SAP 10 WORKSHEET (Version 10.2, December 2021)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

Date 25/10/2023

Complete Energy Consultancy Ltd

The Exchange
Brickrow
Stroud
Tel: 07771 964593

Property	
UPRN	UPRN-0000000000
Address	Little Tresevern; Tresevern;

1 Overall dwelling dimensions				
Ground floor	140.0000	2.3500	329.0000	(1b) - (3b)
First floor	146.0000	2.6500	386.9000	(1c) - (3c)
Total floor area			286.0000	(4)
Dwelling volume (mÂ³)			715.9000	(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	70	(7a)
Number of passive vents	0	(7b)
Number of flueless gas fires	0	(7c)
Infiltration due to chimneys, flues and fans	0.0978	(8)
Predicted Design q50(assumed)	3.0000	(17)
Infiltration rate	0.2478	(18)
Number of sides sheltered	2	(19)
Shelter factor	0.8500	(20)
Infiltration rate incorporating shelter factor	0.2106	(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	0.2685	0.2633	0.2580	0.2317	0.2264	0.2001	0.2001	0.1948	0.2106	0.2264	0.2369	0.2475	(22b)
Effective ach	0.5361	0.5347	0.5333	0.5268	0.5256	0.5200	0.5200	0.5190	0.5222	0.5256	0.5281	0.5306	(25)

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Calculated by Argyle Calculation Engine (ACE) using JPA Designer 10 2.0 | SAP Engine version v10.2.2.0

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3. Heat losses and heat loss parameter

Windows (1)									54.8500	0.9615	52.7404	(27)
groundFloor						140.0000	0.1000	14.0000	75.0000	10500.0000	(28a)	
exposeWall						92.0300	0.1800	34.5654	9.0000	1728.2700	(29a)	
exposeWall						.1200	0.1800	1.1016	9.0000	55.0800	(29a)	
exposeWall						9.0000	0.1800	3.4200	9.0000	171.0000	(29a)	
exposedRoof						105.0000	0.1000	10.5000	9.0000	945.0000	(30)	
exposedRoof						77.0000	0.1500	11.5500	9.0000	693.0000	(30)	
exposedRoof						5.0000	0.1000	0.5000	9.0000	45.0000	(30)	
Total area of external elements:										599.0000	(31)	
Fabric heat loss:										128.3774	(33)	
Heat capacity:										14137.3500	(34)	
Thermal mass parameter:										100.0000	(35)	
Thermal bridges:										18.1160	(36)	
Total fabric heat loss :										146.4934	(37)	

		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Vent loss	126.6412	126.3105	125.9863	124.4635	124.1786	122.8523	122.8523	122.6067	123.3632	124.1786	124.7549	125.3575	(38)
Heat transfer coeff	273.1346	272.8039	272.4797	270.9569	270.6720	269.3457	269.3457	269.1001	269.8565	270.6720	271.2483	271.8509	(39)
Heat transfer coeff (average)												270.9555	(39)
HLP	0.9550	0.9539	0.9527	0.9474	0.9464	0.9418	0.9418	0.9409	0.9436	0.9464	0.9484	0.9505	(40)
HLP (average)												0.9474	(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 pump calculation Output power												9040.0000	
Design heat loss												6557.1234	
Plant size ratio												1.3787	
Service provision							space	and	water	heating	all	year	
DHW vessel											separate	specified	
Heating duration												variable	
Secondary fraction												0.0000	
Space heating thermal efficiency												377.1357	
Summer thermal efficiency												175.5843	

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Net space heating specific electricity generated	0.0000
Net water heating specific electricity generated	0.0000
Net annual electricity generated	0.0000
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												3.1137	(42)
Average daily hot water use (litres\/day)												143.3381	(43)
Mixer shower usage	76.4269	75.2784	73.6047	70.4025	68.0393	65.4039	63.9059	65.5669	67.3877	70.2173	73.4883	76.1341	(42a)
Bath usage	32.9893	32.4994	31.8094	30.5373	29.5848	28.5285	27.9580	28.6431	29.3891	30.5193	31.8176	32.8778	(42b)
Other usage	46.5177	44.8262	43.1346	41.4430	39.7515	38.0599	38.0599	39.7515	41.4430	43.1346	44.8262	46.5177	(42c)
Daily hot water use	155.9339	152.6039	148.5487	142.3828	137.3755	131.9924	129.9239	133.9615	138.2198	143.8712	150.1321	155.5296	(44)
Energy content	246.9612	217.3059	228.3139	194.9150	184.9339	162.3000	157.1317	165.8724	170.4389	195.2318	213.8907	243.5217	(45)
Energy content(annual)												2380.8169	(45)
Distribution loss	37.0442	32.5959	34.2471	29.2372	27.7401	24.3450	23.5698	24.8809	25.5658	29.2848	32.0836	36.5283	(46)
Cylinder volume												110.0000	(47)
Measured cylinder loss (kWh\/day)												2.0900	(48)
Temperature factor												0.5400	(49)
Energy lost from water storage (kWh\/day)												1.1286	(50)
Energy lost from cylinder in kWh\/day												1.1286	(55)
Total storage loss	34.9866	31.6008	34.9866	33.8580	34.9866	33.8580	34.9866	34.9866	33.8580	34.9866	33.8580	34.9866	(56)
Net storage loss	34.9866	31.6008	34.9866	33.8580	34.9866	33.8580	34.9866	34.9866	33.8580	34.9866	33.8580	34.9866	(57)
Primary loss	43.3132	39.1216	43.3132	41.9160	43.3132	41.9160	43.3132	43.3132	41.9160	43.3132	41.9160	43.3132	(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	325.2610	288.0283	306.6137	270.6890	263.2337	238.0740	235.4315	244.1722	246.2129	273.5316	289.6647	321.8215	(62)
WWHRS 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	(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.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(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)

