

Full SAP Calculation Printout



Property Reference	14 Marlborough St		Issued on Date	06/02/2025	
Assessment Reference	Baseline	Prop Type Ref			
Property	14, Marlborough St, Bristol, BS5 6RH				
SAP Rating	78 C	DER	23.37	TER	
Environmental	79 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.82	DFEE	69.11	TFEE	
Compliance Check	See BREEL	% DFEE < TFEE			
% DPER < TPER		DPER	128.51	TPER	
Assessor Details	Mr. Lee Humphries			Assessor ID	DT88-0001
Client					

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	53.2600 (1b)	x 2.4400 (2b)	= 129.9544 (1b) - (3b)
First floor	42.2400 (1c)	x 2.5500 (2c)	= 107.7120 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.5000		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 237.6664 (4)
Dwelling volume			(5)

2. Ventilation rate

		m ³ per hour
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	3 * 10 =	30.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1262 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8762 (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) =	0.7448 (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	0.9496	0.9310	0.9124	0.8193	0.8007	0.7076	0.7076	0.6889	0.7448	0.8007	0.8379	0.8751 (22b)
Effective ac	0.9509	0.9334	0.9162	0.8356	0.8205	0.7503	0.7503	0.7373	0.7774	0.8205	0.8510	0.8829 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Glazing (Uw = 1.40)			11.6500	1.3258	15.4451		(27)
Door			1.6500	1.4000	2.3100		(26)
Roof Window SW			1.0900	1.3258	1.4451		(27a)
Existing Floor			47.5900	0.2500	11.8975		(28a)
New Floor			5.6700	0.1800	1.0206		(28a)
New Wall	40.3300	6.1300	34.2000	0.1800	6.1560		(29a)
Existing Wall	34.0500	7.1700	26.8800	0.3000	8.0640		(29a)
Existing Cold Pitched Roof	44.0900		44.0900	0.1600	7.0544		(30)
Existing Warm Pitched Roof	3.8700	1.0900	2.7800	0.1600	0.4448		(30)
New Warm Pitched Roof	5.7900		5.7900	0.1500	0.8685		(30)
Total net area of external elements Aum(A, m ²)			181.3900				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 54.7060		(33)
Party Wall			86.6400	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							36.2780 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	90.9840 (37)

