Property Reference	Unit 4			**Issued on Date**	15/02/2024
Assessment Reference	Camden High Street	**Prop Type Ref**			
Property					

SAP Rating	79 C	**DER**	23.27	**TER**	13.53
Environmental	86 B	**% DER < TER**			-71.99
CO_2 Emissions (t/year)	0.74	**DFEE**	48.62	**TFEE**	20.24
Compliance Check	See BREL	**% DFEE < TFEE**			-140.21
% DPER < TPER	-84.39	**DPER**	134.72	**TPER**	73.06
Assessor Details	Mr. Neil Ingham			**Assessor ID**	AV35-0001
Client					

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

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		36.7500 (1b)	x	2.5400 (2b)	=	93.3450	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	36.7500						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	93.3450	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	0 * 10 =	0.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
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		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.7500	(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) =	0.6375	(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	0.8128	0.7969	0.7809	0.7013	0.6853	0.6056	0.6056	0.5897	0.6375	0.6853	0.7172	0.7491	(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) =	65.7000	(23c)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Effective ac	0.9843	0.9684	0.9524	0.8728	0.8568	0.7771	0.7771	0.7612	0.8090	0.8568	0.8887	0.9206	(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	
G (Uw = 1.60)			4.7000	1.5038	7.0677			(27)
EW	16.0100	4.7000	11.3100	0.3000	3.3930	110.0000	1244.1000	(29a)
Corriudor	13.7600		13.7600	0.1800	2.4768	190.0000	2614.4000	(29a)
Total net area of external elements Aum(A, m2)			29.7700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		12.9375			(33)
PW			35.8300	0.0000	0.0000	45.0000	1612.3500	(32)
Party Floor 1			36.0700			40.0000	1442.8000	(32d)
Party Ceiling 1			36.7500			30.0000	1102.5000	(32b)
IW			44.9500			9.0000	404.5500	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	8420.7000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		229.1347 (35)
Thermal bridges (Default value 0.200 * total exposed area)		5.9540 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	18.8915 (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	30.3206	29.8297	29.3387	26.8841	26.3931	23.9384	23.9384	23.4475	24.9203	26.3931	27.3750	28.3569	(38)
Heat transfer coeff	49.2121	48.7211	48.2302	45.7755	45.2846	42.8299	42.8299	42.3390	43.8118	45.2846	46.2665	47.2483	(39)
Average = Sum(39)m / 12 =												45.6528	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3391	1.3257	1.3124	1.2456	1.2322	1.1654	1.1654	1.1521	1.1922	1.2322	1.2590	1.2857	(40)
HLP (average)												1.2423	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.3229 (42)

Hot water usage for mixer showers

59.5145	58.6201	57.3168	54.8232	52.9830	50.9308	49.7643	51.0577	52.4756	54.6790	57.2262	59.2865	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

28.1777	27.1531	26.1284	25.1038	24.0791	23.0545	23.0545	24.0791	25.1038	26.1284	27.1531	28.1777	(42c)

Average daily hot water use (litres/day) 80.4865 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	87.6922	85.7732	83.4453	79.9270	77.0621	73.9853	72.8188	75.1369	77.5794	80.8075	84.3793	87.4642	(44)
Energy conte	138.8831	122.1399	128.2523	109.4161	103.7404	90.9735	88.0680	93.0351	95.6631	109.6549	120.2138	136.9478	(45)
Energy content (annual)										Total = Sum(45)m =		1336.9881	
Distribution loss (46)m = 0.15 x (45)m	20.8325	18.3210	19.2378	16.4124	15.5611	13.6460	13.2102	13.9553	14.3495	16.4482	18.0321	20.5422	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	44.6870	39.4792	42.5228	39.4161	39.2700	36.4859	37.1077	38.2889	38.2583	41.1786	41.6117	44.5708	(61)
Total heat required for water heating calculated for each month	183.5701	161.6191	170.7751	148.8321	143.0104	127.4594	125.1757	131.3241	133.9214	150.8335	161.8255	181.5186	(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	183.5701	161.6191	170.7751	148.8321	143.0104	127.4594	125.1757	131.3241	133.9214	150.8335	161.8255	181.5186	(64)
									Total per year (kWh/year) = Sum(64)m =			1819.8650	(64)
12Total per year (kWh/year)												1820	(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	57.3504	50.4813	53.2746	46.2349	44.3112	39.3702	38.5595	40.5064	41.3726	46.7549	50.3740	56.6779	(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	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	64.5021	71.4130	64.5021	66.6522	64.5021	66.6522	64.5021	64.5021	66.6522	64.5021	66.6522	64.5021	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	113.4551	114.6324	111.6657	105.3497	97.3770	89.8838	84.8778	83.7005	86.6673	92.9832	100.9560	108.4492	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	(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)	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	(71)
Water heating gains (Table 5)	77.0838	75.1210	71.6056	64.2151	59.5581	54.6808	51.8273	54.4441	57.4619	62.8426	69.9639	76.1799	(72)
Total internal gains	300.8844	307.0098	293.6167	282.0603	267.2805	254.0601	244.0506	245.4901	253.6247	266.1713	283.4154	294.9745	(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	4.7000	19.6403	0.6300	0.7000	0.7700	28.2109	(76)

Solar gains	28.2109	55.1865	90.8843	132.5494	162.4442	166.2906	158.3154	135.9906	105.7022	65.4834	35.1757	23.1993	(83)
Total gains	329.0953	362.1963	384.5010	414.6097	429.7247	420.3506	402.3660	381.4807	359.3269	331.6548	318.5910	318.1738	(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	47.5307	48.0096	48.4983	51.0990	51.6530	54.6133	54.6133	55.2466	53.3894	51.6530	50.5568	49.5062	
alpha	4.1687	4.2006	4.2332	4.4066	4.4435	4.6409	4.6409	4.6831	4.5593	4.4435	4.3705	4.3004	
util living area	0.9867	0.9787	0.9626	0.9113	0.8080	0.6178	0.4609	0.4996	0.7429	0.9269	0.9760	0.9882	(86)
MIT	19.8029	19.9528	20.1796	20.5250	20.7600	20.8997	20.9263	20.9241	20.8500	20.5534	20.1675	19.8343	(87)
Th 2	19.8103	19.8207	19.8311	19.8837	19.8943	19.9477	19.9477	19.9585	19.9263	19.8943	19.8731	19.8521	(88)
util rest of house													