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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	325.2610	288.0283	306.6137	270.6890	263.2337	238.0740	235.4315	244.1722	246.2129	273.5316	289.6647	321.8215	(64)
Output from water heater(annual)												3302.7339	(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)	144.7544	128.8321	138.5542	125.4284	124.1304	114.5840	114.8861	117.7924	117.2901	127.5544	131.7378	143.6108	(65)

5. Internal gains

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic	155.6865	155.6865	155.6865	155.6865	155.6865	155.6865	155.6865	155.6865	155.6865	155.6865	155.6865	155.6865	(66)
Lighting	232.9931	257.9567	232.9931	240.7595	232.9931	240.7595	232.9931	232.9931	240.7595	232.9931	240.7595	232.9931	(67)
Appliances	446.8266	451.4633	439.7791	414.9047	383.5053	353.9943	334.2791	329.6424	341.3267	366.2010	397.6004	427.1115	(68)
Cooking	38.5686	38.5686	38.5686	38.5686	38.5686	38.5686	38.5686	38.5686	38.5686	38.5686	38.5686	38.5686	(69)
Pumps, fans	10.0000	10.0000	10.0000	10.0000	10.0000	0.0000	0.0000	0.0000	0.0000	10.0000	10.0000	10.0000	(70)
Losses	-124.5492	-124.5492	-124.5492	-124.5492	-124.5492	-124.5492	-124.5492	-124.5492	-124.5492	-124.5492	-124.5492	-124.5492	(71)
Water heating	194.5624	191.7145	186.2288	174.2061	166.8419	159.1444	154.4168	158.3231	162.9029	171.4441	182.9692	193.0253	(72)
Total internal	954.0881	980.8404	938.7069	909.5763	863.0462	823.6041	791.3950	790.6646	814.6951	850.3442	901.0352	932.8358	(73)

6. Solar gains

Windows (1)			54.8500	0.9615	52.7404	(27)
groundFloor	140.0000	0.1000	14.0000	75.0000	10500.0000	(28a)
exposeWall	92.0300	0.1800	34.5654	9.0000	1728.2700	(29a)
exposeWall	.1200	0.1800	1.1016	9.0000	55.0800	(29a)
exposeWall	9.0000	0.1800	3.4200	9.0000	171.0000	(29a)
exposedRoof	105.0000	0.1000	10.5000	9.0000	945.0000	(30)
exposedRoof	77.0000	0.1500	11.5500	9.0000	693.0000	(30)
exposedRoof	5.0000	0.1000	0.5000	9.0000	45.0000	(30)
Total area of external elements:					599.0000	(31)
Fabric heat loss:					128.3774	(33)
Heat capacity:					14137.3500	(34)
Thermal mass parameter:					100.0000	(35)
Thermal bridges:					18.1160	(36)
Total fabric heat loss :					146.4934	(37)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	291.3208	535.4087	836.6429	1211.0838	1515.7381	1574.8140	1489.1426	1251.1494	964.6234	619.8015	356.0705	244.6928	(83)
Total gains	1245.4090	1516.2491	1775.3498	2120.6602	2378.7843	2398.4181	2280.5375	2041.8140	1779.3185	1470.1457	1257.1057	1177.5286	(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												0.7500	
tau	29.0862	29.1215	29.1561	29.3200	29.3508	29.4953	29.4953	29.5223	29.4395	29.3508	29.2885	29.2235	
alpha	2.9391	2.9414	2.9437	2.9547	2.9567	2.9664	2.9664	2.9682	2.9626	2.9567	2.9526	2.9482	
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	0.9839	0.9709	0.9454	0.8813	0.7680	0.6148	0.4810	0.5436	0.7644	0.9242	0.9736	0.9863	(86)
MIT 1	19.9678	19.2203	19.5913	20.0854	20.4990	20.7528	20.8456	20.8228	20.6073	20.0583	19.4321	19.2277	(87)
th2	20.1210	20.1220	20.1229	20.1274	20.1282	20.1321	20.1321	20.1329	20.1306	20.1282	20.1265	20.1248	(88)
util rest	0.9815	0.9666	0.9371	0.8628	0.7314	0.5537	0.3984	0.4596	0.7134	0.9085	0.9690	0.9842	(89)
MIT 2	19.1584	18.0098	18.4804	19.0992	19.5953	19.8795	19.9677	19.9512	19.7330	19.0770	18.2851	18.0995	(90)
Living area fraction =												0.1563	(91)
MIT	19.2849	18.1990	18.6541	19.2534	19.7366	20.0160	20.1049	20.0875	19.8697	19.2304	18.4644	18.2758	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.2849	18.1990	18.6541	19.2534	19.7366	20.0160	20.1049	20.0875	19.8697	19.2304	18.4644	18.2758	(93)

