SAP 10 WORKSHEET (Version 10.2, December 2021)
CALCULATION OF TARGET EMISSIONS

Complete Energy Consultancy Ltd
The Exchange
Brickrow
Stroud
Tel: [redacted]

Date 15/10/2025

Property			
UPRN	UPRN-0000000000	Project Type	New dwelling created by change of use
Address	New Unit, 16 Cherry Lane, Bristol, BS1 3NG	Dwelling Type	Ground-floor flat

1 Overall dwelling dimensions				
Ground floor	54.8000	2.3500	128.7800	(1b) - (3b)
Total floor area			54.8000	(4)
Dwelling volume (mÂ³)			128.7800	(5)

2 Ventilation rate		
Number of chimneys	0	(6a)
Number of open flues	0	(6b)
Number of chimneys/flues to closed fires	0	(6c)
Number of flues to solid fuel boilers	0	(6d)
Number of flues attached to other heaters	0	(6d)
Number of blocked chimneys	0	(6f)
Number of intermittent fans	20	(7a)
Number of passive vents	0	(7b)
Number of flueless gas fires	0	(7c)
Infiltration due to chimneys, flues and fans	0.1553	(8)
q50 measured in this dwelling	5.0000	(17)
Infiltration rate	0.4053	(18)
Number of sides sheltered	2	(19)
Shelter factor	0.8500	(20)
Infiltration rate incorporating shelter factor	0.3445	(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	0.4392	0.4306	0.4220	0.3790	0.3703	0.3273	0.3273	0.3187	0.3445	0.3703	0.3876	0.4048	(22b)
Effective ach	0.5965	0.5927	0.5891	0.5718	0.5686	0.5536	0.5536	0.5508	0.5593	0.5686	0.5751	0.5819	(25)

3. Heat losses and heat loss parameter

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	Net area (m^2)	U-value (W/m^2K)	A x U (W/K)	K Value kJ/m^2K	A x K (kJ/K)	
Windows (1)			10.0800	1.1450	11.5420	(27)
groundFloor	54.8000	0.1300	7.1240	110.0000	6028.0000	(28a)
exposeWall	.9200	0.1800	1.0656	9.0000	53.2800	(29a)
Total area of external elements:					70.8000	(31)
partyWall			55.0000	70.0000	3850.0000	(32)
Fabric heat loss:					19.7316	(33)
partyCeiling			4.8000	30.0000	1644.0000	(32b)
Heat capacity:					11575.2800	(34)
Thermal mass parameter:					250.0000	(35)
Thermal bridges:					3.5400	(36)
Total fabric heat loss :					23.2716	(37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Vent loss	25.3484	25.1892	25.0332	24.3002	24.1631	23.5247	23.5247	23.4065	23.7706	24.1631	24.4405	24.7305	(38)
Heat transfer coeff	48.6200	48.4608	48.3047	47.5718	47.4347	46.7963	46.7963	46.6781	47.0422	47.4347	47.7121	48.0021	(39)
Heat transfer coeff (average)												47.5712	(39)
HLP	0.8872	0.8843	0.8815	0.8681	0.8656	0.8539	0.8539	0.8518	0.8584	0.8656	0.8707	0.8760	(40)
HLP (average)												0.8681	(40)
Days in month	31.0000	28.0000	31.0000	30.0000	31.0000	30.0000	31.0000	31.0000	30.0000	31.0000	30.0000	31.0000	(41)
Heat losses and heat loss parameter												complete	

4. Water heating energy requirements

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Assumed occupancy												1.8315	(42)
Average daily hot water use (litres/day)												95.3553	(43)
Mixer shower usage	70.5059	69.4463	67.9023	64.9482	62.7681	60.3369	58.9550	60.4873	62.1670	64.7774	67.7950	70.2358	(42a)
Bath usage	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)
Other usage	33.3864	32.1723	30.9583	29.7442	28.5302	27.3161	27.3161	28.5302	29.7442	30.9583	32.1723	33.3864	(42c)
Daily hot water use	103.8923	101.6187	98.8606	94.6924	91.2983	87.6530	86.2711	89.0174	91.9112	95.7356	99.9673	103.6221	(44)
Energy content	164.5400	144.7036	151.9451	129.6292	122.9050	107.7796	104.3374	110.2222	113.3357	129.9123	142.4217	162.2472	(45)
Energy content(annual)												1583.9789	(45)

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Calculated by Argyle Calculation Engine (ACE) | SAP Engine version v10.2.2.0
JPA Designer 10 2.0.52.4

