

Full SAP Calculation Printout



Property Reference	404	Issued on Date	22/08/2024
Assessment Reference	404	Prop Type Ref	
Property	30-48 Lawrence Road, 404, N15 4EG		
SAP Rating	91 B	DER	2.65
Environmental	98 A	TER	12.27
CO ₂ Emissions (t/year)	0.13	% DER < TER	78.40
Compliance Check	See BREL	DFEE	19.10
% DPER < TPER	57.05	TFEE	20.50
		% DFEE < TFEE	6.81
		DPER	28.37
		TPER	66.04
Assessor Details	Mr. Ondrej Gajdos	Assessor ID	W452-0001
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	52.0000	2.6000	135.2000
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.0000		
Dwelling volume			

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	3.0000	(17)
Infiltration rate	0.1500	(18)
Number of sides sheltered	3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1162 (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)
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	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366 (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) =												81.0000 (23c)
Effective ac	0.2432	0.2403	0.2374	0.2229	0.2200	0.2054	0.2054	0.2025	0.2112	0.2200	0.2258	0.2316 (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
1 (Uw = 1.20)			3.1300	1.1450	3.5840		(27)
2 (Uw = 1.20)			3.1300	1.1450	3.5840		(27)
3 (Uw = 1.20)			3.1300	1.1450	3.5840		(27)
1			2.5000	1.0000	2.5000		(26)
Terrace	21.0600	11.8900	9.1700	0.1600	1.4672	14.0000	128.3800 (29a)
Total net area of external elements Aum(A, m ²)			21.0600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	14.7191		(33)
PW			72.9000	0.0000	0.0000	20.0000	1458.0000 (32)
PF			52.0000			2080.0000	(32d)
PC			52.0000			30.0000	1560.0000 (32b)
IW			108.0000			9.0000	972.0000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	6198.3800 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							119.1996 (35)
List of Thermal Bridges							

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K1 Element												
E2 Other lintels (including other steel lintels)												
Thermal bridges (Sum(L x Psi) calculated using Appendix K)												
Point Thermal bridges												
Total fabric heat loss												
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	10.8514	10.7218	10.5921	9.9438	9.8141	9.1658	9.1658	9.0361	9.4251	9.8141	10.0735	10.3328 (38)
Average = Sum(39)m / 12 =	26.6236	26.4939	26.3642	25.7159	25.5862	24.9379	24.9379	24.8082	25.1972	25.5862	25.8456	26.1049 (39)
												25.6835
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.5120	0.5095	0.5070	0.4945	0.4920	0.4796	0.4796	0.4771	0.4846	0.4920	0.4970	0.5020 (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												1.7491 (42)
Hot water usage for mixer showers												
53.5457	52.7410	51.5684	49.3249	47.6692	45.8228	44.7733	45.9370	47.2127	49.1951	51.4869	53.3405 (42a)	
Hot water usage for baths												
23.1496	22.8058	22.3217	21.4290	20.7606	20.0194	19.6190	20.0998	20.6232	21.4163	22.3274	23.0714 (42b)	
Hot water usage for other uses												
32.5422	31.3589	30.1755	28.9922	27.8088	26.6255	26.6255	27.8088	28.9922	30.1755	31.3589	32.5422 (42c)	
Average daily hot water use (litres/day)												100.4145 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	109.2375	106.9057	104.0656	99.7460	96.2386	92.4676	91.0178	93.8456	96.8281	100.7870	105.1731	108.9541 (44)
Energy conte	173.0055	152.2323	159.9449	136.5473	129.5556	113.6997	110.0781	116.2005	119.3987	136.7670	149.8384	170.5958 (45)
Energy content (annual)												Total = Sum(45)m = 1667.8640
Distribution loss (46)m = 0.15 x (45)m												
25.9508	22.8348	23.9917	20.4821	19.4333	17.0550	16.5117	17.4301	17.9098	20.5151	22.4758	25.5894 (46)	
Water storage loss:												
Store volume												180.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.4000 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.7560 (55)
Total storage loss												
23.4360	21.1680	23.4360	22.6800	23.4360	22.6800	23.4360	23.4360	22.6800	23.4360	22.6800	23.4360 (56)	
If cylinder contains dedicated solar storage												
23.4360	21.1680	23.4360	22.6800	23.4360	22.6800	23.4360	23.4360	22.6800	23.4360	22.6800	23.4360 (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 (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												
196.4415	173.4003	183.3809	159.2273	152.9916	136.3797	133.5141	139.6365	142.0787	160.2030	172.5184	194.0318 (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												
196.4415	173.4003	183.3809	159.2273	152.9916	136.3797	133.5141	139.6365	142.0787	160.2030	172.5184	194.0318 (64)	
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 1943.8040 (64)
Electric shower(s)												1944 (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												
57.5243	50.6172	53.1817	45.4020	43.0772	37.8052	36.6010	38.6367	39.7001	45.4750	49.8213	56.7231 (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
87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
77.1953	85.4662	77.1953	79.7684	77.1953	79.7684	77.1953	77.1953	77.1953	79.7684	77.1953	79.7684	77.1953 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
152.4259	154.0076	150.0218	141.5364	130.8251	120.7580	114.0326	112.4509	116.4367	124.9221	135.6334	145.7005 (68)	
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454 (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)												
-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628 (71)
Water heating gains (Table 5)												
77.3177	75.3233	71.4808	63.0583	57.8995	52.5072	49.1949	51.9310	55.1390	61.1223	69.1962	76.2407 (72)	
Total internal gains												
356.1749	364.0331	347.9339	333.5992	315.1560	302.2697	289.6588	290.8132	300.5802	312.4758	333.8341	348.3726 (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			
West	3.1300		19.6403		0.6000		0.8000		0.7700		20.4487 (80)	
West	3.1300		19.6403		0.6000		0.8000		0.7700		20.4487 (80)	
East	3.1300		19.6403		0.6000		0.8000		0.7700		20.4487 (76)	
Solar gains	61.3462	120.0061	197.6330	288.2359	353.2439	361.6080	344.2655	295.7190	229.8553	142.3974	76.4914	50.4481 (83)
Total gains	417.5211	484.0392	545.5668	621.8351	668.3999	663.8777	633.9243	586.5322	530.4355	454.8731	410.3256	398.8207 (84)