Full SAP Calculation Printout



Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	74.5775	73.2043	71.8584	65.5363	64.3535	58.8472	58.8472	57.8275	60.9682	64.3535	66.7464	69.2480 (38)
Average = Sum(39)m / 12 =	165.5615	164.1883	162.8423	156.5203	155.3375	149.8312	149.8312	148.8115	151.9521	155.3375	157.7303	160.2319 (39)
												156.5146
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.7336	1.7192	1.7052	1.6390	1.6266	1.5689	1.5689	1.5582	1.5911	1.6266	1.6516	1.6778 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	1.6389 (40)
												31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6938 (42)
Hot water usage for mixer showers	122.5683	120.7263	118.0422	112.9067	109.1168	104.8903	102.4880	105.1518	108.0718	112.6097	117.8556	122.0987 (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	44.4390	42.8230	41.2070	39.5911	37.9751	36.3591	36.3591	37.9751	39.5911	41.2070	42.8230	44.4390 (42c)
Average daily hot water use (litres/day)												153.4029 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	167.0072	163.5493	159.2492	152.4977	147.0919	141.2494	138.8471	143.1269	147.6628	153.8167	160.6786	166.5376 (44)
Energy content (annual)	264.4986	232.8920	244.7602	208.7618	198.0139	173.6827	167.9236	177.2210	182.0831	208.7279	228.9161	260.7577 (45)
Distribution loss (46)m = 0.15 x (45)m	39.6748	34.9338	36.7140	31.3143	29.7021	26.0524	25.1885	26.5831	27.3125	31.3092	34.3374	39.1136 (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												
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 (57)
Combi loss	0.5268	0.5121	0.6014	0.5975	0.6310	0.6143	0.6182	0.6069	0.5740	0.5809	0.5428	0.5267 (61)
Total heat required for water heating calculated for each month	265.0254	233.4042	245.3615	209.3593	198.6449	174.2970	168.5417	177.8278	182.6570	209.3088	229.4589	261.2843 (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	265.0254	233.4042	245.3615	209.3593	198.6449	174.2970	168.5417	177.8278	182.6570	209.3088	229.4589	261.2843 (64)
12Total per year (kWh/year)												2555.1708 (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	88.0775	77.5646	81.5331	69.5627	65.9974	57.9031	55.9891	59.0777	60.6861	69.5472	76.2503	86.8336 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	135.5638	150.0885	135.5638	140.0826	135.5638	140.0826	135.5638	135.5638	140.0826	135.5638	140.0826	135.5638 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	248.8409	251.4231	244.9161	231.0634	213.5768	197.1419	186.1624	183.5802	190.0873	203.9400	221.4265	237.8614 (68)
Pumps, fans	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512 (71)
Total internal gains	118.3837	115.4236	109.5875	96.6148	88.7061	80.4209	75.2542	79.4055	84.2863	93.4775	105.9032	116.7118 (72)
	569.1952	583.3419	556.4741	534.1675	504.2535	481.0522	460.3871	461.9562	477.8628	499.3879	533.8190	556.5437 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains						
	m2	Table 6a	Specific data	Specific data	factor	W						
		W/m2	or Table 6b	or Table 6c	Table 6d							
Northeast	5.5200	11.2829	0.6300	0.7000	0.7700	19.0341 (75)						
Southwest	6.1300	36.7938	0.6300	0.7000	0.7700	68.9298 (79)						
Southwest	1.0900	31.0867	0.6300	0.7000	1.0000	13.4487 (82)						
Solar gains	101.4127	182.9442	275.7586	381.6367	461.9875	473.3114	450.2583	388.4153	312.3068	209.2126	123.3667	85.5386 (83)
Total gains	670.6079	766.2861	832.2327	915.8042	966.2410	954.3636	910.6454	850.3715	790.1696	708.6005	657.1857	642.0824 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												
Utilisation factor for gains for living area, nil,m (see Table 9a)												
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	40.0573	40.3923	40.7262	42.3712	42.6938	44.2628	44.2628	44.5661	43.6450	42.6938	42.0461	41.3897
util living area	3.6705	3.6928	3.7151	3.8247	3.8463	3.9509	3.9509	3.9711	3.9097	3.8463	3.8031	3.7593
	0.9958	0.9926	0.9865	0.9669	0.9178	0.7999	0.6541	0.7045	0.8914	0.9760	0.9928	0.9965 (86)
MIT	18.8723	19.0851	19.4299	19.9607	20.4239	20.7961	20.9336	20.9107	20.6424	20.0457	19.4161	18.8986 (87)
Th 2	19.5168	19.5271	19.5371	19.5849	19.5939	19.6362	19.6362	19.6441	19.6199	19.5939	19.5757	19.5568 (88)

Full SAP Calculation Printout



util rest of house	0.9943	0.9899	0.9810	0.9522	0.8762	0.6955	0.4829	0.5401	0.8194	0.9624	0.9897	0.9953 (89)
MIT 2	17.6372	17.8561	18.2052	18.7599	19.2018	19.5415	19.6204	19.6196	19.4211	18.8553	18.2207	17.6914 (90)
Living area fraction									fla = Living area / (4) =			0.2506 (91)
MIT	17.9467	18.1640	18.5121	19.0608	19.5080	19.8558	19.9495	19.9431	19.7271	19.1536	18.5203	17.9939 (92)
Temperature adjustment												0.0000
adjusted MIT	17.9467	18.1640	18.5121	19.0608	19.5080	19.8558	19.9495	19.9431	19.7271	19.1536	18.5203	17.9939 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9918	0.9862	0.9755	0.9448	0.8730	0.7152	0.5263	0.5811	0.8265	0.9563	0.9862	0.9932 (94)	
Useful gains	665.1278	755.7146	811.8838	865.2273	843.4998	682.5149	479.2748	494.1614	653.0590	677.6648	648.0942	637.7012 (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	2259.3623	2177.7997	1956.0766	1590.3729	1212.8823	787.4895	501.8540	527.2580	855.0527	1328.6929	1801.3217	2210.2212 (97)	
Space heating kWh	1186.1105	955.6412	851.2794	522.1049	274.8206	0.0000	0.0000	0.0000	0.0000	484.3649	830.3238	1169.9549 (98a)	
Space heating requirement - total per year (kWh/year)												6274.6000	
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	1186.1105	955.6412	851.2794	522.1049	274.8206	0.0000	0.0000	0.0000	0.0000	484.3649	830.3238	1169.9549 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												6274.6000	
Space heating per m2										(98c) / (4) =		65.7026 (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 %)												84.1000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	1186.1105	955.6412	851.2794	522.1049	274.8206	0.0000	0.0000	0.0000	0.0000	484.3649	830.3238	1169.9549 (98)
Space heating efficiency (main heating system 1)	84.1000	84.1000	84.1000	84.1000	84.1000	0.0000	0.0000	0.0000	0.0000	84.1000	84.1000	84.1000 (210)
Space heating fuel (main heating system)	1410.3573	1136.3153	1012.2228	620.8143	326.7783	0.0000	0.0000	0.0000	0.0000	575.9392	987.3053	1391.1473 (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 requirement	265.0254	233.4042	245.3615	209.3593	198.6449	174.2970	168.5417	177.8278	182.6570	209.3088	229.4589	261.2843 (64)
Efficiency of water heater (217)m	88.3219	88.2643	88.1487	87.8866	87.3326	85.0000	85.0000	85.0000	85.0000	87.8218	88.1791	88.3223 (217)
Fuel for water heating, kWh/month	300.0675	264.4379	278.3496	238.2151	227.4579	205.0553	198.2844	209.2092	214.8906	238.3335	260.2192	295.8307 (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	32.3251	25.9324	23.3492	17.1067	13.2137	10.7957	12.0540	15.6682	20.3514	26.7022	30.1600	33.2235 (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												7460.8799 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												85.0000
Water heating fuel used												2930.3507 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
central heating pump												41.0000 (230c)
main heating flue fan												45.0000 (230e)
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												260.8821 (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												10738.1128 (238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

Full SAP Calculation Printout



	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	7460.8799	0.2100	1566.7848 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2930.3507	0.2100	615.3737 (264)
Space and water heating			2182.1584 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	260.8821	0.1443	37.6533 (268)
Total CO2, kg/year			2231.7411 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			23.3700 (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	7460.8799	1.1300	8430.7943 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2930.3507	1.1300	3311.2963 (278)
Space and water heating			11742.0907 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	260.8821	1.5338	400.1497 (282)
Total Primary energy kWh/year			12272.3411 (286)
Dwelling Primary energy Rate (DPER)			128.5100 (287)

Full SAP Calculation Printout



Property Reference	14 Marlborough St		Issued on Date	06/02/2025	
Assessment Reference	Baseline	Prop Type Ref			
Property	14, Marlborough St, Bristol, BS5 6RH				
SAP Rating	78 C	DER	23.37	TER	
Environmental	79 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.82	DFEE	69.11	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	128.51	TPER	
Assessor Details	Mr. Lee Humphries			Assessor ID	DT88-0001
Client					

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	53.2600 (1b)	x 2.4400 (2b)	= 129.9544 (1b) - (3b)
First floor	42.2400 (1c)	x 2.5500 (2c)	= 107.7120 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.5000		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 237.6664 (5)
Dwelling volume			

