Full SAP Calculation Printout

Property Reference	402	**Issued on Date**	22/08/2024
Assessment Reference	402	**Prop Type Ref**	
Property	30-48 Lawrence Road, 402, N15 4EG		

SAP Rating	90 B	**DER**	2.61	**TER**	11.99
Environmental	98 A	**% DER < TER**			78.23
CO_2 Emissions (t/year)	0.14	**DFEE**	20.26	**TFEE**	21.83
Compliance Check	See BREL	**% DFEE < TFEE**			7.18
% DPER < TPER	56.82	**DPER**	27.82	**TPER**	64.43

Assessor Details	Mr. Ondrej Gajdos	**Assessor ID**	W452-0001
Client			

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

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	58.0000	(1b)	x 2.6000	(2b) =	150.8000	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	58.0000					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		150.8000	(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		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1162 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
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	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366	(22b)

Balanced mechanical ventilation with heat recovery

If mechanical ventilation		0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)		0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =		81.0000 (23c)

Effective ac	0.2432	0.2403	0.2374	0.2229	0.2200	0.2054	0.2054	0.2025	0.2112	0.2200	0.2258	0.2316	(25)

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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	
1 (Uw = 1.20)			3.1300	1.1450	3.5840			(27)
2 (Uw = 1.20)			3.1300	1.1450	3.5840			(27)
3 (Uw = 1.20)			3.1300	1.1450	3.5840			(27)
1			2.5000	1.0000	2.5000			(26)
Terrace	18.9000	8.7600	10.1400	0.1600	1.6224	14.0000	141.9600	(29a)
Corridor	6.4800		6.4800	0.1600	1.0368	14.0000	90.7200	(29a)
Exposed	7.2900	3.1300	4.1600	0.1600	0.6656	14.0000	58.2400	(29a)
Total net area of external elements Aum(A, m2)			32.6700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		16.5767			(33)
PW			53.4600	0.0000	0.0000	20.0000	1069.2000	(32)
PF			58.0000			40.0000	2320.0000	(32d)
PC			58.0000			30.0000	1740.0000	(32b)
IW			118.8000			9.0000	1069.2000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	6489.3200 (34)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 111.8848 (35)
List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element				
E2 Other lintels (including other steel lintels)	32.6700	0.0500	1.6335	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			1.6335	(36)
Point Thermal bridges		(36a) =	0.0000	
Total fabric heat loss		(33) + (36) + (36a) =	18.2102	(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	12.1035	11.9589	11.8143	11.0912	10.9465	10.2234	10.2234	10.0788	10.5126	10.9465	11.2358	11.5250	(38)
Heat transfer coeff	30.3137	30.1691	30.0245	29.3014	29.1567	28.4336	28.4336	28.2890	28.7229	29.1567	29.4460	29.7352	(39)
Average = Sum(39)m / 12 =												29.2652	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.5227	0.5202	0.5177	0.5052	0.5027	0.4902	0.4902	0.4877	0.4952	0.5027	0.5077	0.5127	(40)
HLP (average)												0.5046	
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 1.9246 (42)
Hot water usage for mixer showers

56.4881	55.6392	54.4021	52.0353	50.2887	48.3408	47.2337	48.4613	49.8071	51.8985	54.3161	56.2716	(42a)

Hot water usage for baths

24.4149	24.0524	23.5417	22.6003	21.8953	21.1136	20.6914	21.1984	21.7505	22.5869	23.5478	24.3324	(42b)

Hot water usage for other uses

34.3394	33.0907	31.8420	30.5933	29.3446	28.0959	28.0959	29.3446	30.5933	31.8420	33.0907	34.3394	(42c)