	0.9827	0.9724	0.9511	0.8842	0.7519	0.5296	0.3544	0.3918	0.6595	0.8988	0.9679	0.9847	(89)
MIT 2	18.4402	18.6373	18.9297	19.3918	19.6631	19.8429	19.8599	19.8702	19.7847	19.4417	18.9506	18.5118	(90)
Living area fraction										fLA = Living area / (4) =		0.6803	(91)
MIT	19.3672	19.5322	19.7799	20.1627	20.4093	20.5618	20.5853	20.5871	20.5094	20.1980	19.7784	19.4114	(92)
Temperature adjustment												-0.1500	
adjusted MIT	19.2172	19.3822	19.6299	20.0127	20.2593	20.4118	20.4353	20.4371	20.3594	20.0480	19.6284	19.2614	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9802	0.9695	0.9487	0.8877	0.7719	0.5698	0.4044	0.4422	0.6954	0.9033	0.9657	0.9824	(94)
Useful gains	322.5878	351.1453	364.7788	368.0630	331.6960	239.5067	162.7366	168.7081	249.8710	299.5913	307.6613	312.5754	(95)
[illegible]	[illegible]000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)	
[illegible]													
	734.1062	705.5888	633.2597	508.6899	387.6028	248.9191	164.2671	170.9286	274.2366	427.8470	579.6451	711.6280	(97)
Space heating kWh													
	306.1697	238.1860	199.7498	101.2513	41.5946	0.0000	0.0000	0.0000	0.0000	95.4222	195.8283	296.8952	(98a)
Space heating requirement - total per year (kWh/year)												1475.0972	
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													
	306.1697	238.1860	199.7498	101.2513	41.5946	0.0000	0.0000	0.0000	0.0000	95.4222	195.8283	296.8952	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1475.0972	
Space heating per m2											(98c) / (4) =	40.1387	(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													
	306.1697	238.1860	199.7498	101.2513	41.5946	0.0000	0.0000	0.0000	0.0000	95.4222	195.8283	296.8952	(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)													
	331.7115	258.0564	216.4137	109.6981	45.0646	0.0000	0.0000	0.0000	0.0000	103.3827	212.1650	321.6632	(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													
	183.5701	161.6191	170.7751	148.8321	143.0104	127.4594	125.1757	131.3241	133.9214	150.8335	161.8255	181.5186	(64)
Efficiency of water heater												79.8000	(216)
(217)m	87.1812	86.8035	86.0850	84.4293	82.3117	79.8000	79.8000	79.8000	79.8000	84.2196	86.1912	87.1221	(217)
Fuel for water heating, kWh/month													
	210.5615	186.1897	198.3796	176.2801	173.7426	159.7236	156.8617	164.5665	167.8213	179.0955	187.7517	208.3497	(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	27.6155	24.9430	27.6155	26.7246	27.6155	26.7246	27.6155	27.6155	26.7246	27.6155	26.7246	27.6155	(231)
Lighting	16.2979	13.0748	11.7724	8.6250	6.6622	5.4431	6.0775	7.8997	10.2609	13.4629	15.2063	16.7509	(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												1598.1551	(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												2169.3234	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, DataSheet: in-use factor = 1.4000, SFP = 2.1000)													
mechanical ventilation fans (SFP = 2.1000)												239.1499	(230a)
central heating pump												41.0000	(230c)
main heating flue fan												45.0000	(230e)
Total electricity for the above, kWh/year												325.1499	(231)
Electricity for lighting (calculated in Appendix L)												131.5336	(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												4224.1621	(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	1598.1551	0.2100	335.6126	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2169.3234	0.2100	455.5579	(264)
Space and water heating			791.1705	(265)
Pumps, fans and electric keep-hot	325.1499	0.1387	45.1023	(267)
Energy for lighting	131.5336	0.1443	18.9844	(268)
Total CO2, kg/year			855.2572	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			23.2700	(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	1598.1551	1.1300	1805.9153	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2169.3234	1.1300	2451.3355	(278)
Space and water heating			4257.2508	(279)
Pumps, fans and electric keep-hot	325.1499	1.5128	491.8868	(281)
Energy for lighting	131.5336	1.5338	201.7506	(282)
Total Primary energy kWh/year			4950.8882	(286)
Dwelling Primary energy Rate (DPER)			134.7200	(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	36.7500	(1b)	x 2.5400	(2b) =	93.3450	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	36.7500					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		93.3450	(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)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.2143 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.4643 (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) =	0.3946 (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	0.5031	0.4933	0.4834	0.4341	0.4242	0.3749	0.3749	0.3650	0.3946	0.4242	0.4439	0.4637	(22b)
Effective ac	0.6266	0.6217	0.6168	0.5942	0.5900	0.5703	0.5703	0.5666	0.5779	0.5900	0.5985	0.6075	(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 Opening Type (Uw = 1.20)			4.7000	1.1450	5.3817			(27)
EW	16.0100	4.7000	11.3100	0.1800	2.0358			(29a)
Corriudor	13.7600		13.7600	0.1800	2.4768			(29a)
Total net area of external elements Aum(A, m2)			29.7700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		9.8943			(33)
PW			35.8300	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		239.1347 (35)
Thermal bridges (User defined value 0.050 * total exposed area)		1.4885 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	11.3828 (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	19.3009	19.1495	19.0011	18.3041	18.1737	17.5665	17.5665	17.4541	17.8004	18.1737	18.4375	18.7133	(38)

Heat transfer coeff

	30.6837	30.5323	30.3839	29.6868	29.5564	28.9493	28.9493	28.8369	29.1832	29.5564	29.8203	30.0961 (39)
Average = Sum(39)m / 12 =												29.6862
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.8349	0.8308	0.8268	0.8078	0.8043	0.7877	0.7877	0.7847	0.7941	0.8043	0.8114	0.8189 (40)
HLP (average)												0.8078
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.3229 (42)
Hot water usage for mixer showers												
	201	57.3168	54.8232	52.9830	50.9308	49.7643	51.0577	52.4756	54.6790	57.2262	59.2865 (42a)
Hot water usage for baths												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses												
	28.1777	27.1531	26.1284	25.1038	24.0791	23.0545	23.0545	24.0791	25.1038	26.1284	27.1531	28.1777 (42c)
Average daily hot water use (litres/day)												80.4865 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	87.6922	85.7732	83.4453	79.9270	77.0621	73.9853	72.8188	75.1369	77.5794	80.8075	84.3793	87.4642	(44)
Energy conte	138.8831	122.1399	128.2523	109.4161	103.7404	90.9735	88.0680	93.0351	95.6631	109.6549	120.2138	136.9478	(45)
Energy content (annual)										Total = Sum(45)m =		1336.9881	
Distribution loss (46)m = 0.15 x (45)m													
	20.8325	18.3210	19.2378	16.4124	15.5611	13.6460	13.2102	13.9553	14.3495	16.4482	18.0321	20.5422	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	44.6870	39.4792	42.5228	39.4161	39.2700	36.4859	37.1077	38.2889	38.2583	41.1786	41.6117	44.5708	(61)
Total heat required for water heating calculated for each month													
	183.5701	161.6191	170.7751	148.8321	143.0104	127.4594	125.1757	131.3241	133.9214	150.8335	161.8255	181.5186	(62)
WWHRS	-27.2076	-24.0626	-25.1970	-20.8641	-19.4446	-16.6389	-15.5963	-16.5851	-17.2152	-20.2948	-22.9916	-26.7037	(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													
	156.3625	137.5565	145.5781	127.9680	123.5659	110.8205	109.5794	114.7390	116.7062	130.5387	138.8339	154.8149	(64)
										Total per year (kWh/year) = Sum(64)m =		1567.0638	(64)
12Total per year (kWh/year)												1567	(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													
	57.3504	50.4813	53.2746	46.2349	44.3112	39.3702	38.5595	40.5064	41.3726	46.7549	50.3740	56.6779	(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	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445	66.1445 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	62.6270	69.3370	62.6270	64.7146	62.6270	64.7146	62.6270	62.6270	64.7146	62.6270	64.7146	62.6270 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	113.4551	114.6324	111.6657	105.3497	97.3770	89.8838	84.8778	83.7005	86.6673	92.9832	100.9560	108.4492 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145	29.6145 (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)												
	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156	-52.9156 (71)
Water heating gains (Table 5)												
	77.0838	75.1210	71.6056	64.2151	59.5581	54.6808	51.8273	54.4441	57.4619	62.8426	69.9639	76.1799 (72)
Total internal gains												
	299.0093	304.9338	291.7416	280.1227	265.4054	252.1225	242.1755	243.6150	251.6871	264.2962	281.4778	293.0995 (73)

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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	4.7000	19.6403	0.6300	0.7000	0.7700	28.2109	(76)