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1262 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8762 (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) = 0.7448 (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	0.9496	0.9310	0.9124	0.8193	0.8007	0.7076	0.7076	0.6889	0.7448	0.8007	0.8379	0.8751 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.9509	0.9334	0.9162	0.8356	0.8205	0.7503	0.7503	0.7373	0.7774	0.8205	0.8510	0.8829 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Glazing (Uw = 1.40)			11.6500	1.3258	15.4451		(27)
Door			1.6500	1.4000	2.3100		(26)
Roof Window SW			1.0900	1.3258	1.4451		(27a)
Existing Floor			47.5900	0.2500	11.8975		(28a)
New Floor			5.6700	0.1800	1.0206		(28a)
New Wall	40.3300	6.1300	34.2000	0.1800	6.1560		(29a)
Existing Wall	34.0500	7.1700	26.8800	0.3000	8.0640		(29a)
Existing Cold Pitched Roof	44.0900		44.0900	0.1600	7.0544		(30)
Existing Warm Pitched Roof	3.8700	1.0900	2.7800	0.1600	0.4448		(30)
New Warm Pitched Roof	5.7900		5.7900	0.1500	0.8685		(30)
Total net area of external elements Aum(A, m ²)			181.3900				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 54.7060		(33)
Party Wall			86.6400	0.0000	0.0000		(32)
Thermal mass parameter (IMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							36.2780 (36)
Point Thermal bridges						(36a) =	0.0000

Full SAP Calculation Printout



Total fabric heat loss												(33) + (36) + (36a) =	90.9840 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	74.5775	73.2043	71.8584	65.5363	64.3535	58.8472	58.8472	57.8275	60.9682	64.3535	66.7464	69.2480	(38)
Average = Sum(39)m / 12 =	165.5615	164.1883	162.8423	156.5203	155.3375	149.8312	149.8312	148.8115	151.9521	155.3375	157.7303	160.2319	(39)
												156.5146	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.7336	1.7192	1.7052	1.6390	1.6266	1.5689	1.5689	1.5582	1.5911	1.6266	1.6516	1.6778	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6938 (42)	
Hot water usage for mixer showers												0.0000 (42a)	
Hot water usage for baths												29.9613 (42b)	
Hot water usage for other uses												42.2170 (42c)	
Average daily hot water use (litres/day)												66.1580 (43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	72.1783	70.1982	68.0364	65.3459	62.9456	60.4512	59.9330	62.0904	64.3031	66.8647	69.5790	72.0770	(44)
Energy content (annual)	114.3128	99.9613	104.5694	89.4553	84.7369	74.3318	72.4838	76.8809	79.2921	90.7348	99.1280	112.8552	(45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1098.7424	
Water storage loss:												0.0000 (46)	
Total storage loss												0.0000 (56)	
If cylinder contains dedicated solar storage												0.0000 (57)	
Primary loss												0.0000 (59)	
Combi loss												0.0000 (61)	
Total heat required for water heating calculated for each month													
WWHRS	97.1659	84.9671	88.8840	76.0370	72.0264	63.1820	61.6112	65.3488	67.3983	77.1245	84.2588	95.9269	(62)
FV diverter												0.0000 (63a)	
Solar input												0.0000 (63b)	
FGHRS												0.0000 (63c)	
Output from w/h												0.0000 (63d)	
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 933.9310 (64)	
Electric shower(s)												934 (64)	
Heat gains from water heating, kWh/month	55.5663	49.5101	54.0631	51.5917	52.5598	50.1370	51.8082	52.5598	51.5917	54.0631	53.0465	55.5663	(64a)
												Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 632.0637 (64a)	
	38.1831	33.6193	35.7368	31.9072	31.1466	28.3297	28.3549	29.4772	29.7475	32.7969	34.3263	37.8733	(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	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												135.5638 (67)	
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												248.8409 (68)	
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												36.4689 (69)	
Pumps, fans												0.0000 (70)	
Losses e.g. evaporation (negative values) (Table 5)												-107.7512 (71)	
Water heating gains (Table 5)												51.3213 (72)	
Total internal gains	499.1327	514.9470	491.9199	478.8682	454.4110	439.9781	423.2443	422.1705	434.8925	446.9923	472.5913	487.7369	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d	Gains W				
Northeast	5.5200	11.2829	0.6300	0.7000	0.7700	19.0341 (75)						
Southwest	6.1300	36.7938	0.6300	0.7000	68.9298 (79)							
Southwest	1.0900	31.0867	0.6300	0.7000	13.4487 (82)							
Solar gains	101.4127	182.9442	275.7586	381.6367	461.9875	473.3114	450.2583	388.4153	312.3068	209.2126	123.3667	85.5386 (83)
Total gains	600.5455	697.8912	767.6785	860.5049	916.3985	913.2895	873.5025	810.5859	747.1994	656.2049	595.9580	573.2755 (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)													
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
alpha	40.0573	40.3923	40.7262	42.3712	42.6938	44.2628	44.2628	44.5661	43.6450	42.6938	42.0461	41.3897	
util living area	3.6705	3.6928	3.7151	3.8247	3.8463	3.9509	3.9509	3.9711	3.9097	3.8463	3.8031	3.7593	
	0.9971	0.9946	0.9896	0.9727	0.9286	0.8170	0.6737	0.7264	0.9057	0.9812	0.9949	0.9976 (86)	