7. Mean internal temperature (heating season)												
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Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)	
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	64.6710	64.9875	65.3071	66.9536	67.2929	69.0424	69.0424	69.4032	68.3318	67.2929	66.6177	65.9559	
alpha	5.3114	5.3325	5.3538	5.4636	5.4862	5.6028	5.6028	5.6269	5.5555	5.4862	5.4412	5.3971	
util living area	0.8668	0.7844	0.6658	0.4946	0.3552	0.2403	0.1731	0.1945	0.3273	0.5718	0.7836	0.8808 (86)	
Living	20.6696	20.7876	20.8794	20.9314	20.9417	20.9445	20.9446	20.9448	20.9434	20.9235	20.8183	20.6545	
Non living	20.1205	20.2632	20.3718	20.4408	20.4539	20.4684	20.4685	20.4711	20.4627	20.4356	20.3123	20.1107	
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	20.8310	20.7876	20.8794	20.9314	20.9417	20.9445	20.9446	20.9448	20.9434	20.9235	20.8183	20.7028 (87)	
Th 2	20.5099	20.5121	20.5144	20.5258	20.5281	20.5396	20.5396	20.5419	20.5350	20.5281	20.5236	20.5190 (88)	
util rest of house													
	0.8551	0.7693	0.6476	0.4762	0.3374	0.2231	0.1550	0.1752	0.3054	0.5481	0.7662	0.8701 (89)	
MIT 2	20.3546	20.2632	20.3718	20.4408	20.4539	20.4684	20.4685	20.4711	20.4627	20.4356	20.3123	20.1842 (90)	
Living area fraction									fLA = Living area / (4) =				0.2365 (91)
MIT	20.4673	20.3873	20.4919	20.5569	20.5693	20.5810	20.5811	20.5832	20.5764	20.5510	20.4320	20.3069 (92)	
Temperature adjustment												0.0000	
adjusted MIT	20.4673	20.3873	20.4919	20.5569	20.5693	20.5810	20.5811	20.5832	20.5764	20.5510	20.4320	20.3069 (93)	