Average daily hot water use (litres/day) 105.9343 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	115.2424	112.7822	109.7859	105.2289	101.5286	97.5503	96.0209	99.0043	102.1508	106.3274	110.9546	114.9435	(44)
Energy conte	182.5158	160.6004	168.7368	144.0531	136.6770	119.9495	116.1290	122.5880	125.9622	144.2853	158.0752	179.9737	(45)
Energy content (annual)										Total = Sum(45)m =		1759.5459	
Distribution loss (46)m = 0.15 x (45)m	27.3774	24.0901	25.3105	21.6080	20.5015	17.9924	17.4193	18.3882	18.8943	21.6428	23.7113	26.9961	(46)
Water storage loss:													
Store volume												180.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.4000	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7560	(55)
Total storage loss	23.4360	21.1680	23.4360	22.6800	23.4360	22.6800	23.4360	23.4360	22.6800	23.4360	22.6800	23.4360	(56)
If cylinder contains dedicated solar storage	23.4360	21.1680	23.4360	22.6800	23.4360	22.6800	23.4360	23.4360	22.6800	23.4360	22.6800	23.4360	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	205.9518	181.7684	192.1728	166.7331	160.1130	142.6295	139.5650	146.0240	148.6422	167.7213	180.7552	203.4097	(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	205.9518	181.7684	192.1728	166.7331	160.1130	142.6295	139.5650	146.0240	148.6422	167.7213	180.7552	203.4097	(64)
										Total per year (kWh/year) = Sum(64)m =		2035.4859	(64)
12Total per year (kWh/year)												2035	(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	60.6865	53.3996	56.1050	47.8976	45.4451	39.8832	38.6129	40.7605	41.8824	47.9749	52.5600	59.8413	(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	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	86.1175	95.3444	86.1175	88.9881	86.1175	88.9881	86.1175	86.1175	88.9881	86.1175	88.9881	86.1175	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	167.8762	169.6182	165.2284	155.8829	144.0859	132.9984	125.5912	123.8492	128.2391	137.5845	149.3815	160.4691	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	(71)
Water heating gains (Table 5)	81.5679	79.4637	75.4099	66.5245	61.0821	55.3933	51.8990	54.7856	58.1700	64.4823	73.0000	80.4318	(72)
Total internal gains	387.4300	396.2947	378.6242	363.2639	343.1539	329.2482	315.4761	316.6207	327.2655	340.0527	363.2380	378.8867	(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	3.1300	19.6403	0.6000	0.8000	0.7700	20.4487	(80)
West	3.1300	19.6403	0.6000	0.8000	0.7700	20.4487	(80)
West	3.1300	19.6403	0.6000	0.8000	0.7700	20.4487	(80)

Solar gains	61.3462	120.0061	197.6330	288.2359	353.2439	361.6080	344.2655	295.7190	229.8553	142.3974	76.4914	50.4481	(83)
Total gains	448.7761	516.3008	576.2571	651.4997	696.3978	690.8561	659.7417	612.3397	557.1209	482.4501	439.7294	429.3348	(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	59.4644	59.7495	60.0373	61.5189	61.8241	63.3964	63.3964	63.7205	62.7580	61.8241	61.2168	60.6213	
alpha	4.9643	4.9833	5.0025	5.1013	5.1216	5.2264	5.2264	5.2480	5.1839	5.1216	5.0811	5.0414	
util living area	0.8782	0.8065	0.6997	0.5328	0.3875	0.2632	0.1896	0.2125	0.3547	0.6055	0.8042	0.8908	(86)
Living	20.5915	20.7235	20.8386	20.9161	20.9354	20.9403	20.9406	20.9408	20.9383	20.9050	20.7661	20.5755	
Non living	20.0169	20.1779	20.3154	20.4140	20.4368	20.4534	20.4537	20.4562	20.4469	20.4056	20.2418	20.0057	
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0	
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0	
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10	
MIT	20.7910	20.7235	20.8386	20.9161	20.9354	20.9403	20.9406	20.9408	20.9383	20.9050	20.7661	20.6349	(87)
Th 2	20.5001	20.5024	20.5047	20.5161	20.5184	20.5298	20.5298	20.5321	20.5252	20.5184	20.5138	20.5092	(88)
util rest of house	0.8675	0.7922	0.6817	0.5132	0.3678	0.2439	0.1694	0.1909	0.3305	0.5812	0.7877	0.8809	(89)
MIT 2	20.3075	20.1779	20.3154	20.4140	20.4368	20.4534	20.4537	20.4562	20.4469	20.4056	20.2418	20.0964	(90)
Living area fraction										fLA = Living area / (4) =		0.3741	(91)
MIT	20.4884	20.3820	20.5111	20.6019	20.6233	20.6356	20.6359	20.6375	20.6308	20.5924	20.4380	20.2979	(92)
Temperature adjustment												0.0000	
adjusted MIT	20.4884	20.3820	20.5111	20.6019	20.6233	20.6356	20.6359	20.6375	20.6308	20.5924	20.4380	20.2979	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8672	0.7886	0.6819	0.5167	0.3721	0.2483	0.1739	0.1957	0.3359	0.5850	0.7850	0.8763	(94)
Useful gains	389.1899	407.1373	392.9555	336.6110	259.1200	171.5235	114.7439	119.8573	187.1408	282.2123	345.1954	376.2470	(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	490.7304	467.0792	420.6775	342.8815	260.1749	171.6126	114.7541	119.8758	187.5821	291.3460	392.7497	478.6743	(97)
Space heating kWh	75.5461	40.2810	20.6252	4.5148	0.7848	0.0000	0.0000	0.0000	0.0000	6.7955	34.2391	76.2059	(98a)
Space heating requirement - total per year (kWh/year)												258.9924	
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	75.5461	40.2810	20.6252	4.5148	0.7848	0.0000	0.0000	0.0000	0.0000	6.7955	34.2391	76.2059	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												258.9924	
Space heating per m2										(98c) / (4) =		4.4654	(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 %)	202.3307	(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	75.5461	40.2810	20.6252	4.5148	0.7848	0.0000	0.0000	0.0000	0.0000	6.7955	34.2391	76.2059	(98)
Space heating efficiency (main heating system 1)	202.3307	202.3307	202.3307	202.3307	202.3307	0.0000	0.0000	0.0000	0.0000	202.3307	202.3307	202.3307	(210)
Space heating fuel (main heating system)	37.3379	19.9085	10.1938	2.2314	0.3879	0.0000	0.0000	0.0000	0.0000	3.3586	16.9223	37.6640	(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	205.9518	181.7684	192.1728	166.7331	160.1130	142.6295	139.5650	146.0240	148.6422	167.7213	180.7552	203.4097	(64)
Efficiency of water heater												309.5100	(216)
(217)m	309.5100	309.5100	309.5100	309.5100	309.5100	309.5100	309.5100	309.5100	309.5100	309.5100	309.5100	309.5100	(217)
Fuel for water heating, kWh/month	66.5413	58.7278	62.0894	53.8700	51.7311	46.0824	45.0922	47.1791	48.0250	54.1893	58.4004	65.7199	(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	10.5471	9.5264	10.5471	10.2069	10.5471	10.2069	10.5471	10.5471	10.2069	10.5471	10.2069	10.5471	(231)
Lighting	17.8935	14.3548	12.9249	9.4694	7.3144	5.9759	6.6725	8.6731	11.2655	14.7810	16.6951	18.3908	(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	128.0045	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	309.5100	
Water heating fuel used	657.6479	(219)
Space cooling fuel	0.0000	(221)