Full SAP Calculation Printout



MIT	18.8023	19.0175	19.3674	19.9107	20.3869	20.7781	20.9262	20.9000	20.6138	19.9965	19.3548	18.8291 (87)
Th 2	19.5168	19.5271	19.5371	19.5849	19.5939	19.6362	19.6362	19.6441	19.6199	19.5939	19.5757	19.5568 (88)
util rest of house												
	0.9961	0.9926	0.9853	0.9602	0.8910	0.7157	0.5011	0.5623	0.8396	0.9702	0.9926	0.9968 (89)
MIT 2	17.5676	17.7891	18.1440	18.7127	19.1708	19.5310	19.6182	19.6159	19.4002	18.8085	18.1602	17.6222 (90)
Living area fraction									fLA = Living area / (4) =			0.2506 (91)
MIT	17.8770	18.0969	18.4506	19.0129	19.4755	19.8435	19.9460	19.9377	19.7043	19.1062	18.4595	17.9246 (92)
Temperature adjustment												0.0000
adjusted MIT	17.8770	18.0969	18.4506	19.0129	19.4755	19.8435	19.9460	19.9377	19.7043	19.1062	18.4595	17.9246 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9942	0.9896	0.9806	0.9532	0.8869	0.7340	0.5448	0.6030	0.8448	0.9647	0.9898	0.9953 (94)
Useful gains	597.0743	690.6446	752.8209	820.2094	812.7641	670.3506	475.8853	488.7954	631.2562	633.0502	589.8809	570.5659 (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												
	2247.8218	2166.7752	1946.0566	1582.8760	1207.8237	785.6370	501.3313	526.4457	851.5827	1321.3311	1791.7427	2199.1158 (97)
Space heating kWh	1228.1561	991.9598	887.7673	549.1200	293.9244	0.0000	0.0000	0.0000	0.0000	512.0810	865.3405	1211.6411 (98a)
Space heating requirement - total per year (kWh/year)												6539.9902
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	1228.1561	991.9598	887.7673	549.1200	293.9244	0.0000	0.0000	0.0000	0.0000	512.0810	865.3405	1211.6411 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6539.9902
Space heating per m2												(98c) / (4) = 68.4816 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
Heat loss rate W												
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	1408.4130	1108.7507	1130.9673	0.0000	0.0000	0.0000	0.0000 (100)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.6408	0.7316	0.6887	0.0000	0.0000	0.0000	0.0000 (101)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	902.5693	811.1894	778.9161	0.0000	0.0000	0.0000	0.0000 (102)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	991.5996	948.7480	880.1299	0.0000	0.0000	0.0000	0.0000 (103)
Cooled fraction												
	0.0000	0.0000	0.0000	0.0000	0.0000	64.1018	102.3436	75.3031	0.0000	0.0000	0.0000	0.0000 (104)
Intermittency factor (Table 10b)									fC = cooled area / (4) =			1.0000 (105)
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	16.0255	25.5859	18.8258	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												60.4371 (107)
Energy for space heating												68.4816 (99)
Energy for space cooling												0.6328 (108)
Total												69.1144 (109)
Fabric Energy Efficiency (DFEE)												69.1 (109)