8. Space heated requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9787	0.9538	0.9191	0.8405	0.7129	0.5449	0.3957	0.4549	0.6958	0.8878	0.9568	0.9784	(94)
Useful gains W	1218.9186	1446.1977	1631.6418	1782.3360	1695.9382	1306.8760	902.3473	928.7632	1238.0498	1305.1618	1202.8547	1152.0365	(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	4092.8969	3628.0136	3311.7328	2805.3165	2175.2705	1458.7774	944.0341	992.2956	1556.9829	2336.0090	3082.5646	3826.5160	(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	2138.2398	1466.1803	1249.9877	736.5460	356.6232	0.0000	0.0000	0.0000	0.0000	766.9504	1353.3911	1989.8127	(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	2138.2398	1466.1803	1249.9877	736.5460	356.6232	0.0000	0.0000	0.0000	0.0000	766.9504	1353.3911	1989.8127	(98)
Space heating per m2												35.1669	(99)

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Utilisation	0.9787	0.9538	0.9191	0.8405	0.7129	0.5449	0.3957	0.4549	0.6958	0.8878	0.9568	0.9784	(94)
Useful gains W	1218.9186	1446.1977	1631.6418	1782.3360	1695.9382	1306.8760	902.3473	928.7632	1238.0498	1305.1618	1202.8547	1152.0365	(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	4092.8969	3628.0136	3311.7328	2805.3165	2175.2705	1458.7774	944.0341	992.2956	1556.9829	2336.0090	3082.5646	3826.5160	(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 each month (kWh)	2138.2398	1466.1803	1249.9877	736.5460	356.6232	0.0000	0.0000	0.0000	0.0000	766.9504	1353.3911	1989.8127	(98a)
Solar space heating contribution (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)
Total space heating requirement (kWh\/month)	2138.2398	1466.1803	1249.9877	736.5460	356.6232	0.0000	0.0000	0.0000	0.0000	766.9504	1353.3911	1989.8127	(98)
Space heating per m2												35.1669	(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	377.1357	(206)
Efficiency of secondary heating system	100.0000	(208)
Efficiency of water heater	175.5843	(216)
micro-CHP export	0.0000	(235d)
Space heating fuel - main system 1	2666.8731	(211)
Water heating fuel	1880.9965	(219)
Electricity for pumps and fans	0.0000	(231)
Electricity for lighting	363.5555	(232)
PV generation	-2098.7884	(233)
Micro-CHP generation	0.0000	(235)
Total delivered energy for all uses	2812.6367	(238)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating efficiency (main heating system)	377.1357	377.1357	377.1357	377.1357	377.1357	0.0000	0.0000	0.0000	0.0000	377.1357	377.1357	377.1357	(210)
Space heating fuel (main heating system)	566.9682	388.7673	331.4424	195.3000	94.5610	0.0000	0.0000	0.0000	0.0000	203.3619	358.8605	527.6118	(211)
Water heating requirement	325.2610	288.0283	306.6137	270.6890	263.2337	238.0740	235.4315	244.1722	246.2129	273.5316	289.6647	321.8215	(64)
Water heating efficiency	175.5843	175.5843	175.5843	175.5843	175.5843	175.5843	175.5843	175.5843	175.5843	175.5843	175.5843	175.5843	(217)
Water heating fuel detail	185.2450	164.0399	174.6248	154.1647	149.9187	135.5896	134.0846	139.0627	140.2249	155.7837	164.9719	183.2861	(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	96.2295	142.0805	213.1808	240.3505	250.4017	216.5964	213.3057	201.1986	177.5394	160.0611	106.2108	81.6335	(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	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)
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	2666.8731	0.1360	413.5851	(261)
Water heating	1880.9965	0.1360	264.8033	(264)
Space and water heating			678.3884	(265)
Energy for lighting	0.0000	0.1360	52.4723	(268)
Electricity generated - PVs	-2098.7884	1.6660	-283.4330	(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			447.4277	(272)

13. Primary energy

Space heating - main system	2666.8731	18.1590	4197.9625	(275)
Water heating	1880.9965	18.1590	2860.1319	(278)
Space and water heating			7058.0944	(279)
Pumps and fans	0.0000	1.5133	0.0000	(281)

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Energy for lighting	363.5555	1.5133	557.6336	(282)
Electricity generated - PVs	-2098.7884	18.1590	-3146.4179	(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			4469.3101	(286)
EI value			98.1887	
Dwelling Carbon Dioxide Emission Rate (DER)			1.56	(273)\/(384)
Dwelling Primary Energy Rate (DPER)			15.63	(287)\/(484)

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance;