	540.7796	420.3350	260.4012	139.8795	92.2541 (83)
Total gains	727.5986	849.1759	965.0665	1109.6962	1199.1684	1191.7054	1139.7825	1051.9169	946.8916	807.8065	720.5247	694.8300 (84)

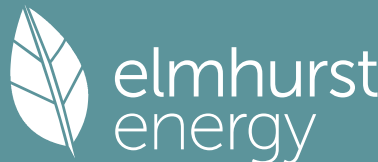
7. Mean internal temperature (heating season)

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	58.7320	58.9164	59.0983	59.9677	60.1333	60.9160	60.9160	61.0631	60.6121	60.1333	59.7994	59.4542
alpha	4.9155	4.9278	4.9399	4.9978	5.0089	5.0611	5.0611	5.0709	5.0408	5.0089	4.9866	4.9636
util living area	0.9907	0.9796	0.9510	0.8620	0.7047	0.5120	0.3731	0.4204	0.6688	0.9149	0.9806	0.9925 (86)
MIT	19.7977	20.0180	20.3318	20.7025	20.9125	20.9858	20.9976	20.9958	20.9497	20.6432	20.1607	19.7686 (87)
Th 2	20.0909	20.0935	20.0960	20.1079	20.1102	20.1206	20.1206	20.1226	20.1166	20.1102	20.1057	20.1009 (88)
util rest of house	0.9883	0.9745	0.9388	0.8316	0.6524	0.4454	0.2994	0.3417	0.5976	0.8882	0.9748	0.9905 (89)
MIT 2	18.6923	18.9725	19.3651	19.8137	20.0380	20.1122	20.1198	20.1209	20.0823	19.7588	19.1645	18.6625 (90)
Living area fraction	fLA = Living area / (4) =											0.2397 (91)
MIT	18.9573	19.2232	19.5968	20.0267	20.2477	20.3216	20.3302	20.3306	20.2902	19.9708	19.4033	18.9277 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.9573	19.2232	19.5968	20.0267	20.2477	20.3216	20.3302	20.3306	20.2902	19.9708	19.4033	18.9277 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9841	0.9680	0.9306	0.8286	0.6609	0.4608	0.3171	0.3606	0.6122	0.8833	0.9687	0.9869 (94)
Useful gains	716.0179	822.0229	898.0833	919.4468	792.5274	549.1846	361.3941	379.2722	579.6995	713.5704	697.9984	685.7146 (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												
	1475.8870	1437.7280	1310.5866	1097.2969	840.6334	555.4741	362.1407	380.6781	603.9801	921.5848	1216.7484	1464.9596 (97)
Space heating kWh												
	565.3426	413.7538	306.9025	128.0521	35.7909	0.0000	0.0000	0.0000	0.0000	154.7627	373.5000	579.7583 (98a)
Space heating requirement - total per year (kWh/year)												2557.8628
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												
	565.3426	413.7538	306.9025	128.0521	35.7909	0.0000	0.0000	0.0000	0.0000	154.7627	373.5000	579.7583 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2557.8628
Space heating per m2											(98c) / (4) =	25.1733 (99)

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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	565.3426	413.7538	306.9025	128.0521	35.7909	0.0000	0.0000	0.0000	0.0000	154.7627	373.5000	579.7583 (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)	612.5055	448.2706	332.5054	138.7347	38.7767	0.0000	0.0000	0.0000	0.0000	167.6735	404.6587	628.1238 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	246.0750	217.5659	231.2788	204.0032	198.1278	178.9610	177.0722	183.9530	185.7749	206.6063	218.9637	243.5030 (64)
Efficiency of water heater	85.8632	85.4777	84.6951	83.0458	81.0570	79.8000	79.8000	79.8000	79.8000	83.4209	85.2467	79.8000 (216)
(217)m												85.9334 (217)
Fuel for water heating, kWh/month	286.5895	254.5293	273.0723	245.6514	244.4302	224.2620	221.8950	230.5175	232.8006	247.6672	256.8588	283.3625 (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)
(221)m												
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	27.6202	22.1579	19.9508	14.6168	11.2904	9.2244	10.2995	13.3877	17.3893	22.8157	25.7703	28.3878 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-34.9448	-50.2825	-73.7414	-84.6290	-92.6961	-87.0036	-85.8953	-80.3630	-70.8670	-58.2320	-38.7635	-30.0911 (233a)
(233a)m												
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)
(234a)m												
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)
(235a)m												
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
(235c)m												
Electricity generated by PVs (Appendix M) (negative quantity)	-16.7706	-35.5820	-71.2963	-107.9367	-143.5716	-144.6014	-142.9391	-120.6707	-87.9524	-51.2133	-22.4940	-13.2423 (233b)
(233b)m												
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
(234b)m												
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
(235b)m												
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)
(235d)m												
Annual totals kWh/year												
Space heating fuel - main system 1												2771.2490 (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												3001.6362 (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)												222.9107 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1745.7795 (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												4336.0165 (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	2771.2490	0.2100	581.9623 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3001.6362	0.2100	630.3436 (264)
Space and water heating			1212.3059 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	222.9107	0.1443	32.1729 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-787.5093	0.1342	-105.6604
PV Unit electricity exported	-958.2702	0.1257	-120.4124
Total			-226.0728 (269)
Total CO2, kg/year			1030.3352 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.1400 (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	2771.2490	1.1300	3131.5114 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3001.6362	1.1300	3391.8490 (278)
Space and water heating			6523.3603 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	222.9107	1.5338	341.9079 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-787.5093	1.4958	-1177.9939
PV Unit electricity exported	-958.2702	0.4612	-441.9851
Total			-1619.9790 (283)
Total Primary energy kWh/year			5375.3900 (286)

Target Primary Energy Rate (TPER)

52.9000 (287)