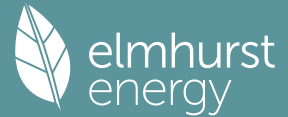
8. Space heating requirement													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8541	0.7652	0.6468	0.4774	0.3389	0.2246	0.1566	0.1769	0.3073	0.5493	0.7627	0.8651 (94)	
Useful gains	356.5985	370.4085	352.8506	296.8590	226.5322	149.1278	99.2790	103.7722	163.0255	249.8543	312.9601	345.0145 (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													
	430.4313	410.3178	368.8846	299.7670	226.9325	149.1547	99.2815	103.7772	163.1873	254.6095	344.5719	420.4690 (97)	
Space heating kWh													
	54.9316	26.8191	11.9293	2.0938	0.2978	0.0000	0.0000	0.0000	0.0000	3.5379	22.7605	56.1382 (98a)	
Space heating requirement - total per year (kWh/year)												178.5082	
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													
	54.9316	26.8191	11.9293	2.0938	0.2978	0.0000	0.0000	0.0000	0.0000	3.5379	22.7605	56.1382 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												178.5082	
Space heating per m2										(98c) / (4) =		3.4328 (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 %)												186.5378 (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													
	54.9316	26.8191	11.9293	2.0938	0.2978	0.0000	0.0000	0.0000	0.0000	3.5379	22.7605	56.1382 (98)	
Space heating efficiency (main heating system 1)													
	186.5378	186.5378	186.5378	186.5378	186.5378	0.0000	0.0000	0.0000	0.0000	186.5378	186.5378	186.5378 (210)	
Space heating fuel (main heating system)													
	29.4480	14.3773	6.3951	1.1224	0.1596	0.0000	0.0000	0.0000	0.0000	1.8966	12.2016	30.0948 (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													
	196.4415	173.4003	183.3809	159.2273	152.9916	136.3797	133.5141	139.6365	142.0787	160.2030	172.5184	194.0318 (64)	
Efficiency of water heater													
(217)m	309.4980	309.4980	309.4980	309.4980	309.4980	309.4980	309.4980	309.4980	309.4980	309.4980	309.4980	309.4980 (216)	
Fuel for water heating, kWh/month													
	63.4710	56.0263	59.2511	51.4470	49.4322	44.0648	43.1389	45.1171	45.9062	51.7622	55.7414	62.6924 (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													
	9.4560	8.5409	9.4560	9.1510	9.4560	9.1510	9.4560	9.4560	9.1510	9.4560	9.1510	9.4560 (231)	
Lighting													
	16.0397	12.8676	11.5858	8.4883	6.5566	5.3568	5.9811	7.7745	10.0983	13.2496	14.9654	16.4854 (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												95.6954 (211)	
Space heating fuel - main system 2												0.0000 (213)	
Space heating fuel - secondary												0.0000 (215)	
Efficiency of water heater												309.4980	
Water heating fuel used												628.0506 (219)	
Space cooling fuel												0.0000 (221)	
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.6750)													
mechanical ventilation fans (SFP = 0.6750)												111.3372 (230a)	
Total electricity for the above, kWh/year												111.3372 (231)	
Electricity for lighting (calculated in Appendix L)												129.4492 (232)	

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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	964.5324 (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	95.6954	0.1595	15.2662 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	628.0506	0.1412	88.6627 (264)
Space and water heating			103.9289 (265)
Pumps, fans and electric keep-hot	111.3372	0.1387	15.4438 (267)
Energy for lighting	129.4492	0.1443	18.6835 (268)
Total CO2, kg/year			138.0563 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			2.6500 (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	95.6954	1.5904	152.1955 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	628.0506	1.5220	955.9015 (278)
Space and water heating			1108.0971 (279)
Pumps, fans and electric keep-hot	111.3372	1.5128	168.4309 (281)
Energy for lighting	129.4492	1.5338	198.5535 (282)
Total Primary energy kWh/year			1475.0814 (286)
Dwelling Primary energy Rate (DPER)			28.3700 (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	52.0000 (1b)	x 2.6000 (2b)	= 135.2000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 135.2000 (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	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1479 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3979	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =		0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =		0.3084 (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	0.3932	0.3855	0.3778	0.3392	0.3315	0.2930	0.2930	0.2853	0.3084	0.3315	0.3469	0.3624 (22b)
Effective ac	0.5773	0.5743	0.5714	0.5575	0.5550	0.5429	0.5429	0.5407	0.5476	0.5550	0.5602	0.5657 (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			2.5000	1.0000	2.5000		(26)
TER Opening Type (Uw = 1.20)			9.3900	1.1450	10.7519		(27)

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Terrace	21.0600	11.8900	9.1700	0.1800	1.6506	(29a)
Total net area of external elements Aum(A, m2)	21.0600		21.0600			(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		14.9025	(33)
PW			72.9000	0.0000	0.0000	(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 129.1996 (35)

List of Thermal Bridges													
K1 Element													
E2 Other lintels (including other steel lintels)													
Thermal bridges (Sum(L x Psi) calculated using Appendix K)													
Point Thermal bridges													
Total fabric heat loss													

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	25.7570	25.6231	25.4918	24.8752	24.7598	24.2228	24.2228	24.1233	24.4297	24.7598	24.9932	25.2372	(38)
Heat transfer coeff	41.7125	41.5786	41.4473	40.8307	40.7153	40.1783	40.1783	40.0789	40.3852	40.7153	40.9487	41.1927	(39)
Average = Sum(39)m / 12 =												40.8302	(39)