Solar gains	28.2109	55.1865	90.8843	132.5494	162.4442	166.2906	158.3154	135.9906	105.7022	65.4834	35.1757	23.1993 (83)
Total gains	327.2202	360.1204	382.6260	412.6721	427.8497	418.4131	400.4909	379.6056	357.3894	329.7797	316.6535	316.2987 (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, ni1,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	79.5590	79.9536	80.3441	82.2306	82.5934	84.3255	84.3255	84.6543	83.6498	82.5934	81.8627	81.1124
alpha	6.3039	6.3302	6.3563	6.4820	6.5062	6.6217	6.6217	6.6436	6.5767	6.5062	6.4575	6.4075
util living area												
	0.9778	0.9585	0.9169	0.7994	0.6291	0.4417	0.3179	0.3492	0.5577	0.8344	0.9521	0.9809 (86)
MIT	20.3819	20.5294	20.7113	20.9053	20.9815	20.9985	20.9999	20.9997	20.9934	20.8959	20.6353	20.3706 (87)
Th 2	20.2232	20.2267	20.2302	20.2466	20.2496	20.2640	20.2640	20.2666	20.2584	20.2496	20.2434	20.2369 (88)
util rest of house												
	0.9721	0.9486	0.8984	0.7648	0.5826	0.3914	0.2648	0.2937	0.5001	0.7964	0.9391	0.9760 (89)
MIT 2	19.5206	19.7055	19.9271	20.1585	20.2354	20.2631	20.2639	20.2665	20.2544	20.1560	19.8519	19.5178 (90)
Living area fraction									fLA = Living area / (4) =			0.6803 (91)
MIT	20.1065	20.2660	20.4606	20.6666	20.7429	20.7634	20.7646	20.7653	20.7571	20.6594	20.3848	20.0979 (92)
Temperature adjustment												0.0000

adjusted MIT	20.1065	20.2660	20.4606	20.6666	20.7429	20.7634	20.7646	20.7653	20.7571	20.6594	20.3848	20.0979	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9711	0.9491	0.9043	0.7846	0.6134	0.4256	0.3010	0.3315	0.5390	0.8179	0.9418	0.9749	(94)
Useful gains	317.7790	341.7973	346.0110	323.7684	262.4374	178.0625	120.5314	125.8271	192.6494	269.7315	298.2279	308.3705	(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	485.0019	469.1590	424.1765	349.3121	267.2772	178.4253	120.5611	125.8821	194.2752	297.3186	396.1573	478.4644	(97)
Space heating kWh	124.4138	85.5870	58.1552	18.3915	3.6008	0.0000	0.0000	0.0000	0.0000	20.5248	70.5092	126.5498	(98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Space heating kWh	124.4138	85.5870	58.1552	18.3915	3.6008	0.0000	0.0000	0.0000	0.0000	20.5248	70.5092	126.5498	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 507.7321

Space heating per m2 (98c) / (4) = 13.8158 (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 %)												92.4000	(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	124.4138	85.5870	58.1552	18.3915	3.6008	0.0000	0.0000	0.0000	0.0000	20.5248	70.5092	126.5498	(98)
Space heating efficiency (main heating system 1)	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000	(210)
Space heating fuel (main heating system)	134.6470	92.6267	62.9385	19.9042	3.8970	0.0000	0.0000	0.0000	0.0000	22.2130	76.3086	136.9587	(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	156.3625	137.5565	145.5781	127.9680	123.5659	110.8205	109.5794	114.7390	116.7062	130.5387	138.8339	154.8149	(64)
Efficiency of water heater												80.3000	(216)
(217)m	83.8962	83.3943	82.5803	81.2881	80.5206	80.3000	80.3000	80.3000	80.3000	81.3695	83.0045	83.9528	(217)
Fuel for water heating, kWh/month	186.3761	164.9472	176.2866	157.4252	153.4588	138.0082	136.4625	142.8879	145.3378	160.4271	167.2607	184.4071	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	13.0127	10.4392	9.3994	6.8864	5.3192	4.3459	4.8524	6.3073	8.1926	10.7491	12.1411	13.3743	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-8.3175	-12.5685	-19.3539	-23.3757	-26.6719	-25.4643	-25.1831	-23.0536	-19.5453	-15.0861	-9.4472	-7.0980	(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	-2.4443	-5.2997	-10.8281	-16.6967	-22.4948	-22.7321	-22.4367	-18.7810	-13.5046	-7.6892	-3.3003	-1.9196	(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	549.4936	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	80.3000	
Water heating fuel used	1913.2853	(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)	105.0196	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-363.2922	(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	2290.5063	(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	549.4936	0.2100	115.3937	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1913.2853	0.2100	401.7899	(264)
Space and water heating			517.1836	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	105.0196	0.1443	15.1576	(268)

Energy saving/generation technologies				
PV Unit electricity used in dwelling	-215.1651	0.1331	-28.6441	
PV Unit electricity exported	-148.1271	0.1252	-18.5403	
Total			-47.1844	(269)
Total CO2, kg/year			497.0860	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.5300	(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	549.4936	1.1300	620.9278	(275)
Space heating - secondary systems			0.0000	(473)
Water heating (other fuel)	1913.2853	1.1300	2162.0124	(278)
Space and water heating			2782.9401	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	105.0196	1.5338	161.0825	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-215.1651	1.4919	-321.0106	
PV Unit electricity exported	-148.1271	0.4594	-68.0508	
Total			-389.0614	(283)
Total Primary energy kWh/year			2685.0621	(286)
Target Primary Energy Rate (TPER)			73.0600	(287)

Property Reference	Unit 5			**Issued on Date**	15/02/2024
Assessment Reference	Camden High Street		**Prop Type Ref**		
Property					

SAP Rating	78 C	**DER**	23.54	**TER**	13.58
Environmental	86 B	**% DER < TER**			-73.34
CO_2 Emissions (t/year)	0.74	**DFEE**	48.81	**TFEE**	18.47
Compliance Check	See BREL	**% DFEE < TFEE**			-164.21
% DPER < TPER	-85.33	**DPER**	136.57	**TPER**	73.69

Assessor Details	Mr. Neil Ingham	**Assessor ID**	AV35-0001
Client			

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

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		36.0700	(1b)	x 2.5400	(2b) =	91.6178	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	36.0700						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		91.6178	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	0 * 10 =	0.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
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		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.7500	(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) =	0.6375	(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	0.8128	0.7969	0.7809	0.7013	0.6853	0.6056	0.6056	0.5897	0.6375	0.6853	0.7172	0.7491	(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) =	65.7000	(23c)

Effective ac	0.9843	0.9684	0.9524	0.8728	0.8568	0.7771	0.7771	0.7612	0.8090	0.8568	0.8887	0.9206	(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	
G (Uw = 1.60)			2.3400	1.5038	3.5188			(27)
EW	16.1200	2.3400	13.7800	0.3000	4.1340	110.0000	1515.8000	(29a)
Corriudor	16.3600		16.3600	0.1800	2.9448	190.0000	3108.4000	(29a)
Total net area of external elements Aum(A, m2)			32.4800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		10.5976			(33)
PW			41.3500	0.0000	0.0000	45.0000	1860.7500	(32)
Party Floor 1			36.0700			40.0000	1442.8000	(32d)
Party Ceiling 1			36.0700			30.0000	1082.1000	(32b)
IW			32.3600			9.0000	291.2400	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	9301.0900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		257.8622 (35)
Thermal bridges (Default value 0.200 * total exposed area)		6.4960 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	17.0936 (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	29.7596	29.2777	28.7959	26.3866	25.9048	23.4955	23.4955	23.0136	24.4592	25.9048	26.8685	27.8322	(38)
Heat transfer coeff	46.8532	46.3713	45.8895	43.4802	42.9984	40.5891	40.5891	40.1072	41.5528	42.9984	43.9621	44.9258	(39)
Average = Sum(39)m / 12 =												43.3597	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2990	1.2856	1.2722	1.2054	1.1921	1.1253	1.1253	1.1119	1.1520	1.1921	1.2188	1.2455	(40)
HLP (average)												1.2021	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.3063 (42)

Hot water usage for mixer showers

59.1549	58.2659	56.9705	54.4920	52.6628	50.6230	49.4636	50.7492	52.1585	54.3486	56.8804	58.9283	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

28.0073	26.9889	25.9704	24.9520	23.9335	22.9151	22.9151	23.9335	24.9520	25.9704	26.9889	28.0073	(42c)

Average daily hot water use (litres/day) 80.0001 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	87.1622	85.2548	82.9409	79.4439	76.5964	73.5381	72.3787	74.6827	77.1105	80.3191	83.8693	86.9356	(44)
Energy conte	138.0437	121.4017	127.4771	108.7548	103.1134	90.4237	87.5357	92.4728	95.0849	108.9922	119.4872	136.1201	(45)
Energy content (annual)										Total = Sum(45)m =		1328.9074	
Distribution loss (46)m = 0.15 x (45)m	20.7066	18.2103	19.1216	16.3132	15.4670	13.5636	13.1304	13.8709	14.2627	16.3488	17.9231	20.4180	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	44.4169	39.2406	42.2658	39.1778	39.0327	36.2654	36.8834	38.0575	38.0271	40.9297	41.3602	44.3014	(61)
Total heat required for water heating calculated for each month	182.4606	160.6423	169.7429	147.9326	142.1461	126.6891	124.4191	130.5303	133.1120	149.9219	160.8474	180.4216	(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	182.4606	160.6423	169.7429	147.9326	142.1461	126.6891	124.4191	130.5303	133.1120	149.9219	160.8474	180.4216	(64)
									Total per year (kWh/year) = Sum(64)m =			1808.8659	(64)
12Total per year (kWh/year)												1809	(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	57.0038	50.1762	52.9526	45.9554	44.0434	39.1322	38.3265	40.2616	41.1225	46.4723	50.0695	56.3353	(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	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	72.0332	79.7510	72.0332	74.4343	72.0332	74.4343	72.0332	72.0332	74.4343	72.0332	74.4343	72.0332	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	111.7916	112.9516	110.0283	103.8050	95.9492	88.5658	83.6333	82.4733	85.3965	91.6199	99.4757	106.8590	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	(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)	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	(71)
Water heating gains (Table 5)	76.6179	74.6670	71.1728	63.8270	59.1981	54.3503	51.5141	54.1150	57.1146	62.4628	69.5410	75.7195	(72)
Total internal gains	306.0365	312.9634	298.8281	287.6600	272.7742	259.9442	249.7743	251.2152	259.5392	271.7096	289.0447	300.2055	(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	
West	2.3400	19.6403	0.6300	0.7000	0.7700	14.0454	(80)

Solar gains	14.0454	27.4758	45.2488	65.9927	80.8765	82.7915	78.8209	67.7060	52.6262	32.6024	17.5130	11.5503	(83)
Total gains	320.0819	340.4392	344.0769	353.6527	353.6507	342.7357	328.5952	318.9212	312.1654	304.3120	306.5577	311.7557	(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	55.1432	55.7162	56.3013	59.4210	60.0869	63.6535	63.6535	64.4182	62.1772	60.0869	58.7697	57.5090	
alpha	4.6762	4.7144	4.7534	4.9614	5.0058	5.2436	5.2436	5.2945	5.1451	5.0058	4.9180	4.8339	
util living area	0.9909	0.9864	0.9785	0.9496	0.8802	0.7058	0.5331	0.5646	0.7997	0.9484	0.9830	0.9918	(86)
MIT	19.9480	20.0620	20.2352	20.5278	20.7469	20.9019	20.9334	20.9318	20.8592	20.5958	20.2715	19.9831	(87)
Th 2	19.8417	19.8521	19.8626	19.9157	19.9263	19.9802	19.9802	19.9911	19.9586	19.9263	19.9050	19.8838	(88)
util rest of house													

	0.9879	0.9819	0.9708	0.9305	0.8336	0.6140	0.4150	0.4479	0.7188	0.9251	0.9764	0.9891	(89)
MIT 2	18.6367	18.7894	19.0165	19.4213	19.6837	19.8822	19.9021	19.9127	19.8282	19.5160	19.0974	18.7142	(90)
Living area fraction										fLA = Living area / (4) =		0.7208	(91)
MIT	19.5819	19.7067	19.8950	20.2189	20.4501	20.6172	20.6455	20.6472	20.5713	20.2943	19.9437	19.6288	(92)
Temperature adjustment												-0.1500	
adjusted MIT	19.4319	19.5567	19.7450	20.0689	20.3001	20.4672	20.4955	20.4972	20.4213	20.1443	19.7937	19.4788	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9865	0.9805	0.9698	0.9336	0.8515	0.6598	0.4757	0.5077	0.7575	0.9306	0.9756	0.9879	(94)
Useful gains	315.7745	333.7838	333.6967	330.1809	301.1412	226.1357	156.3258	161.9120	236.4658	283.2055	299.0822	307.9687	(95)
[illegible]	[illegible]	[illegible]	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
	708.9776	679.6517	607.8039	485.6250	369.7886	238.1435	158.1151	164.3291	262.6693	410.3898	558.0429	686.4135	(97)
Space heating kWh													
	292.5431	232.4232	203.9357	111.9197	51.0737	0.0000	0.0000	0.0000	0.0000	94.6251	186.4517	281.5629	(98a)
Space heating requirement - total per year (kWh/year)												1454.5352	
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													
	292.5431	232.4232	203.9357	111.9197	51.0737	0.0000	0.0000	0.0000	0.0000	94.6251	186.4517	281.5629	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1454.5352	
Space heating per m2											(98c) / (4) =	40.3253	(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													
	292.5431	232.4232	203.9357	111.9197	51.0737	0.0000	0.0000	0.0000	0.0000	94.6251	186.4517	281.5629	(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)													
	316.9481	251.8128	220.9488	121.2565	55.3344	0.0000	0.0000	0.0000	0.0000	102.5191	202.0062	305.0519	(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													
	182.4606	160.6423	169.7429	147.9326	142.1461	126.6891	124.4191	130.5303	133.1120	149.9219	160.8474	180.4216	(64)
Efficiency of water heater												79.8000	(216)
(217)m	87.0615	86.7467	86.1687	84.7430	82.7627	79.8000	79.8000	79.8000	79.8000	84.2130	86.0569	86.9791	(217)
Fuel for water heating, kWh/month													
	209.5766	185.1856	196.9890	174.5661	171.7514	158.7582	155.9137	163.5719	166.8070	178.0271	186.9083	207.4309	(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	27.2396	24.6035	27.2396	26.3609	27.2396	26.3609	27.2396	27.2396	26.3609	27.2396	26.3609	27.2396	(231)
Lighting	18.1325	14.5466	13.0976	9.5958	7.4121	6.0558	6.7616	8.7889	11.4160	14.9784	16.9180	18.6365	(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	1575.8778	(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	2155.4858	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
(BalancedWithHeatRecovery, DataSheet: in-use factor = 1.4000, SFP = 2.1000)		
mechanical ventilation fans (SFP = 2.1000)	234.7248	(230a)
central heating pump	41.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	320.7248	(231)
Electricity for lighting (calculated in Appendix L)	146.3397	(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	4198.4281	(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	1575.8778	0.2100	330.9343	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2155.4858	0.2100	452.6520	(264)
Space and water heating			783.5863	(265)
Pumps, fans and electric keep-hot	320.7248	0.1387	44.4885	(267)
Energy for lighting	146.3397	0.1443	21.1213	(268)
Total CO2, kg/year			849.1962	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			23.5400	(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	1575.8778	1.1300	1780.7419	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2155.4858	1.1300	2435.6989	(278)
Space and water heating			4216.4408	(279)
Pumps, fans and electric keep-hot	320.7248	1.5128	485.1925	(281)
Energy for lighting	146.3397	1.5338	224.4608	(282)
Total Primary energy kWh/year			4926.0941	(286)
Dwelling Primary energy Rate (DPER)			136.5700	(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	36.0700	(1b)	x 2.5400	(2b)	= 91.6178	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	36.0700					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)		= 91.6178	(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)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.2183 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.4683 (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) =	0.3981 (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	0.5075	0.4976	0.4876	0.4379	0.4279	0.3782	0.3782	0.3682	0.3981	0.4279	0.4478	0.4677	(22b)
Effective ac	0.6288	0.6238	0.6189	0.5959	0.5916	0.5715	0.5715	0.5678	0.5792	0.5916	0.6003	0.6094	(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 Opening Type (Uw = 1.20)			2.3400	1.1450	2.6794			(27)
EW	16.1200	2.3400	13.7800	0.1800	2.4804			(29a)
Corriudor	16.3600		16.3600	0.1800	2.9448			(29a)
Total net area of external elements Aum(A, m2)			32.4800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		8.1046			(33)
PW			41.3500	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		267.8622 (35)
Thermal bridges (User defined value 0.050 * total exposed area)		1.6240 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	9.7286 (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	19.0107	18.8595	18.7113	18.0152	17.8849	17.2786	17.2786	17.1664	17.5122	17.8849	18.1484	18.4238	(38)