Electricity for pumps and fans:

(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.6750)

mechanical ventilation fans (SFP = 0.6750) 124.1838 (230a)

Total electricity for the above, kWh/year 124.1838 (231)

Electricity for lighting (calculated in Appendix L)	144.4109	(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	1054.2470	(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	128.0045	0.1590	20.3527	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	657.6479	0.1412	92.8530	(264)
Space and water heating			113.2057	(265)
Pumps, fans and electric keep-hot	124.1838	0.1387	17.2258	(267)
Energy for lighting	144.4109	0.1443	20.8430	(268)
Total CO2, kg/year			151.2745	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			2.6100	(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	128.0045	1.5885	203.3338	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	657.6479	1.5221	1000.9942	(278)
Space and water heating			1204.3280	(279)
Pumps, fans and electric keep-hot	124.1838	1.5128	187.8653	(281)
Energy for lighting	144.4109	1.5338	221.5023	(282)
Total Primary energy kWh/year			1613.6955	(286)
Dwelling Primary energy Rate (DPER)			27.8200	(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	58.0000 (1b)	x	2.6000 (2b)	=	150.8000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n) 58.0000						(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	150.8000	(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) =	0.1326	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3826	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.2965	(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	0.3781	0.3707	0.3633	0.3262	0.3188	0.2817	0.2817	0.2743	0.2965	0.3188	0.3336	0.3484	(22b)
Effective ac	0.5715	0.5687	0.5660	0.5532	0.5508	0.5397	0.5397	0.5376	0.5440	0.5508	0.5556	0.5607	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K