HLP	0.8022	0.7996	0.7971	0.7852	0.7830	0.7727	0.7727	0.7707	0.7766	0.7830	0.7875	0.7922	(40)
HLP (average)												0.7852	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	(40)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7491 (42)
Hot water usage for mixer showers													
53.5457	52.7410	51.5684	49.3249	47.6692	45.8228	44.7733	45.9370	47.2127	49.1951	51.4869	53.3405	(42a)	
Hot water usage for baths													
23.1496	22.8058	22.3217	21.4290	20.7606	20.0194	19.6190	20.0998	20.6232	21.4163	22.3274	23.0714	(42b)	
Hot water usage for other uses													
32.5422	31.3589	30.1755	28.9922	27.8088	26.6255	26.6255	27.8088	28.9922	30.1755	31.3589	32.5422	(42c)	
Average daily hot water use (litres/day)													100.4145 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
109.2375	106.9057	104.0656	99.7460	96.2386	92.4676	91.0178	93.8456	96.8281	100.7870	105.1731	108.9541	(44)	
Energy content (annual)	173.0055	152.2323	159.9449	136.5473	129.5556	113.6997	110.0781	116.2005	119.3987	136.7670	149.8384	170.5958	(45)
Distribution loss (46)m = 0.15 x (45)m													
25.9508	22.8348	23.9917	20.4821	19.4333	17.0550	16.5117	17.4301	17.9098	20.5151	22.4758	25.5894	(46)	
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss													
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)	
If cylinder contains dedicated solar storage													
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	(59)	
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)	
Total heat required for water heating calculated for each month													
219.6004	194.3180	206.5398	181.6392	176.1505	158.7916	156.6730	162.7954	164.4906	183.3619	194.9303	217.1907	(62)	
WWHRS	-24.4788	-21.6493	-22.6699	-18.7716	-17.4944	-14.9701	-14.0321	-14.9217	-15.4886	-18.2594	-20.6857	-24.0255	(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													
195.1216	172.6687	183.8700	162.8676	158.6561	143.8215	142.6410	147.8737	149.0019	165.1025	174.2446	193.1652	(64)	
12Total per year (kWh/year)													1989.0342 (64)
Electric shower(s)													1989 (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													
94.8003	84.2858	90.4576	81.4755	80.3532	73.8786	73.8769	75.9126	75.7735	82.7510	85.8947	93.9990	(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	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535	87.4535 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	78.4833	86.8922	78.4833	81.0994	78.4833	81.0994	78.4833	78.4833	81.0994	78.4833	81.0994	78.4833 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	152.4259	154.0076	150.0218	141.5364	130.8251	120.7580	114.0326	112.4509	116.4367	124.9221	135.6334	145.7005 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454	31.7454 (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)												
	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628	-69.9628 (71)
Water heating gains (Table 5)												
	127.4197	125.4253	121.5828	113.1604	108.0016	102.6092	99.2969	102.0330	105.2410	111.2244	119.2983	126.3428 (72)
Total internal gains												
	410.5650	418.5612	402.3240	388.0322	369.5461	353.7027	341.0489	342.2033	352.0133	366.8659	388.2672	402.7627 (73)

6. Solar gains

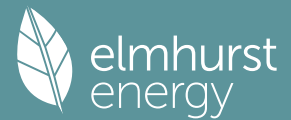
[Jan]													
Area													
m2													
Solar flux													
Table 6a													
W/m2													
Specific data													
or Table 6b													
Specific data													
or Table 6c													
Access													
factor													
Table 6d													
Gains													
W													
East													
West													
3.1300													
6.2600													
19.6403													
0.6300													
0.6300													
0.7000													
0.7000													
18.7873													(76)
37.5745													(80)
Solar gains	56.3618	110.2556	181.5753	264.8167	324.5428	332.2273	316.2940	271.6918	211.1796	130.8276	70.2765	46.3492	(83)
Total gains	466.9268	528.8169	583.8993	652.8490	694.0889	685.9301	657.3429	613.8952	563.1928	497.6935	458.5437	449.1118	(84)