Full SAP Calculation Printout



Property Reference	14 Marlborough St		Issued on Date	06/02/2025	
Assessment Reference	Baseline	Prop Type Ref			
Property	14, Marlborough St, Bristol, BS5 6RH				
SAP Rating	78 C	DER	23.37	TER	
Environmental	79 C	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.82	DFEE	69.11	TFEE	
Compliance Check	See BREEL	% DFEE < TFEE			
% DPER < TPER		DPER	128.51	TPER	
Assessor Details	Mr. Lee Humphries			Assessor ID	DT88-0001
Client					

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	53.2600 (1b)	x 2.4400 (2b)	= 129.9544 (1b) - (3b)
First floor	42.2400 (1c)	x 2.5500 (2c)	= 107.7120 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.5000		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 237.6664 (4)
Dwelling volume			(5)

2. Ventilation rate

		m ³ per hour
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	3 * 10 =	30.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1262 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8762 (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) =	0.7448 (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	0.9496	0.9310	0.9124	0.8193	0.8007	0.7076	0.7076	0.6889	0.7448	0.8007	0.8379	0.8751 (22b)
Effective ac	0.9509	0.9334	0.9162	0.8356	0.8205	0.7503	0.7503	0.7373	0.7774	0.8205	0.8510	0.8829 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Glazing (Uw = 1.40)			11.6500	1.3258	15.4451		(27)
Door			1.6500	1.4000	2.3100		(26)
Roof Window SW			1.0900	1.3258	1.4451		(27a)
Existing Floor			47.5900	0.2500	11.8975		(28a)
New Floor			5.6700	0.1800	1.0206		(28a)
New Wall	40.3300	6.1300	34.2000	0.1800	6.1560		(29a)
Existing Wall	34.0500	7.1700	26.8800	0.3000	8.0640		(29a)
Existing Cold Pitched Roof	44.0900		44.0900	0.1600	7.0544		(30)
Existing Warm Pitched Roof	3.8700	1.0900	2.7800	0.1600	0.4448		(30)
New Warm Pitched Roof	5.7900		5.7900	0.1500	0.8685		(30)
Total net area of external elements Aum(A, m ²)			181.3900				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	54.7060	(33)
Party Wall			86.6400	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							36.2780 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss					(33) + (36) + (36a) =	90.9840	(37)