TER Opaque door			2.5000	1.0000	2.5000	(26)
TER Opening Type (Uw = 1.20)			9.3900	1.1450	10.7519	(27)
Terrace	18.9000	8.7600	10.1400	0.1800	1.8252	(29a)
Corridor	6.4800		6.4800	0.1800	1.1664	(29a)
Exposed	7.2900	3.1300	4.1600	0.1800	0.7488	(29a)
Total net area of external elements Aum(A, m2)			32.6700			(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		16.9923	(33)
PW			53.4600	0.0000	0.0000	(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 121.8848 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element				
E2 Other lintels (including other steel lintels)	32.6700	0.0500	1.6335	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			1.6335	(36)
Point Thermal bridges		(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =		18.6258	(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	28.4388	28.3007	28.1653	27.5294	27.4105	26.8566	26.8566	26.7541	27.0700	27.4105	27.6511	27.9027	(38)
Heat transfer coeff	47.0646	46.9265	46.7911	46.1552	46.0363	45.4824	45.4824	45.3799	45.6958	46.0363	46.2769	46.5285	(39)
Average = Sum(39)m / 12 =												46.1547	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.8115	0.8091	0.8067	0.7958	0.7937	0.7842	0.7842	0.7824	0.7879	0.7937	0.7979	0.8022	(40)
HLP (average)												0.7958	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.9246 (42)

Hot water usage for mixer showers

56.4881	55.6392	54.4021	52.0353	50.2887	48.3408	47.2337	48.4613	49.8071	51.8985	54.3161	56.2716	(42a)

Hot water usage for baths

24.4149	24.0524	23.5417	22.6003	21.8953	21.1136	20.6914	21.1984	21.7505	22.5869	23.5478	24.3324	(42b)

Hot water usage for other uses

34.3394	33.0907	31.8420	30.5933	29.3446	28.0959	28.0959	29.3446	30.5933	31.8420	33.0907	34.3394	(42c)

Average daily hot water use (litres/day) 105.9343 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	115.2424	112.7822	109.7859	105.2289	101.5286	97.5503	96.0209	99.0043	102.1508	106.3274	110.9546	114.9435	(44)
Energy conte	182.5158	160.6004	168.7368	144.0531	136.6770	119.9495	116.1290	122.5880	125.9622	144.2853	158.0752	179.9737	(45)
Energy content (annual)										Total = Sum(45)m =		1759.5459	
Distribution loss (46)m = 0.15 x (45)m	27.3774	24.0901	25.3105	21.6080	20.5015	17.9924	17.4193	18.3882	18.8943	21.6428	23.7113	26.9961	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	229.1107	202.6861	215.3317	189.1449	183.2719	165.0413	162.7239	169.1829	171.0540	190.8802	203.1670	226.5686	(62)
WWHRS	-25.8240	-22.8389	-23.9156	-19.8031	-18.4558	-15.7927	-14.8032	-15.7417	-16.3398	-19.2628	-21.8224	-25.3458	(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	203.2868	179.8472	191.4161	169.3418	164.8161	149.2486	147.9207	153.4412	154.7143	171.6174	181.3446	201.2228	(64)
										Total per year (kWh/year) = Sum(64)m =		2068.2176	(64)
12Total per year (kWh/year)												2068	(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	97.9624	87.0682	93.3809	83.9711	82.7210	75.9567	75.8888	78.0364	77.9559	85.2508	88.6335	97.1172	(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	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	96.2279	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	88.1353	97.5783	88.1353	91.0731	88.1353	91.0731	88.1353	88.1353	91.0731	88.1353	91.0731	88.1353	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	167.8762	169.6182	165.2284	155.8829	144.0859	132.9984	125.5912	123.8492	128.2391	137.5845	149.3815	160.4691	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	32.6228	(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)	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	-76.9823	(71)
Water heating gains (Table 5)	131.6699	129.5658	125.5120	116.6266	111.1842	105.4954	102.0011	104.8877	108.2721	114.5844	123.1020	130.5338	(72)
Total internal gains	442.5498	451.6307	433.7440	418.4509	398.2737	381.4352	367.5959	368.7405	379.4526	395.1726	418.4251	434.0065	(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	9.3900	19.6403	0.6300	0.7000	0.7700	56.3618	(80)