Heat transfer coeff

	28.7393	28.5881	28.4399	27.7438	27.6135	27.0072	27.0072	26.8949	27.2408	27.6135	27.8770	28.1524 (39)
Average = Sum(39)m / 12 =												27.7431
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.7968	0.7926	0.7885	0.7692	0.7656	0.7487	0.7487	0.7456	0.7552	0.7656	0.7729	0.7805 (40)
HLP (average)												0.7691
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.3063 (42)
Hot water usage for mixer showers												
	659	56.9705	54.4920	52.6628	50.6230	49.4636	50.7492	52.1585	54.3486	56.8804	58.9283 (42a)
Hot water usage for baths												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses												
	28.0073	26.9889	25.9704	24.9520	23.9335	22.9151	22.9151	23.9335	24.9520	25.9704	26.9889	28.0073 (42c)
Average daily hot water use (litres/day)												80.0001 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	87.1622	85.2548	82.9409	79.4439	76.5964	73.5381	72.3787	74.6827	77.1105	80.3191	83.8693	86.9356	(44)
Energy conte	138.0437	121.4017	127.4771	108.7548	103.1134	90.4237	87.5357	92.4728	95.0849	108.9922	119.4872	136.1201	(45)
Energy content (annual)										Total = Sum(45)m =		1328.9074	
Distribution loss (46)m = 0.15 x (45)m													
	20.7066	18.2103	19.1216	16.3132	15.4670	13.5636	13.1304	13.8709	14.2627	16.3488	17.9231	20.4180	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	44.4169	39.2406	42.2658	39.1778	39.0327	36.2654	36.8834	38.0575	38.0271	40.9297	41.3602	44.3014	(61)
Total heat required for water heating calculated for each month													
	182.4606	160.6423	169.7429	147.9326	142.1461	126.6891	124.4191	130.5303	133.1120	149.9219	160.8474	180.4216	(62)
WWHRS	-27.0432	-23.9172	-25.0447	-20.7380	-19.3271	-16.5383	-15.5020	-16.4849	-17.1112	-20.1722	-22.8526	-26.5424	(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													
	155.4174	136.7251	144.6982	127.1946	122.8190	110.1507	108.9171	114.0455	116.0008	129.7497	137.9948	153.8792	(64)
										Total per year (kWh/year) = Sum(64)m =		1557.5922	(64)
12Total per year (kWh/year)												1558	(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													
	57.0038	50.1762	52.9526	45.9554	44.0434	39.1322	38.3265	40.2616	41.1225	46.4723	50.0695	56.3353	(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	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125	65.3125 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	70.5819	78.1442	70.5819	72.9346	70.5819	72.9346	70.5819	70.5819	72.9346	70.5819	72.9346	70.5819 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	111.7916	112.9516	110.0283	103.8050	95.9492	88.5658	83.6333	82.4733	85.3965	91.6199	99.4757	106.8590 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313	29.5313 (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)												
	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500	-52.2500 (71)
Water heating gains (Table 5)												
	76.6179	74.6670	71.1728	63.8270	59.1981	54.3503	51.5141	54.1150	57.1146	62.4628	69.5410	75.7195 (72)
Total internal gains												
	304.5852	311.3566	297.3768	286.1604	271.3230	258.4445	248.3230	249.7640	258.0395	270.2583	287.5451	298.7542 (73)

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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	
West	2.3400	19.6403	0.6300	0.7000	0.7700	14.0454	(80)

Solar gains	14.0454	27.4758	45.2488	65.9927	80.8765	82.7915	78.8209	67.7060	52.6262	32.6024	17.5130	11.5503 (83)
Total gains	318.6306	338.8324	342.6256	352.1530	352.1994	341.2360	327.1439	317.4699	310.6657	302.8607	305.0581	310.3045 (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, ni1,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	93.3855	93.8794	94.3686	96.7364	97.1927	99.3746	99.3746	99.7894	98.5226	97.1927	96.2741	95.3321
alpha	7.2257	7.2586	7.2912	7.4491	7.4795	7.6250	7.6250	7.6526	7.5682	7.4795	7.4183	7.3555
util living area												
	0.9820	0.9690	0.9442	0.8595	0.7092	0.5051	0.3631	0.3895	0.5996	0.8573	0.9584	0.9840 (86)
MIT	20.4996	20.6044	20.7334	20.9006	20.9788	20.9986	20.9999	20.9998	20.9949	20.9171	20.7138	20.4964 (87)
Th 2	20.6016	20.6037	20.6058	20.6154	20.6172	20.6256	20.6256	20.6272	20.6224	20.6172	20.6136	20.6098 (88)
util rest of house												
	0.9794	0.9647	0.9367	0.8434	0.6839	0.4760	0.3323	0.3580	0.5683	0.8384	0.9521	0.9818 (89)
MIT 2	20.1330	20.2378	20.3651	20.5311	20.6011	20.6247	20.6256	20.6271	20.6190	20.5489	20.3540	20.1371 (90)
Living area fraction										fLA = Living area / (4) =		0.7208 (91)
MIT	20.3972	20.5021	20.6305	20.7974	20.8734	20.8942	20.8954	20.8958	20.8900	20.8143	20.6133	20.3961 (92)
Temperature adjustment												0.0000

adjusted MIT	20.3972	20.5021	20.6305	20.7974	20.8734	20.8942	20.8954	20.8958	20.8900	20.8143	20.6133	20.3961	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9779	0.9636	0.9372	0.8512	0.7009	0.4969	0.3545	0.3807	0.5906	0.8484	0.9521	0.9804	(94)
Useful gains	311.6003	326.4840	321.1005	299.7560	246.8699	169.5673	115.9791	120.8672	183.4685	256.9407	290.4545	304.2148	(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													
	462.6230	446.0337	401.8709	330.0791	253.3087	169.9885	116.0067	120.9135	184.9643	282.0518	376.7113	455.9597	(97)
Space heating kWh													
	112.3609	80.3374	60.0931	21.8327	4.7905	0.0000	0.0000	0.0000	0.0000	18.6827	62.1049	112.8982	(98a)
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Space heating kWh													
	112.3609	80.3374	60.0931	21.8327	4.7905	0.0000	0.0000	0.0000	0.0000	18.6827	62.1049	112.8982	(98c)

Full SAP Calculation Printout

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating requirement after solar contribution - total per year (kWh/year) 473.1003