Full SAP Calculation Printout



Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	74.5775	73.2043	71.8584	65.5363	64.3535	58.8472	58.8472	57.8275	60.9682	64.3535	66.7464	69.2480 (38)
Average = Sum(39)m / 12 =	165.5615	164.1883	162.8423	156.5203	155.3375	149.8312	149.8312	148.8115	151.9521	155.3375	157.7303	160.2319 (39)
												156.5146
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.7336	1.7192	1.7052	1.6390	1.6266	1.5689	1.5689	1.5582	1.5911	1.6266	1.6516	1.6778 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	1.6389 (40)
												31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6938 (42)
Hot water usage for mixer showers	122.5683	120.7263	118.0422	112.9067	109.1168	104.8903	102.4880	105.1518	108.0718	112.6097	117.8556	122.0987 (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	44.4390	42.8230	41.2070	39.5911	37.9751	36.3591	36.3591	37.9751	39.5911	41.2070	42.8230	44.4390 (42c)
Average daily hot water use (litres/day)												153.4029 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	167.0072	163.5493	159.2492	152.4977	147.0919	141.2494	138.8471	143.1269	147.6628	153.8167	160.6786	166.5376 (44)
Energy content (annual)	264.4986	232.8920	244.7602	208.7618	198.0139	173.6827	167.9236	177.2210	182.0831	208.7279	228.9161	260.7577 (45)
Distribution loss (46)m = 0.15 x (45)m	39.6748	34.9338	36.7140	31.3143	29.7021	26.0524	25.1885	26.5831	27.3125	31.3092	34.3374	39.1136 (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												
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 (57)
Combi loss	0.5268	0.5121	0.6014	0.5975	0.6310	0.6143	0.6182	0.6069	0.5740	0.5809	0.5428	0.5267 (61)
Total heat required for water heating calculated for each month	265.0254	233.4042	245.3615	209.3593	198.6449	174.2970	168.5417	177.8278	182.6570	209.3088	229.4589	261.2843 (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	265.0254	233.4042	245.3615	209.3593	198.6449	174.2970	168.5417	177.8278	182.6570	209.3088	229.4589	261.2843 (64)
12Total per year (kWh/year)												2555.1708 (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	88.0775	77.5646	81.5331	69.5627	65.9974	57.9031	55.9891	59.0777	60.6861	69.5472	76.2503	86.8336 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890	134.6890 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	135.5638	150.0885	135.5638	140.0826	135.5638	140.0826	135.5638	135.5638	140.0826	135.5638	140.0826	135.5638 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	248.8409	251.4231	244.9161	231.0634	213.5768	197.1419	186.1624	183.5802	190.0873	203.9400	221.4265	237.8614 (68)
Pumps, fans	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689	36.4689 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512	-107.7512 (71)
Total internal gains	118.3837	115.4236	109.5875	96.6148	88.7061	80.4209	75.2542	79.4055	84.2863	93.4775	105.9032	116.7118 (72)
	569.1952	583.3419	556.4741	534.1675	504.2535	481.0522	460.3871	461.9562	477.8628	499.3879	533.8190	556.5437 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains						
	m ²	Table 6a	Specific data	Specific data	factor	W						
		W/m ²	or Table 6b	or Table 6c	Table 6d							
Northeast	5.5200	11.2829	0.6300	0.7000	0.7700	19.0341 (75)						
Southwest	6.1300	36.7938	0.6300	0.7000	0.7700	68.9298 (79)						
Southwest	1.0900	31.0867	0.6300	0.7000	1.0000	13.4487 (82)						
Solar gains	101.4127	182.9442	275.7586	381.6367	461.9875	473.3114	450.2583	388.4153	312.3068	209.2126	123.3667	85.5386 (83)
Total gains	670.6079	766.2861	832.2327	915.8042	966.2410	954.3636	910.6454	850.3715	790.1696	708.6005	657.1857	642.0824 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												
Utilisation factor for gains for living area, nil,m (see Table 9a)												
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	40.0573	40.3923	40.7262	42.3712	42.6938	44.2628	44.2628	44.5661	43.6450	42.6938	42.0461	41.3897
util living area	3.6705	3.6928	3.7151	3.8247	3.8463	3.9509	3.9509	3.9711	3.9097	3.8463	3.8031	3.7593
	0.9958	0.9926	0.9865	0.9669	0.9178	0.7999	0.6541	0.7045	0.8914	0.9760	0.9928	0.9965 (86)
MIT	18.8723	19.0851	19.4299	19.9607	20.4239	20.7961	20.9336	20.9107	20.6424	20.0457	19.4161	18.8986 (87)
Th 2	19.5168	19.5271	19.5371	19.5849	19.5939	19.6362	19.6362	19.6441	19.6199	19.5939	19.5757	19.5568 (88)

