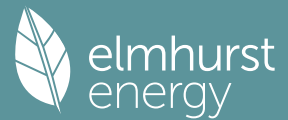


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Property Reference	Flat 1				Issued on Date	26/09/2025	
Assessment Reference	Be Green			Prop Type Ref			
Property	Flat 1, 12a Westbury Avenue, London, N22 6RS						
SAP Rating	79 C	DER	6.01	TER	16.62		
Environmental	96 A	% DER < TER				63.84	
CO ₂ Emissions (t/year)	0.29	DFEE	42.86	TFEE	47.09		
Compliance Check	See BREL	% DFEE < TFEE				8.98	
% DPER < TPER	29.63	DPER	62.26	TPER	88.47		
Assessor Details	Mr. Liam Rushton				Assessor ID	AK74-0001	
Client	George Karaolis, George Karaolis						

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling	60.1100	2.4700	148.4717
Basement floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	60.1100		
Dwelling volume			148.4717

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	2	(19)

Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275 (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	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (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) =												81.9000 (23c)
Effective ac	0.2531	0.2499	0.2467	0.2307	0.2276	0.2116	0.2116	0.2084	0.2180	0.2276	0.2339	0.2403 (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							
W			7.3000	1.1450	8.3588		(27)
GD			4.5600	1.1450	5.2214		(27)
D			1.8500	1.0000	1.8500		(26)
Basement Floor			60.1100	0.0900	5.4099	110.0000	6612.1000 (28a)
Basement Wall	100.6000	13.7100	86.8900	0.1600	13.9024	9.0000	782.0100 (29a)
Total net area of external elements A _{um} (A, m ²)			160.7100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.7425		(33)
Main dwelling							
Party Ceiling			53.4800			30.0000	1604.4000 (32b)
Corridor Above			6.6300			30.0000	198.9000 (32b)
Internal Wall Blockwork			45.7900			75.0000	3434.2500 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12631.6600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		210.1424 (35)
List of Thermal Bridges		

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K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	8.9000	0.0500	0.4450
E3 Sill	8.0500	0.0500	0.4025
E4 Jamb	21.5000	0.0500	1.0750
E16 Corner (normal)	14.8200	0.0900	1.3338
E22 Basement floor	40.7300	0.0700	2.8511
E7 Party floor between dwellings (in blocks of flats)	40.7300	0.0700	2.8511
E17 Corner (inverted - internal area greater than external area)	4.9400	-0.0900	-0.4446
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			8.5139 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	43.2564 (37)

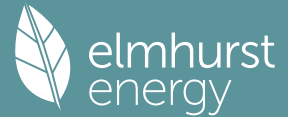
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	12.3990	12.2428	12.0866	11.3057	11.1496	10.3687	10.3687	10.2125	10.6811	11.1496	11.4619	11.7743 (38)
Average = Sum(39)m / 12 =	55.6553	55.4991	55.3430	54.5621	54.4059	53.6251	53.6251	53.4689	53.9374	54.4059	54.7183	55.0306 (39)
												54.5231
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9259	0.9233	0.9207	0.9077	0.9051	0.8921	0.8921	0.8895	0.8973	0.9051	0.9103	0.9155 (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												1.9847 (42)
Hot water usage for mixer showers												
61.0908	60.1727	58.8349	56.2752	54.3862	52.2797	51.0823	52.4100	53.8654	56.1272	58.7418	60.8567 (42a)	
Hot water usage for baths												
24.8489	24.4799	23.9602	23.0020	22.2845	21.4889	21.0591	21.5752	22.1371	22.9884	23.9663	24.7649 (42b)	
Hot water usage for other uses												
34.9558	33.6846	32.4135	31.1424	29.8713	28.6002	28.6002	29.8713	31.1424	32.4135	33.6846	34.9558 (42c)	
Average daily hot water use (litres/day)												111.1404 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
120.8954	118.3372	115.2085	110.4196	106.5420	102.3687	100.7416	103.8564	107.1449	111.5291	116.3928	120.5773 (44)	
Energy conte	191.4688	168.5106	177.0713	151.1589	143.4260	125.8743	121.8382	128.5960	132.1203	151.3439	165.8229	188.7950 (45)
Energy content (annual)										Total = Sum(45)m =		1846.0259
Distribution loss (46)m = 0.15 x (45)m												
28.7203	25.2766	26.5607	22.6738	21.5139	18.8811	18.2757	19.2894	19.8180	22.7016	24.8734	28.3192 (46)	
Water storage loss:												
Store volume												201.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6100 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8694 (55)
Total storage loss												
26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514 (56)	
If cylinder contains dedicated solar storage												
26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514 (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												
218.4202	192.8538	204.0227	177.2409	170.3774	151.9563	148.7896	155.5474	158.2023	178.2953	191.9049	215.7464 (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	218.4202	192.8538	204.0227	177.2409	170.3774	151.9563	148.7896	155.5474	158.2023	178.2953	191.9049	215.7464 (64)
12Total per year (kWh/year)												2163.3569 (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												
63.6634	56.0298	58.8762	50.2603	47.6891	41.8532	40.5112	42.7582	43.9300	50.3219	55.1361	62.7743 (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
99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
88.1169	97.5580	88.1169	91.0542	88.1169	91.0542	88.1169	88.1169	91.0542	88.1169	91.0542	88.1169	88.1169 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
173.2243	175.0218	170.4921	160.8489	148.6761	137.2353	129.5922	127.7947	132.3244	141.9676	154.1404	165.5812 (68)	
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237 (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)												
-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897 (71)
Water heating gains (Table 5)												
85.5690	83.3776	79.1347	69.8060	64.0983	58.1294	54.4505	57.4706	61.0139	67.6369	76.5779	84.3741 (72)	
Total internal gains	399.6814	408.7286	390.5148	374.4802	353.6624	339.1901	324.9308	326.1534	337.1636	350.4926	374.5437	390.8433 (73)