Space heating per m2 (98c) / (4) = 13.1162 (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 %)												92.4000	(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													
	112.3609	80.3374	60.0931	21.8327	4.7905	0.0000	0.0000	0.0000	0.0000	18.6827	62.1049	112.8982	(98)
Space heating efficiency (main heating system 1)													
	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000	(210)
Space heating fuel (main heating system)													
	121.6027	86.9452	65.0358	23.6284	5.1845	0.0000	0.0000	0.0000	0.0000	20.2193	67.2131	122.1843	(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													
	155.4174	136.7251	144.6982	127.1946	122.8190	110.1507	108.9171	114.0455	116.0008	129.7497	137.9948	153.8792	(64)
Efficiency of water heater												80.3000	(216)
(217)m	83.6974	83.2818	82.6460	81.4544	80.5927	80.3000	80.3000	80.3000	80.3000	81.2898	82.7856	83.7277	(217)
Fuel for water heating, kWh/month													
	185.6897	164.1716	175.0819	156.1544	152.3948	137.1740	135.6377	142.0243	144.4593	159.6138	166.6893	183.7853	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	14.6655	11.7652	10.5933	7.7611	5.9949	4.8979	5.4687	7.1085	9.2332	12.1145	13.6833	15.0731	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-8.1821	-12.3712	-19.0578	-23.0242	-26.2736	-25.0849	-24.8137	-22.7214	-19.2644	-14.8607	-9.2980	-6.9820	(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	-2.3807	-5.1663	-10.5657	-16.3068	-21.9833	-22.2197	-21.9250	-18.3392	-13.1740	-7.4931	-3.2137	-1.8688	(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												512.0134	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												80.3000	
Water heating fuel used												1902.8760	(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)												118.3592	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-356.5700	(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												2262.6785	(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	512.0134	0.2100	107.5228	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1902.8760	0.2100	399.6040	(264)
Space and water heating			507.1268	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	118.3592	0.1443	17.0829	(268)

Energy saving/generation technologies				
PV Unit electricity used in dwelling	-211.9338	0.1331	-28.2121	
PV Unit electricity exported	-144.6362	0.1251	-18.1004	
Total			-46.3125	(269)
Total CO2, kg/year			489.8264	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.5800	(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	512.0134	1.1300	578.5751	(275)
Space heating - secondary systems			0.0000	(473)
Water heating (other fuel)	1902.8760	1.1300	2150.2499	(278)
Space and water heating			2728.8250	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	118.3592	1.5338	181.5432	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-211.9338	1.4919	-316.1833	
PV Unit electricity exported	-144.6362	0.4593	-66.4360	
Total			-382.6192	(283)
Total Primary energy kWh/year			2657.8498	(286)
Target Primary Energy Rate (TPER)			73.6900	(287)

Property Reference	Unit 9			**Issued on Date**	15/02/2024
Assessment Reference	Camden High Street		**Prop Type Ref**		
Property					

SAP Rating	85 B	**DER**	11.49	**TER**	16.61
Environmental	92 A	**% DER < TER**			30.82
CO_2 Emissions (t/year)	0.54	**DFEE**	29.79	**TFEE**	41.93
Compliance Check	See BREL	**% DFEE < TFEE**			28.96
% DPER < TPER	24.95	**DPER**	67.26	**TPER**	89.62
Assessor Details	Mr. Neil Ingham			**Assessor ID**	AV35-0001
Client					

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

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	50.9500	(1b)	x 2.6000	(2b) =	132.4700	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.9500					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		132.4700	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	0 * 10 =	0.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
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) =		76.5000 (23c)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Effective ac	0.2801	0.2769	0.2737	0.2578	0.2546	0.2386	0.2386	0.2354	0.2450	0.2546	0.2609	0.2673	(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	
G (Uw = 1.00)			2.2000	0.9615	2.1154			(27)
EW	54.5600	2.2000	52.3600	0.1400	7.3304	110.0000	5759.6000	(29a)
Corriudor	17.3500		17.3500	0.1300	2.2555	190.0000	3296.5000	(29a)
External Roof 1	50.9500		50.9500	0.1000	5.0950	9.0000	458.5500	(30)
Total net area of external elements Aum(A, m2)			122.8600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		16.7963			(33)
PW			12.7500	0.0000	0.0000	45.0000	573.7500	(32)
Party Floor 1			50.9500			40.0000	2038.0000	(32d)
IW			90.6400			9.0000	815.7600	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12942.1600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		254.0169 (35)
Thermal bridges (User defined value 0.060 * total exposed area)		7.3716 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	24.1679 (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	12.2430	12.1036	11.9643	11.2676	11.1282	10.4315	10.4315	10.2922	10.7102	11.1282	11.4069	11.6856	(38)
Heat transfer coeff	36.4108	36.2715	36.1322	35.4355	35.2961	34.5994	34.5994	34.4601	34.8781	35.2961	35.5748	35.8535	(39)
Average = Sum(39)m / 12 =												35.4006	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.7146	0.7119	0.7092	0.6955	0.6928	0.6791	0.6791	0.6764	0.6846	0.6928	0.6982	0.7037	(40)
HLP (average)												0.6948	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.7181 (42)

Hot water usage for mixer showers

68.0552	67.0325	65.5422	62.6907	60.5864	58.2397	56.9058	58.3848	60.0061	62.5258	65.4385	67.7945	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

32.2250	31.0532	29.8814	28.7096	27.5377	26.3659	26.3659	27.5377	28.7096	29.8814	31.0532	32.2250	(42c)

Average daily hot water use (litres/day) 92.0401 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	100.2803	98.0857	95.4236	91.4003	88.1241	84.6056	83.2717	85.9226	88.7157	92.4072	96.4917	100.0195	(44)
Energy conte	158.8194	139.6727	146.6625	125.1224	118.6320	104.0324	100.7099	106.3901	109.3954	125.3957	137.4702	156.6064	(45)
Energy content (annual)										Total = Sum(45)m =		1528.9091	
Distribution loss (46)m = 0.15 x (45)m	23.8229	20.9509	21.9994	18.7684	17.7948	15.6049	15.1065	15.9585	16.4093	18.8094	20.6205	23.4910	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.1463	48.6268	45.0741	44.9071	41.7233	42.4344	43.7852	43.7502	47.0897	47.5850	50.9589	(61)
Total heat required for water heating calculated for each month	209.7783	184.8190	195.2892	170.1965	163.5391	145.7557	143.1443	150.1753	153.1456	172.4854	185.0551	207.5653	(62)
WWHRS	-52.5416	-46.4682	-48.6588	-40.2914	-37.5502	-32.1319	-30.1186	-32.0281	-33.2449	-39.1921	-44.3999	-51.5686	(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	157.2368	138.3509	146.6304	129.9051	125.9889	113.6238	113.0257	118.1472	119.9006	133.2933	140.6552	155.9967	(64)
										Total per year (kWh/year) = Sum(64)m =		1592.7547	(64)
12Total per year (kWh/year)												1593	(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	65.5472	57.7278	60.9220	52.8717	50.6719	45.0216	44.0946	46.3210	47.3115	53.4665	57.6051	64.8114	(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	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.3789	112.2409	101.3789	104.7582	101.3789	104.7582	101.3789	101.3789	104.7582	101.3789	104.7582	101.3789	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.7010	151.2544	147.3398	139.0061	128.4863	118.5992	111.9940	110.4406	114.3552	122.6889	133.2087	143.0958	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	(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)	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	(71)
Water heating gains (Table 5)	88.1011	85.9044	81.8844	73.4329	68.1074	62.5300	59.2670	62.2594	65.7104	71.8636	80.0070	87.1120	(72)
Total internal gains	390.9524	401.1712	382.3745	368.9687	349.7441	334.6589	321.4113	322.8504	333.5952	347.7028	369.7454	383.3582	(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	2.2000	19.6403	0.6300	0.7000	0.7700	13.2051	(76)