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Distribution loss	24.6810	21.7055	22.7918	19.4444	18.4358	16.1669	15.6506	16.5333	17.0004	19.4869	21.3633	24.3371	(46)
Cylinder volume												150.0000	(47)
Measured cylinder loss (kWh/day)												1.3938	(48)
Temperature factor												0.5400	(49)
Energy lost from water storage (kWh/day)												0.7527	(50)
Energy lost from cylinder in kWh/day												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)
Net 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	(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	211.1349	186.7893	198.5400	174.7210	169.4999	152.8714	150.9323	156.8171	158.4275	176.5072	187.5136	208.8421	(62)
WWHRS Saving	-32.2324	-28.5066	-29.8504	-24.7173	-23.0357	-19.7118	-18.4767	-19.6481	-20.3946	-24.0430	-27.2377	-31.6355	(63a)
PV Diverter Saving	-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 Saving	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)
WW heat rec.	-32.2324	-28.5066	-29.8504	-24.7173	-23.0357	-19.7118	-18.4767	-19.6481	-20.3946	-24.0430	-27.2377	-31.6355	(63)
Flue gas heat rec.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(G6)
Fghrs PV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Output from w/h	178.9025	158.2828	168.6895	150.0037	146.4642	133.1596	132.4556	137.1690	138.0330	152.4643	160.2758	177.2067	(64)
Output from water heater(annual)												1833.1067	(64)
Instantaneous electric showers	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)
Heat gains (kWh)	91.9855	81.7825	87.7977	79.1752	78.1418	71.9102	71.9681	73.9248	73.7576	80.4718	83.4287	91.2231	(65)

5. Internal gains

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic	91.5748	91.5748	91.5748	91.5748	91.5748	91.5748	91.5748	91.5748	91.5748	91.5748	91.5748	91.5748	(66)
Lighting	81.9794	90.7630	81.9794	84.7121	81.9794	84.7121	81.9794	81.9794	84.7121	81.9794	84.7121	81.9794	(67)
Appliances	159.6700	161.3269	157.1517	148.2630	137.0427	126.4971	119.4521	117.7952	121.9704	130.8591	142.0794	152.6250	(68)
Cooking	32.1575	32.1575	32.1575	32.1575	32.1575	32.1575	32.1575	32.1575	32.1575	32.1575	32.1575	32.1575	(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	-73.2599	-73.2599	-73.2599	-73.2599	-73.2599	-73.2599	-73.2599	-73.2599	-73.2599	-73.2599	-73.2599	-73.2599	(71)
Water heating	123.6364	121.7002	118.0076	109.9655	105.0293	99.8753	96.7313	99.3613	102.4411	108.1610	115.8732	122.6117	(72)

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Total internal	418.7583	427.2625	410.6112	396.4131	377.5239	361.5569	348.6353	349.6084	359.5961	374.4720	396.1372	410.6886	(73)

6. Solar gains

Windows (1)												11.5420	(27)
groundFloor												6028.0000	(28a)
exposeWall												53.2800	(29a)
Total area of external elements:												70.8000	(31)
partyWall												3850.0000	(32)
Fabric heat loss:												19.7316	(33)
partyCeiling												1644.0000	(32b)
Heat capacity:												11575.2800	(34)
Thermal mass parameter:												250.0000	(35)
Thermal bridges:												3.5400	(36)
Total fabric heat loss :												23.2716	(37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	113.3463	193.0707	264.1677	327.3166	366.6219	363.9707	350.9066	321.5831	286.0378	213.3843	135.7628	97.0008	(83)
Total gains	532.1046	620.3332	674.7789	723.7297	744.1458	725.5276	699.5419	671.1915	645.6339	587.8563	531.8999	507.6894	(84)

7. Mean internal temperature

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Living room temperature during heating periods Th1												21.0000	(85)
Heating system responsiveness												1.0000	
tau	78.2714	78.5286	78.7822	79.9960	80.2273	81.3217	81.3217	81.5276	80.8966	80.2273	79.7608	79.2789	
alpha	6.2181	6.2352	6.2521	6.3331	6.3485	6.4214	6.4214	6.4352	6.3931	6.3485	6.3174	6.2853	
external 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	
util living area	0.9739	0.9394	0.8776	0.7484	0.5839	0.4120	0.2943	0.3198	0.4996	0.7780	0.9387	0.9791	(86)
MIT 1	20.3965	20.5941	20.7775	20.9300	20.9863	20.9988	20.9999	20.9998	20.9959	20.9258	20.6622	20.3630	(87)
th2	20.1784	20.1808	20.1833	20.1947	20.1968	20.2068	20.2068	20.2087	20.2030	20.1968	20.1925	20.1880	(88)
util rest	0.9670	0.9255	0.8530	0.7097	0.5365	0.3613	0.2413	0.2648	0.4433	0.7337	0.9222	0.9735	(89)
MIT 2	19.4997	19.7420	19.9580	20.1321	20.1868	20.2062	20.2068	20.2086	20.2006	20.1335	19.8378	19.4661	(90)
Living area fraction =												0.2974	(91)
MIT	19.7664	19.9954	20.2017	20.3694	20.4246	20.4419	20.4427	20.4439	20.4371	20.3692	20.0830	19.7329	(92)