Solar gains	56.3618	110.2556	181.5753	264.8167	324.5428	332.2273	316.2940	271.6918	211.1796	130.8276	70.2765	46.3492	(83)
Total gains	498.9116	561.8863	615.3193	683.2676	722.8165	713.6626	683.8899	640.4324	590.6322	526.0001	488.7016	480.3557	(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	41.7235	41.8463	41.9674	42.5456	42.6555	43.1749	43.1749	43.2725	42.9734	42.6555	42.4337	42.2042	
alpha	3.7816	3.7898	3.7978	3.8364	3.8437	3.8783	3.8783	3.8848	3.8649	3.8437	3.8289	3.8136	
util living area	0.9261	0.8899	0.8284	0.7068	0.5573	0.4003	0.2909	0.3231	0.5107	0.7547	0.8858	0.9334	(86)
MIT	19.8772	20.1137	20.4141	20.7368	20.9117	20.9811	20.9958	20.9936	20.9523	20.7147	20.2675	19.8410	(87)
Th 2	20.2434	20.2455	20.2475	20.2570	20.2588	20.2671	20.2671	20.2686	20.2639	20.2588	20.2552	20.2514	(88)
util rest of house	0.9165	0.8766	0.8088	0.6777	0.5197	0.3567	0.2431	0.2728	0.4622	0.7223	0.8699	0.9247	(89)
MIT 2	18.9398	19.2325	19.5988	19.9837	20.1766	20.2527	20.2647	20.2648	20.2250	19.9690	19.4346	18.9010	(90)
Living area fraction									fLA = Living area / (4) =			0.3741	(91)
MIT	19.2905	19.5622	19.9039	20.2655	20.4516	20.5253	20.5382	20.5375	20.4972	20.2480	19.7462	19.2527	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.2905	19.5622	19.9039	20.2655	20.4516	20.5253	20.5382	20.5375	20.4972	20.2480	19.7462	19.2527	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9024	0.8630	0.7991	0.6781	0.5297	0.3722	0.2608	0.2914	0.4779	0.7218	0.8577	0.9109	(94)
Useful gains	450.2150	484.8868	491.6779	463.3122	382.8506	265.6219	178.3861	186.6279	282.2517	379.6455	419.1521	437.5684	(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	705.5226	688.0444	627.1813	524.5762	402.8911	269.4951	179.1195	187.7600	292.3230	444.1584	585.2268	700.3801	(97)
Space heating kWh	189.9488	136.5219	100.8146	44.1100	14.9101	0.0000	0.0000	0.0000	0.0000	47.9976	119.5738	195.5319	(98a)
Space heating requirement - total per year (kWh/year)												849.4088	
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	189.9488	136.5219	100.8146	44.1100	14.9101	0.0000	0.0000	0.0000	0.0000	47.9976	119.5738	195.5319	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												849.4088	
Space heating per m2											(98c) / (4) =	14.6450	(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	189.9488	136.5219	100.8146	44.1100	14.9101	0.0000	0.0000	0.0000	0.0000	47.9976	119.5738	195.5319	(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)	205.7951	147.9111	109.2249	47.7899	16.1540	0.0000	0.0000	0.0000	0.0000	52.0017	129.5491	211.8439	(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	203.2868	179.8472	191.4161	169.3418	164.8161	149.2486	147.9207	153.4412	154.7143	171.6174	181.3446	201.2228	(64)
Efficiency of water heater												79.8000	(216)
(217)m	83.9079	83.4497	82.6913	81.5071	80.4767	79.8000	79.8000	79.8000	79.8000	81.6077	83.1487	83.9955	(217)
Fuel for water heating, kWh/month	242.2738	215.5155	231.4829	207.7633	204.7999	187.0283	185.3643	192.2823	193.8775	210.2957	218.0969	239.5639	(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	18.3128	14.6912	13.2278	9.6912	7.4858	6.1160	6.8288	8.8763	11.5295	15.1273	17.0862	18.8217	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-11.0447	-16.7495	-25.8770	-31.3471	-35.8285	-34.2020	-33.7972	-30.8938	-26.1448	-20.1183	-12.5567	-9.4172	(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	-3.1092	-6.7506	-13.8181	-21.3559	-28.8351	-29.1855	-28.8320	-24.1268	-17.3221	-9.8356	-4.2087	-2.4427	(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 1 920.2696 (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 2528.3441 (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)	147.7945	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-477.7992	(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	3204.6090	(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	920.2696	0.2100	193.2566	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2528.3441	0.2100	530.9523	(264)
Space and water heating			724.2089	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	147.7945	0.1443	21.3313	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-287.9768	0.1331	-38.3240	
PV Unit electricity exported	-189.8224	0.1251	-23.7426	
Total			-62.0666	(269)
Total CO2, kg/year			695.4028	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.9900	(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	920.2696	1.1300	1039.9046	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2528.3441	1.1300	2857.0289	(278)
Space and water heating			3896.9335	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	147.7945	1.5338	226.6922	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-287.9768	1.4918	-429.5911	
PV Unit electricity exported	-189.8224	0.4591	-87.1443	
Total			-516.7354	(283)
Total Primary energy kWh/year			3736.9911	(286)
Target Primary Energy Rate (TPER)			64.4300	(287)