Solar gains	13.2051	25.8320	42.5416	62.0444	76.0377	77.8381	74.1051	63.6552	49.4776	30.6518	16.4652	10.8592	(83)
Total gains	404.1575	427.0032	424.9161	431.0131	425.7818	412.4970	395.5164	386.5055	383.0729	378.3546	386.2106	394.2174	(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	98.7355	99.1148	99.4971	101.4533	101.8538	103.9048	103.9048	104.3250	103.0746	101.8538	101.0559	100.2705	
alpha	7.5824	7.6077	7.6331	7.7636	7.7903	7.9270	7.9270	7.9550	7.8716	7.7903	7.7371	7.6847	
util living area	0.9844	0.9734	0.9543	0.8836	0.7450	0.5350	0.3848	0.4099	0.6221	0.8724	0.9634	0.9864	(86)
MIT	20.6036	20.6744	20.7588	20.8786	20.9413	20.9595	20.9607	20.9607	20.9565	20.8972	20.7522	20.5978	(87)
Th 2	20.3279	20.3303	20.3327	20.3448	20.3472	20.3593	20.3593	20.3618	20.3545	20.3472	20.3424	20.3376	(88)
util rest of house													

	0.9802	0.9665	0.9424	0.8571	0.7008	0.4823	0.3288	0.3532	0.5665	0.8399	0.9530	0.9827	(89)
MIT 2	19.8686	19.9588	20.0647	20.2147	20.2811	20.3083	20.3089	20.3115	20.3013	20.2387	20.0665	19.8699	(90)
Living area fraction										fLA = Living area / (4) =		0.4514	(91)
MIT	20.2004	20.2818	20.3780	20.5144	20.5791	20.6022	20.6031	20.6046	20.5971	20.5360	20.3760	20.1985	(92)
Temperature adjustment												-0.1500	
adjusted MIT	20.0504	20.1318	20.2280	20.3644	20.4291	20.4522	20.4531	20.4546	20.4471	20.3860	20.2260	20.0485	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9781	0.9641	0.9403	0.8580	0.7065	0.4900	0.3370	0.3614	0.5746	0.8420	0.9508	0.9808	(94)
Useful gains	395.3154	411.6729	399.5487	369.8087	300.8300	202.1168	133.3001	139.6940	220.1167	318.5654	367.2240	386.6297	(95)
Heat loss rate W	[illegible]	[illegible]	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
	573.4859	552.4810	496.0233	406.2465	308.1046	202.4835	133.3160	139.7213	221.3734	345.4076	466.9564	568.2245	(97)
Space heating kWh													
	132.5589	94.6230	71.7771	26.2352	5.4123	0.0000	0.0000	0.0000	0.0000	19.9705	71.8073	135.1066	(98a)
Space heating requirement - total per year (kWh/year)												557.4909	
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													
	132.5589	94.6230	71.7771	26.2352	5.4123	0.0000	0.0000	0.0000	0.0000	19.9705	71.8073	135.1066	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												557.4909	
Space heating per m2											(98c) / (4) =	10.9419	(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													
	132.5589	94.6230	71.7771	26.2352	5.4123	0.0000	0.0000	0.0000	0.0000	19.9705	71.8073	135.1066	(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)													
	143.6174	102.5168	77.7650	28.4238	5.8638	0.0000	0.0000	0.0000	0.0000	21.6365	77.7977	146.3777	(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													
	157.2368	138.3509	146.6304	129.9051	125.9889	113.6238	113.0257	118.1472	119.9006	133.2933	140.6552	155.9967	(64)
Efficiency of water heater												79.8000	(216)
(217)m	85.0699	84.4448	83.5171	81.6581	80.2476	79.8000	79.8000	79.8000	79.8000	81.2335	83.6278	85.1522	(217)
Fuel for water heating, kWh/month													
	184.8325	163.8358	175.5694	159.0841	157.0002	142.3857	141.6362	148.0542	150.2514	164.0866	168.1920	183.1975	(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	18.8340	17.0114	18.8340	18.2265	18.8340	18.2265	18.8340	18.8340	18.2265	18.8340	18.2265	18.8340	(231)
Lighting	17.6708	14.1762	12.7641	9.3515	7.2234	5.9016	6.5894	8.5652	11.1253	14.5970	16.4873	18.1619	(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	603.9988	(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	1938.1256	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
(BalancedWithHeatRecovery, DataSheet: in-use factor = 1.4000, SFP = 0.8400)		
mechanical ventilation fans (SFP = 0.8400)	135.7553	(230a)
central heating pump	41.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	221.7553	(231)
Electricity for lighting (calculated in Appendix L)	142.6135	(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	2906.4931	(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	603.9988	0.2100	126.8397	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1938.1256	0.2100	407.0064	(264)
Space and water heating			533.8461	(265)
Pumps, fans and electric keep-hot	221.7553	0.1387	30.7602	(267)
Energy for lighting	142.6135	0.1443	20.5835	(268)
Total CO2, kg/year			585.1898	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			11.4900	(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	603.9988	1.1300	682.5186	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1938.1256	1.1300	2190.0820	(278)
Space and water heating			2872.6006	(279)
Pumps, fans and electric keep-hot	221.7553	1.5128	335.4714	(281)
Energy for lighting	142.6135	1.5338	218.7453	(282)
Total Primary energy kWh/year			3426.8173	(286)
Dwelling Primary energy Rate (DPER)			67.2600	(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)	
Ground floor	50.9500	(1b)	x 2.6000	(2b) =	132.4700	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.9500					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		132.4700	(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)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1510 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.4010 (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) =	0.3408 (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	0.4346	0.4260	0.4175	0.3749	0.3664	0.3238	0.3238	0.3153	0.3408	0.3664	0.3834	0.4005	(22b)
Effective ac	0.5944	0.5908	0.5872	0.5703	0.5671	0.5524	0.5524	0.5497	0.5581	0.5671	0.5735	0.5802	(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 Opening Type (Uw = 1.20)			2.2000	1.1450	2.5191			(27)
EW	54.5600	2.2000	52.3600	0.1800	9.4248			(29a)
Corriudor	17.3500		17.3500	0.1800	3.1230			(29a)
External Roof 1	50.9500		50.9500	0.1100	5.6045			(30)
Total net area of external elements Aum(A, m2)			122.8600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		20.6714			(33)
PW			12.7500	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 254.0169 (35)

List of Thermal Bridges

	K1 Element	Length	Psi-value	Total
E2	Other lintels (including other steel lintels)	20.0000	0.0500	1.0000
E3	Sill	20.0000	0.0500	1.0000
E4	Jamb	24.1400	0.0500	1.2070
E22	Basement floor	0.0000	0.0700	0.0000
E5	Ground floor (normal)	29.1300	0.1600	4.6608

E20 Exposed floor (normal)	0.0000	0.3200	0.0000
E6 Intermediate floor within a dwelling	53.7200	0.0000	0.0000
E14 Flat roof	8.1800	0.0800	0.6544
E16 Corner (normal)	2.7000	0.0900	0.2430
E17 Corner (inverted - internal area greater than external area)	2.7000	-0.0900	-0.2430
E18 Party wall between dwellings	36.0000	0.0600	2.1600
E10 Eaves (insulation at ceiling level)	0.0000	0.0600	0.0000
E11 Eaves (insulation at rafter level)	8.5400	0.0400	0.3416
E13 Gable (insulation at rafter level)	14.3900	0.0800	1.1512

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 12.1750 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 32.8464 (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	25.9852	25.8249	25.6678	24.9299	24.7918	24.1491	24.1491	24.0301	24.3966	24.7918	25.0711	25.3631	(38)
(39)m	58.0510	57.8713	58.5142	57.7762	57.6382	56.9955	56.9955	56.8764	57.2430	57.6382	57.9175	58.2095	(39)

Average = Sum(39)m / 12 = 57.7756

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1547	1.1515	1.1485	1.1340	1.1313	1.1187	1.1187	1.1163	1.1235	1.1313	1.1368	1.1425	(40)
HLP (average)												1.1340	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.7181 (42)

Hot water usage for mixer showers

68.0552	67.0325	65.5422	62.6907	60.5864	58.2397	56.9058	58.3848	60.0061	62.5258	65.4385	67.7945	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

32.2250	31.0532	29.8814	28.7096	27.5377	26.3659	26.3659	27.5377	28.7096	29.8814	31.0532	32.2250	(42c)