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Temperature adjustment												0.0000	
adjusted MIT	19.7664	19.9954	20.2017	20.3694	20.4246	20.4419	20.4427	20.4439	20.4371	20.3692	20.0830	19.7329	(93)

8. Space heated requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9629	0.9220	0.8536	0.7184	0.5501	0.3764	0.2570	0.2812	0.4600	0.7437	0.9197	0.9697	(94)
Useful gains W	512.3672	571.9212	576.0165	519.9467	409.3576	273.0571	179.8019	188.7249	296.9617	437.1638	489.1822	492.2843	(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	751.9775	731.5359	661.8594	545.6219	413.8476	273.3805	179.8236	188.7636	298.1132	463.3980	619.4449	745.6120	(97)
Month fraction	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating requirement for	178.2701	107.2611	63.8671	18.4861	3.3406	0.0000	0.0000	0.0000	0.0000	19.5183	93.7892	188.4758	(98a)
Solar space heating contribution	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)
Total space heating requirement	178.2701	107.2611	63.8671	18.4861	3.3406	0.0000	0.0000	0.0000	0.0000	19.5183	93.7892	188.4758	(98)
Space heating per m2												12.2812	(99)

9. Energy requirements

Fraction of space heat from secondary	0.0000	(201)
Fraction of space heat from main system	1.0000	(202)
Fraction of total space heat from main system 1	1.0000	(204)
Efficiency of main heating system 1	92.3000	(206)
Efficiency of water heater	79.8000	(216)
micro-CHP export	0.0000	(235d)
Space heating fuel - main system 1	729.1530	(211)
Water heating fuel	2247.9642	(219)
central heating pump	41.0000	(230c)
boiler flue fan	45.0000	(230e)
Electricity for pumps and fans	86.0000	(231)
Electricity for lighting	137.4718	(232)

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PV generation	-902.8758	(233)
Micro-CHP generation	0.0000	(235)
Total delivered energy for all uses	2297.7131	(238)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating efficiency (main heating system)	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)	193.1420	116.2092	69.1951	20.0283	3.6192	0.0000	0.0000	0.0000	0.0000	21.1465	101.6134	204.1991	(211)
Water heating requirement	178.9025	158.2828	168.6895	150.0037	146.4642	133.1596	132.4556	137.1690	138.0330	152.4643	160.2758	177.2067	(64)
Water heating efficiency	84.0518	83.2064	82.0848	80.6973	79.9808	79.8000	79.8000	79.8000	79.8000	80.7286	82.9017	84.1983	(217)
Water heating fuel detail	212.8478	190.2291	205.5065	185.8843	183.1243	166.8667	165.9845	171.8910	172.9736	188.8604	193.3324	210.4635	(219)
Space cooling fuel total	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)
PV Generation in dwelling	18.8134	27.4710	40.8913	47.6830	52.9233	49.9752	49.3896	45.8947	39.9614	32.1926	21.0264	16.1585	(233a)
Wind Generation in dwelling	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)
Hydro Generation in dwelling	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)
micro-CHP in dwelling	-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)
PV Generation export	7.9326	16.9361	34.1187	51.9074	69.2687	69.8054	68.9580	58.0752	42.1762	24.4099	10.6545	6.2525	(233b)
Wind Generation export	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)
Hydro Generation export	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)

12. Carbon dioxide emmissions

Space heating - main system	729.1530	0.2100	153.1221	(261)
Water heating	2247.9642	0.2100	472.0725	(264)
Space and water heating			625.1946	(265)
Pumps and fans	86.0000	0.1388	11.9293	(267)
Energy for lighting	0.0000	0.1360	19.8414	(268)
Electricity generated - PVs	-902.8758	1.6660	-117.0104	(269)
Electricity generated - wind	-0.0000	1.6660	-0.0000	(269)
Electricity generated - hydro	-0.0000	1.6660	-0.0000	(269)
Electricity generated - mCHP	-0.0000	1.6660	-0.0000	(269)
Total kg/year			539.9549	(272)

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13. Primary energy				
Space heating - main system	729.1530	13.5600	823.9428	(275)
Water heating	2247.9642	13.5600	2540.1995	(278)
Space and water heating			3364.1423	(279)
Pumps and fans	86.0000	1.5133	130.1008	(281)
Energy for lighting	137.4718	1.5133	210.8588	(282)
Electricity generated - PVs	-902.8758	18.1590	-873.3512	(283)
Electricity generated - wind	-0.0000	18.1590	-0.0000	(283)
Electricity generated - hydro	-0.0000	18.1590	-0.0000	(283)
Electricity generated - mCHP	-0.0000	18.1590	-0.0000	(283)
Total kg/year			2831.7508	(286)
EI value			92.7501	
Target Carbon Dioxide EmissionRate(TER)			9.85	(273)
Target Primary Energy Rate (TPER)			51.67	(287)

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