6. Solar gains												
[Jan]	Area	Solar flux	g	FF	Access	Gains						
	m2	Table 6a	W/m2	Specific data	factor	W						
				or Table 6b	Table 6c							
Northeast	3.2300	11.2829	0.5000	0.7000	0.7700	8.8395 (75)						
Southeast	0.9700	36.7938	0.5000	0.7000	0.7700	8.6566 (77)						
Northwest	3.1000	11.2829	0.5000	0.7000	0.7700	8.4837 (81)						
Northeast	4.5600	11.2829	0.5000	0.7000	0.7700	12.4792 (75)						
Solar gains	38.4590	75.4091	129.4720	204.4947	269.2786	285.0260	267.4318	216.3949	155.0253	90.4327	47.8678	31.7464 (83)

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Total gains 438.1404 484.1377 519.9868 578.9749 622.9410 624.2161 592.3626 542.5483 492.1889 440.9252 422.4114 422.5897 (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	63.0451	63.2225	63.4009	64.3083	64.4929	65.4320	65.4320	65.6231	65.0531	64.4929	64.1247	63.7608
alpha	5.2030	5.2148	5.2267	5.2872	5.2995	5.3621	5.3621	5.3749	5.3369	5.2995	5.2750	5.2507
util living area	0.9893	0.9808	0.9609	0.8906	0.7429	0.5396	0.3966	0.4498	0.7062	0.9257	0.9795	0.9910 (86)
MIT	19.9384	20.1033	20.3511	20.6894	20.9071	20.9862	20.9978	20.9958	20.9470	20.6610	20.2551	19.9151 (87)
Th 2	20.1455	20.1477	20.1499	20.1610	20.1632	20.1742	20.1742	20.1764	20.1698	20.1632	20.1588	20.1543 (88)
util rest of house	0.9866	0.9760	0.9510	0.8648	0.6935	0.4740	0.3230	0.3710	0.6378	0.9020	0.9735	0.9887 (89)
MIT 2	18.9106	19.1207	19.4324	19.8474	20.0847	20.1658	20.1734	20.1747	20.1326	19.8249	19.3227	18.8876 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.5114	19.6951	19.9695	20.3396	20.5654	20.6454	20.6553	20.6547	20.6087	20.3137	19.8678	19.4882 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.5114	19.6951	19.9695	20.3396	20.5654	20.6454	20.6553	20.6547	20.6087	20.3137	19.8678	19.4882 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9841	0.9729	0.9485	0.8708	0.7180	0.5118	0.3660	0.4170	0.6751	0.9068	0.9709	0.9864 (94)
Useful gains	431.1572	471.0066	493.2066	504.1622	447.2725	319.4690	216.8272	226.2546	332.2698	399.8202	410.1377	416.8537 (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	846.5969	821.1159	745.4411	624.1693	482.3329	324.1858	217.4668	227.4957	351.0620	528.4824	698.6301	841.3212 (97)
Space heating kWh	309.0871	235.2734	187.6624	86.4051	26.0849	0.0000	0.0000	0.0000	0.0000	95.7247	207.7146	315.8038 (98a)
Space heating requirement - total per year (kWh/year)	1463.7561											
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	309.0871	235.2734	187.6624	86.4051	26.0849	0.0000	0.0000	0.0000	0.0000	95.7247	207.7146	315.8038 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1463.7561											
Space heating per m2	(98c) / (4) = 24.3513 (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)											
Fraction of main heating from main system 2	0.0000 (203)											
Fraction of total heating from main system 1	1.0000 (204)											
Fraction of total heating from main system 2	0.0000 (205)											
Efficiency of main space heating system 1 (in %)	100.0000 (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	309.0871	235.2734	187.6624	86.4051	26.0849	0.0000	0.0000	0.0000	0.0000	95.7247	207.7146	315.8038 (98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000 (210)
Space heating fuel (main heating system)	309.0871	235.2734	187.6624	86.4051	26.0849	0.0000	0.0000	0.0000	0.0000	95.7247	207.7146	315.8038 (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)
Space heating fuel used, main system 2	0.0000 (213)											
Water heating												
Water heating requirement	218.4202	192.8538	204.0227	177.2409	170.3774	151.9563	148.7896	155.5474	158.2023	178.2953	191.9049	215.7464 (64)
Efficiency of water heater (217)m	345.9455	345.9455	345.9455	345.9455	345.9455	345.9455	345.9455	345.9455	345.9455	345.9455	345.9455	345.9455 (216)
Fuel for water heating, kWh/month	63.1372	55.7469	58.9754	51.2337	49.2498	43.9249	43.0096	44.9630	45.7304	51.5386	55.4726	62.3643 (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	13.7842	12.4502	13.7842	13.3395	13.7842	13.3395	13.7842	13.7842	13.3395	13.7842	13.3395	13.7842 (231)
Lighting	19.0463	15.2796	13.7576	10.0794	7.7856	6.3609	7.1023	9.2319	11.9913	15.7332	17.7706	19.5756 (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	1463.7561 (211)											
Space heating fuel - main system 2	0.0000 (213)											
Space heating fuel - secondary	0.0000 (215)											
Efficiency of water heater	345.9455											
Water heating fuel used	625.3461 (219)											
Space cooling fuel	0.0000 (221)											

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Electricity for pumps and fans:

(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8960)	
mechanical ventilation fans (SFP = 0.8960)	162.2974 (230a)
Total electricity for the above, kWh/year	162.2974 (231)
Electricity for lighting (calculated in Appendix L)	153.7144 (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	2405.1140 (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	1463.7561	0.1560	228.3959 (261)
Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO2 associated with community systems			0.0000 (263)
Water heating (other fuel)	625.3461	0.1412	88.2725 (264)
Space and water heating			316.6684 (265)
Pumps, fans and electric keep-hot	162.2974	0.1387	22.5126 (267)
Energy for lighting	153.7144	0.1443	22.1857 (268)
Total CO2, kg/year			361.3668 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.0100 (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	1463.7561	1.5777	2309.3296 (275)
Space heating - main system 2	0.0000	0.0000	0.0000 (276)
Total CO2 associated with community systems			0.0000 (277)
Water heating (other fuel)	625.3461	1.5220	951.7537 (278)
Space and water heating			3261.0833 (279)
Pumps, fans and electric keep-hot	162.2974	1.5128	245.5235 (281)
Energy for lighting	153.7144	1.5338	235.7722 (282)
Total Primary energy kWh/year			3742.3790 (286)
Dwelling Primary energy Rate (DPER)			62.2600 (287)

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

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	60.1100	2.4700	148.4717
Basement floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	60.1100		
Dwelling volume			148.4717

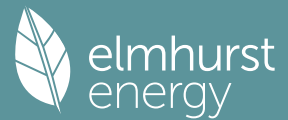
2. Ventilation rate

	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) =	0.1347 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3847	(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) =		0.3270 (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	0.4169	0.4087	0.4006	0.3597	0.3515	0.3106	0.3106	0.3025	0.3270	0.3515	0.3679	0.3842 (22b)
Effective ac	0.5869	0.5835	0.5802	0.5647	0.5618	0.5483	0.5483	0.5457	0.5535	0.5618	0.5677	0.5738 (25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			1.8500	1.0000	1.8500			(26)
TER Opening Type			11.8600	1.1450	13.5802			(27)
Basement Floor			60.1100	0.1300	7.8143			(28a)
Basement Wall	100.6000	13.7100	86.8900	0.1800	15.6402			(29a)
Total net area of external elements Aum(A, m2)			160.7100					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	38.8847		(33)

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

220.1424 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)	8.9000	0.0500	0.4450	
E3 Sill	8.0500	0.0500	0.4025	
E4 Jamb	21.5000	0.0500	1.0750	
E16 Corner (normal)	14.8200	0.0900	1.3338	
E22 Basement floor	40.7300	0.0700	2.8511	
E7 Party floor between dwellings (in blocks of flats)	40.7300	0.0700	2.8511	
E17 Corner (inverted - internal area greater than external area)	4.9400	-0.0900	-0.4446	

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

8.5139 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 47.3986 (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	28.7562	28.5908	28.4288	27.6675	27.5250	26.8620	26.8620	26.7392	27.1174	27.5250	27.8132	28.1144	(38)
Average = Sum(39)m / 12 =	76.1548	75.9894	75.8273	75.0660	74.9236	74.2605	74.2605	74.1377	74.5159	74.9236	75.2117	75.5130	(39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.2669	1.2642	1.2615	1.2488	1.2464	1.2354	1.2354	1.2334	1.2397	1.2464	1.2512	1.2562	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

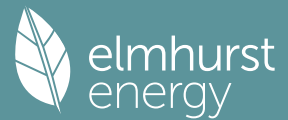
4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.9847 (42)
Hot water usage for mixer showers	57.4972	56.6331	55.3740	52.9649	51.1870	49.2044	48.0775	49.3270	50.6968	52.8256	55.2864	57.2769	(42a)
Hot water usage for baths	24.8489	24.4799	23.9602	23.0020	22.2845	21.4889	21.0591	21.5752	22.1371	22.9884	23.9663	24.7649	(42b)
Hot water usage for other uses	34.9558	33.6846	32.4135	31.1424	29.8713	28.6002	28.6002	29.8713	31.1424	32.4135	33.6846	34.9558	(42c)
Average daily hot water use (litres/day)													107.8273 (43)
Daily hot water use	117.3018	114.7976	111.7477	107.1093	103.3428	99.2934	97.7367	100.7735	103.9763	108.2275	112.9374	116.9975	(44)
Energy conte	185.7774	163.4703	171.7520	146.6272	139.1192	122.0928	118.2041	124.7787	128.2132	146.8637	160.9000	183.1899	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m	27.8666	24.5205	25.7628	21.9941	20.8679	18.3139	17.7306	18.7168	19.2320	22.0296	24.1350	27.4785	(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	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	232.3723	205.5560	218.3469	191.7190	185.7141	167.1847	164.7990	171.3736	173.3050	193.4586	205.9919	229.7848	(62)
WWHRS	-26.2853	-23.2469	-24.3429	-20.1569	-18.7855	-16.0749	-15.0676	-16.0229	-16.6317	-19.6069	-22.2122	-25.7985	(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	206.0870	182.3090	194.0041	171.5622	166.9287	151.1098	149.7314	155.3507	156.6734	173.8517	183.7796	203.9862	(64)
12Total per year (kWh/year)													2095.3738 (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	99.0469	88.0224	94.3835	84.8270	83.5331	76.6693	76.5788	78.7648	78.7044	86.1081	89.5727	98.1866	(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	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	99.2371	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	88.1169	97.5580	88.1169	91.0542	88.1169	91.0542	88.1169	88.1169	91.0542	88.1169	91.0542	88.1169	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	173.2243	175.0218	170.4921	160.8489	148.6761	137.2353	129.5922	127.7947	132.3244	141.9676	154.1404	165.5812	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	32.9237	(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)	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	-79.3897	(71)
Water heating gains (Table 5)	133.1276	130.9858	126.8595	117.8153	112.2756	106.4852	102.9285	105.8667	109.3116	115.7367	124.4066	131.9712	(72)
Total internal gains	450.2399	459.3367	441.2397	425.4895	404.8398	387.5458	373.4088	374.5495	385.4613	401.5924	425.3723	441.4404	(73)