Full SAP Calculation Printout



util rest of house	0.9943	0.9899	0.9810	0.9522	0.8762	0.6955	0.4829	0.5401	0.8194	0.9624	0.9897	0.9953 (89)
MIT 2	17.6372	17.8561	18.2052	18.7599	19.2018	19.5415	19.6204	19.6196	19.4211	18.8553	18.2207	17.6914 (90)
Living area fraction									fla = Living area / (4) =			0.2506 (91)
MIT	17.9467	18.1640	18.5121	19.0608	19.5080	19.8558	19.9495	19.9431	19.7271	19.1536	18.5203	17.9939 (92)
Temperature adjustment												0.0000
adjusted MIT	17.9467	18.1640	18.5121	19.0608	19.5080	19.8558	19.9495	19.9431	19.7271	19.1536	18.5203	17.9939 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9918	0.9862	0.9755	0.9448	0.8730	0.7152	0.5263	0.5811	0.8265	0.9563	0.9862	0.9932 (94)	
Useful gains	665.1278	755.7146	811.8838	865.2273	843.4998	682.5149	479.2748	494.1614	653.0590	677.6648	648.0942	637.7012 (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	2259.3623	2177.7997	1956.0766	1590.3729	1212.8823	787.4895	501.8540	527.2580	855.0527	1328.6929	1801.3217	2210.2212 (97)	
Space heating kWh	1186.1105	955.6412	851.2794	522.1049	274.8206	0.0000	0.0000	0.0000	0.0000	484.3649	830.3238	1169.9549 (98a)	
Space heating requirement - total per year (kWh/year)												6274.6000	
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	1186.1105	955.6412	851.2794	522.1049	274.8206	0.0000	0.0000	0.0000	0.0000	484.3649	830.3238	1169.9549 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												6274.6000	
Space heating per m2												(98c) / (4) =	65.7026 (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 %)													84.1000 (206)
Efficiency of main space heating system 2 (in %)													0.0000 (207)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement	1186.1105	955.6412	851.2794	522.1049	274.8206	0.0000	0.0000	0.0000	0.0000	484.3649	830.3238	1169.9549 (98)	
Space heating efficiency (main heating system 1)	84.1000	84.1000	84.1000	84.1000	84.1000	0.0000	0.0000	0.0000	0.0000	84.1000	84.1000	84.1000 (210)	
Space heating fuel (main heating system)	1410.3573	1136.3153	1012.2228	620.8143	326.7783	0.0000	0.0000	0.0000	0.0000	575.9392	987.3053	1391.1473 (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 requirement	265.0254	233.4042	245.3615	209.3593	198.6449	174.2970	168.5417	177.8278	182.6570	209.3088	229.4589	261.2843 (64)	
Efficiency of water heater (217)m	88.3219	88.2643	88.1487	87.8866	87.3326	85.0000	85.0000	85.0000	85.0000	87.8218	88.1791	88.3223 (217)	
Fuel for water heating, kWh/month	300.0675	264.4379	278.3496	238.2151	227.4579	205.0553	198.2844	209.2092	214.8906	238.3335	260.2192	295.8307 (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	32.3251	25.9324	23.3492	17.1067	13.2137	10.7957	12.0540	15.6682	20.3514	26.7022	30.1600	33.2235 (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													7460.8799 (211)
Space heating fuel - main system 2													0.0000 (213)
Space heating fuel - secondary													0.0000 (215)
Efficiency of water heater													85.0000
Water heating fuel used													2930.3507 (219)
Space cooling fuel													0.0000 (221)
Electricity for pumps and fans:													
central heating pump													41.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													86.0000 (231)
Electricity for lighting (calculated in Appendix L)													260.8821 (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													10738.1128 (238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

Full SAP Calculation Printout



	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	7460.8799	0.2100	1566.7848 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2930.3507	0.2100	615.3737 (264)
Space and water heating			2182.1584 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	260.8821	0.1443	37.6533 (268)
Total CO2, kg/year			2231.7411 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			23.3700 (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	7460.8799	1.1300	8430.7943 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2930.3507	1.1300	3311.2963 (278)
Space and water heating			11742.0907 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	260.8821	1.5338	400.1497 (282)
Total Primary energy kWh/year			12272.3411 (286)
Dwelling Primary energy Rate (DPER)			128.5100 (287)