Average daily hot water use (litres/day) 92.0401 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	100.2803	98.0857	95.4236	91.4003	88.1241	84.6056	83.2717	85.9226	88.7157	92.4072	96.4917	100.0195	(44)
Energy conte	158.8194	139.6727	146.6625	125.1224	118.6320	104.0324	100.7099	106.3901	109.3954	125.3957	137.4702	156.6064	(45)
Energy content (annual)										Total = Sum(45)m =		1528.9091	
Distribution loss (46)m = 0.15 x (45)m	23.8229	20.9509	21.9994	18.7684	17.7948	15.6049	15.1065	15.9585	16.4093	18.8094	20.6205	23.4910	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.1463	48.6268	45.0741	44.9071	41.7233	42.4344	43.7852	43.7502	47.0897	47.5850	50.9589	(61)
Total heat required for water heating calculated for each month	209.7783	184.8190	195.2892	170.1965	163.5391	145.7557	143.1443	150.1753	153.1456	172.4854	185.0551	207.5653	(62)
WWHRS	-31.1120	-27.5157	-28.8129	-23.8582	-22.2350	-19.0266	-17.8344	-18.9651	-19.6857	-23.2073	-26.2910	-30.5359	(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	178.6663	157.3033	166.4764	146.3383	141.3041	126.7291	125.3098	131.2102	133.4599	149.2781	158.7641	177.0294	(64)
									Total per year (kWh/year) = Sum(64)m =			1791.8691	(64)
12Total per year (kWh/year)												1792	(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	65.5472	57.7278	60.9220	52.8717	50.6719	45.0216	44.0946	46.3210	47.3115	53.4665	57.6051	64.8114	(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	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	85.9048	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	99.9276	110.6342	99.9276	103.2586	99.9276	103.2586	99.9276	99.9276	103.2586	99.9276	103.2586	99.9276	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.7010	151.2544	147.3398	139.0061	128.4863	118.5992	111.9940	110.4406	114.3552	122.6889	133.2087	143.0958	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	31.5905	(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)	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	-68.7239	(71)
Water heating gains (Table 5)	88.1011	85.9044	81.8844	73.4329	68.1074	62.5300	59.2670	62.2594	65.7104	71.8636	80.0070	87.1120	(72)
Total internal gains	389.5011	399.5644	380.9233	367.4691	348.2928	333.1592	319.9601	321.3991	332.0956	346.2515	368.2457	381.9069	(73)

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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	2.2000	19.6403	0.6300	0.7000	0.7700	13.2051	(76)

Solar gains	13.2051	25.8320	42.5416	62.0444	76.0377	77.8381	74.1051	63.6552	49.4776	30.6518	16.4652	10.8592	(83)
Total gains	402.7062	425.3964	423.4649	429.5135	424.3306	410.9974	394.0652	385.0543	381.5732	376.9033	384.7109	392.7661	(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, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	61.1074	61.2744	61.4389	62.2236	62.3726	63.0760	63.0760	63.2080	62.8032	62.3726	62.0718	61.7605	
alpha	5.0738	5.0850	5.0959	5.1482	5.1582	5.2051	5.2051	5.2139	5.1869	5.1582	5.1381	5.1174	
util living area	0.9936	0.9904	0.9853	0.9669	0.9182	0.7850	0.6130	0.6475	0.8525	0.9640	0.9881	0.9944	(86)
MIT	19.7911	19.9131	20.1038	20.4087	20.6948	20.9119	20.9807	20.9743	20.8545	20.5078	20.1151	19.7780	(87)
Th 2	19.9564	19.9590	19.9615	19.9732	19.9754	19.9856	19.9856	19.9875	19.9817	19.9754	19.9709	19.9663	(88)
util rest of house	0.9915	0.9872	0.9800	0.9538	0.8824	0.6974	0.4835	0.5206	0.7817	0.9471	0.9835	0.9925	(89)
MIT 2	18.5665	18.7235	18.9676	19.3579	19.7011	19.9311	19.9791	19.9780	19.8788	19.4847	18.9900	18.5570	(90)
Living area fraction									fLA = Living area / (4) =			0.4514	(91)
MIT	19.1193	19.2605	19.4805	19.8323	20.1496	20.3739	20.4313	20.4277	20.3193	19.9466	19.4979	19.1082	(92)
												0.0000	
adjusted MIT	19.1193	19.2605	19.4805	19.8323	20.1496	20.3739	20.4313	20.4277	20.3193	19.9466	19.4979	19.1082	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9892	0.9844	0.9768	0.9515	0.8894	0.7336	0.5424	0.5782	0.8080	0.9465	0.9808	0.9905	(94)
Useful gains	398.3628	418.7726	413.6429	408.6953	377.4168	301.5213	213.7391	222.6380	308.2958	356.7336	377.3175	389.0162	(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	871.8428	842.5501	759.5446	631.6265	487.0215	329.0851	218.3647	229.0829	356.0102	538.7204	718.0555	867.7990	(97)
Space heating kWh	352.2691	284.7785	257.3508	160.5105	81.5459	0.0000	0.0000	0.0000	0.0000	135.3982	245.3314	356.2144	(98a)
Space heating requirement - total per year (kWh/year)												1873.3988	
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	352.2691	284.7785	257.3508	160.5105	81.5459	0.0000	0.0000	0.0000	0.0000	135.3982	245.3314	356.2144	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1873.3988	
Space heating per m2											(98c) / (4) =	36.7694	(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 %) 92.4000 (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	352.2691	284.7785	257.3508	160.5105	81.5459	0.0000	0.0000	0.0000	0.0000	135.3982	245.3314	356.2144	(98)
Space heating efficiency (main heating system 1)	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000	(210)
Space heating fuel (main heating system)	381.2437	308.2018	278.5182	173.7126	88.2532	0.0000	0.0000	0.0000	0.0000	146.5349	265.5101	385.5134	(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	178.6663	157.3033	166.4764	146.3383	141.3041	126.7291	125.3098	131.2102	133.4599	149.2781	158.7641	177.0294	(64)
Efficiency of water heater												80.3000	(216)
(217)m	85.8075	85.6365	85.3112	84.5800	83.2468	80.3000	80.3000	80.3000	80.3000	84.1728	85.3103	85.8477	(217)
Fuel for water heating, kWh/month	208.2176	183.6871	195.1402	173.0176	169.7411	157.8196	156.0521	163.4000	166.2016	177.3471	186.1019	206.2134	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	20.7630	16.6568	14.9976	10.9879	8.4874	6.9343	7.7425	10.0640	13.0721	17.1513	19.3723	21.3401	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-11.4368	-17.2240	-26.4206	-31.7657	-36.0936	-34.3843	-33.9985	-31.2028	-26.5658	-20.6160	-12.9690	-9.7658	(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	-3.4833	-7.5484	-15.4235	-23.7905	-32.0708	-32.4349	-32.0214	-26.7964	-19.2544	-10.9595	-4.7041	-2.7361	(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 2027.4879 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 80.3000
Water heating fuel used 2142.9393 (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) 167.5692 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation -503.6663 (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	3920.3301	(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	2027.4879	0.2100	425.7725	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2142.9393	0.2100	450.0173	(264)
Space and water heating			875.7897	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	167.5692	0.1443	24.1854	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-292.4428	0.1332	-38.9588	
PV Unit electricity exported	-211.2234	0.1251	-26.4337	
Total			-65.3925	(269)
Total CO2, kg/year			846.5119	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			16.6100	(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	2027.4879	1.1300	2291.0613	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2142.9393	1.1300	2421.5214	(278)
Space and water heating			4712.5827	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	167.5692	1.5338	257.0233	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-292.4428	1.4923	-436.4053	
PV Unit electricity exported	-211.2234	0.4593	-97.0223	
Total			-533.4276	(283)
Total Primary energy kWh/year			4566.2792	(286)
Target Primary Energy Rate (TPER)			89.6200	(287)