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6. Solar gains

[Jan]	Area m2				Solar flux Table 6a W/m2	Specific data or Table 6b	g or Table 6b	Specific data or Table 6c	FF or Table 6c	Access factor Table 6d	Gains W
Northeast	7.7900				11.2829		0.6300		0.7000	0.7700	26.8616 (75)
Southeast	0.9700				36.7938		0.6300		0.7000	0.7700	10.9073 (77)
Northwest	3.1000				11.2829		0.6300		0.7000	0.7700	10.6895 (81)
Solar gains	48.4584	95.0155	163.1347	257.6633	339.2910	359.1328	336.9640	272.6576	195.3319	113.9451	40.0005 (83)
Total gains	498.6983	554.3522	604.3744	683.1528	744.1308	746.6786	710.3728	647.2070	580.7932	515.5375	481.4409 (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	48.2671	48.3721	48.4755	48.9671	49.0602	49.4983	49.4983	49.5803	49.3286	49.0602	48.8723	48.6773
alpha	4.2178	4.2248	4.2317	4.2645	4.2707	4.2999	4.2999	4.3054	4.2886	4.2707	4.2582	4.2452
util living area	0.9882	0.9804	0.9626	0.9053	0.7827	0.6000	0.4510	0.5106	0.7585	0.9346	0.9792	0.9898 (86)
MIT	19.5012	19.6911	20.0028	20.4403	20.7791	20.9472	20.9877	20.9795	20.8576	20.4255	19.9002	19.4728 (87)
Th 2	19.8668	19.8690	19.8711	19.8811	19.8830	19.8918	19.8918	19.8934	19.8884	19.8830	19.8792	19.8753 (88)
util rest of house	0.9848	0.9748	0.9515	0.8776	0.7247	0.5100	0.3418	0.3955	0.6753	0.9092	0.9722	0.9869 (89)
MIT 2	18.1525	18.3940	18.7866	19.3242	19.7001	19.8615	19.8877	19.8859	19.7914	19.3209	18.6683	18.1222 (90)
Living area fraction	fLA = Living area / (4) =											0.5846 (91)
MIT	18.9410	19.1523	19.4976	19.9767	20.3309	20.4962	20.5307	20.5252	20.4147	19.9667	19.3884	18.9117 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9410	19.1523	19.4976	19.9767	20.3309	20.4962	20.5307	20.5252	20.4147	19.9667	19.3884	18.9117 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9812	0.9703	0.9471	0.8803	0.7495	0.5604	0.4056	0.4625	0.7173	0.9115	0.9683	0.9835 (94)
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	1114.9794	1083.0211	985.5707	831.4833	646.6573	437.8564	291.8993	305.8328	470.5431	701.7832	924.2339	1110.9277 (97)
Space heating kWh	465.5063	366.3379	307.4115	165.6883	66.1713	0.0000	0.0000	0.0000	0.0000	172.5189	326.8485	474.2438 (98a)
Space heating requirement - total per year (kWh/year)												2344.7265
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	465.5063	366.3379	307.4115	165.6883	66.1713	0.0000	0.0000	0.0000	0.0000	172.5189	326.8485	474.2438 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2344.7265
Space heating per m2												(98c) / (4) = 39.0073 (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	465.5063	366.3379	307.4115	165.6883	66.1713	0.0000	0.0000	0.0000	0.0000	172.5189	326.8485	474.2438 (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)	504.3405	396.8991	333.0569	179.5107	71.6916	0.0000	0.0000	0.0000	0.0000	186.9111	354.1153	513.8069 (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	206.0870	182.3090	194.0041	171.5622	166.9287	151.1098	149.7314	155.3507	156.6734	173.8517	183.7796	203.9862 (64)
Efficiency of water heater	85.8296	85.5923	85.0871	83.9817	82.1640	79.8000	79.8000	79.8000	79.8000	84.0425	85.3361	79.8000 (216)
Fuel for water heating, kWh/month	240.1119	212.9969	228.0065	204.2852	203.1654	189.3607	187.6334	194.6750	196.3325	206.8616	215.3598	237.5063 (219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	18.3090	14.6881	13.2250	9.6892	7.4842	6.1147	6.8274	8.8745	11.5271	15.1241	17.0827	18.8178 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-16.1928	-24.0382	-36.3662	-43.1140	-48.4619	-45.9713	-45.4233	-41.9062	-36.0420	-28.4658	-18.2307	-13.8630 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)	-5.8104	-12.4943	-25.3426	-38.8164	-52.0623	-52.5690	-51.9382	-43.6270	-31.5305	-18.0996	-7.8324	-4.5739 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
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)

13a. Primary energy - Individual heating systems including micro-CHP			
	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year
Space heating - main system 1	2540.3321	1.1300	2870.5753 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	2516.2951	1.1300	2843.4135 (278)
Space and water heating			5713.9888 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	147.7638	1.5338	226.6450 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-398.0754	1.4933	-594.4653
PV Unit electricity exported	-344.6964	0.4600	-158.5697
Total			-753.0350 (283)
Total Primary energy kWh/year			5317.6996 (286)
Target Primary Energy Rate (TPER)			88.4700 (287)