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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	44.7400	44.8841	45.0262	45.7062	45.8357	46.4484	46.4484	46.5636	46.2104	45.8357	45.5745	45.3045
alpha	3.9827	3.9923	4.0017	4.0471	4.0557	4.0966	4.0966	4.1042	4.0807	4.0557	4.0383	4.0203
util living area	0.9224	0.8815	0.8114	0.6778	0.5233	0.3706	0.2680	0.2988	0.4802	0.7327	0.8776	0.9303 (86)
MIT	20.0117	20.2440	20.5265	20.8074	20.9422	20.9891	20.9978	20.9965	20.9693	20.7802	20.3772	19.9775 (87)
Th 2	20.2515	20.2537	20.2559	20.2662	20.2681	20.2771	20.2771	20.2788	20.2736	20.2681	20.2642	20.2601 (88)
util rest of house												
	0.9122	0.8672	0.7904	0.6480	0.4868	0.3301	0.2244	0.2526	0.4337	0.6990	0.8606	0.9210 (89)
MIT 2	19.1095	19.3955	19.7370	20.0693	20.2153	20.2690	20.2759	20.2768	20.2492	20.0484	19.5719	19.0739 (90)
Living area fraction												0.2365 (91)
fLA = Living area / (4) =												0.2365 (91)
MIT	19.3229	19.5962	19.9237	20.2439	20.3873	20.4393	20.4466	20.4470	20.4195	20.2215	19.7624	19.2876 (92)
Temperature adjustment												0.0000
adjusted MIT	19.3229	19.5962	19.9237	20.2439	20.3873	20.4393	20.4466	20.4470	20.4195	20.2215	19.7624	19.2876 (93)
8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8973	0.8530	0.7803	0.6470	0.4928	0.3392	0.2346	0.2634	0.4432	0.6967	0.8475	0.9066 (94)
Useful gains	418.9860	451.0652	455.6196	422.4228	342.0526	232.7014	154.2366	161.6927	249.5932	346.7392	388.6111	407.1534 (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	626.6428	611.0462	556.3779	463.1792	353.7047	234.6143	154.5509	162.1996	255.2151	391.7432	518.5096	621.4998 (97)
Space heating kWh	154.4966	107.5072	74.9642	29.3446	8.6692	0.0000	0.0000	0.0000	0.0000	33.4830	93.5269	159.4737 (98a)
Space heating requirement - total per year (kWh/year)												661.4654
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	154.4966	107.5072	74.9642	29.3446	8.6692	0.0000	0.0000	0.0000	0.0000	33.4830	93.5269	159.4737 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												661.4654
Space heating per m2												(98c) / (4) = 12.7205 (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	154.4966	107.5072	74.9642	29.3446	8.6692	0.0000	0.0000	0.0000	0.0000	33.4830	93.5269	159.4737 (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)												
	167.3853	116.4759	81.2180	31.7926	9.3924	0.0000	0.0000	0.0000	0.0000	36.2762	101.3293	172.7776 (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												
	195.1216	172.6687	183.8700	162.8676	158.6561	143.8215	142.6410	147.8737	149.0019	165.1025	174.2446	193.1652 (64)
Efficiency of water heater												
(217)m	83.5416	83.0290	82.2133	81.0542	80.2212	79.8000	79.8000	79.8000	79.8000	81.1874	82.7286	79.8000 (216)
Fuel for water heating, kWh/month												
	233.5622	207.9619	223.6500	200.9368	197.7731	180.2274	178.7481	185.3054	186.7192	203.3598	210.6220	83.6333 (217)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa												
	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting												
	16.3073	13.0823	11.7792	8.6299	6.6660	5.4462	6.0809	7.9042	10.2668	13.4706	15.2151	16.7605 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-9.9266	-15.0678	-23.3024	-28.2608	-32.3346	-30.8838	-30.5220	-27.8850	-23.5749	-18.1145	-11.2914	-8.4625 (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	-2.7631	-6.0012	-12.2863	-18.9901	-25.6398	-25.9464	-25.6283	-21.4438	-15.3955	-8.7407	-3.7397	-2.1704 (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												716.6473 (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												2439.8328 (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)												131.6091 (232)
Energy saving/generation technologies (Appendices M ,N and O)												

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PV generation	-428.3717 (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	2945.7175 (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	716.6473	0.2100	150.4959 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2439.8328	0.2100	512.3649 (264)
Space and water heating			662.8608 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	131.6091	0.1443	18.9953 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-259.6264	0.1331	-34.5448
PV Unit electricity exported	-168.7453	0.1251	-21.1066
Total			-55.6515 (269)
Total CO2, kg/year			638.1339 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.2700 (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	716.6473	1.1300	809.8114 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2439.8328	1.1300	2757.0111 (278)
Space and water heating			3566.8225 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	131.6091	1.5338	201.8664 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-259.6264	1.4917	-387.2754
PV Unit electricity exported	-168.7453	0.4591	-77.4693
Total			-464.7447 (283)
Total Primary energy kWh/year			3434.0450 (286)
Target Primary Energy Rate (TPER)			66.0400 (287)