

Annual Estimated Operational GHG Emissions Accounting for Grid Decarbonisation

To account for the continual decarbonisation of the UK electricity grid over the assumed years of operation (2029-2088), the total estimated annual energy use for each building was multiplied by the projected greenhouse gas (GHG) conversion factors provided by the Department for Energy Security and Net Zero.¹ This was used to determine the total estimated lifetime operational emissions associated with each building.

[1] Department for Energy Security & Net Zero (2023). Electricity emissions Factors to 2100 [online]. Available at: <https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fassets.publishing.service.gov.uk%2Fmedia%2F6567994fcc1ec5000d8eef17%2Fdata-tables-1-19.xlsx&wdOrigin=BROWSELINK>

LON06

Year	kgCO ₂ e/kWh	Annual (kgCO ₂ e)	Annual (tCO ₂ e)	Annual (ktCO ₂ e)
2029	0.0750	24,304,338.15	24,304.34	24.3043
2030	0.0690	22,359,991.10	22,359.99	22.3600
2031	0.0650	21,063,759.73	21,063.76	21.0638
2032	0.0520	16,851,007.78	16,851.01	16.8510
2033	0.0410	13,286,371.52	13,286.37	13.2864
2034	0.0350	11,342,024.47	11,342.02	11.3420
2035	0.0310	10,045,793.10	10,045.79	10.0458
2036	0.0280	9,073,619.58	9,073.62	9.0736
2037	0.0250	8,101,446.05	8,101.45	8.1014
2038	0.0210	6,805,214.68	6,805.21	6.8052
2039	0.0180	5,833,041.16	5,833.04	5.8330
2040	0.0180	5,833,041.16	5,833.04	5.8330
2041	0.0170	5,508,983.31	5,508.98	5.5090
2042	0.0150	4,860,867.63	4,860.87	4.8609
2043	0.0130	4,212,751.95	4,212.75	4.2128
2044	0.0120	3,888,694.10	3,888.69	3.8887
2045	0.0120	3,888,694.10	3,888.69	3.8887
2046	0.0110	3,564,636.26	3,564.64	3.5646
2047	0.0090	2,916,520.58	2,916.52	2.9165
2048	0.0090	2,916,520.58	2,916.52	2.9165
2049	0.0080	2,592,462.74	2,592.46	2.5925
2050	0.0070	2,268,404.89	2,268.40	2.2684

2051	0.0070	2,268,404.89	2,268.40	2.2684
2052	0.0070	2,268,404.89	2,268.40	2.2684
2053	0.0070	2,268,404.89	2,268.40	2.2684
2054	0.0070	2,268,404.89	2,268.40	2.2684
2055	0.0070	2,268,404.89	2,268.40	2.2684
2056	0.0070	2,268,404.89	2,268.40	2.2684
2057	0.0070	2,268,404.89	2,268.40	2.2684
2058	0.0070	2,268,404.89	2,268.40	2.2684
2059	0.0070	2,268,404.89	2,268.40	2.2684
2060	0.0070	2,268,404.89	2,268.40	2.2684
2061	0.0070	2,268,404.89	2,268.40	2.2684
2062	0.0070	2,268,404.89	2,268.40	2.2684
2063	0.0070	2,268,404.89	2,268.40	2.2684
2064	0.0070	2,268,404.89	2,268.40	2.2684
2065	0.0070	2,268,404.89	2,268.40	2.2684
2066	0.0070	2,268,404.89	2,268.40	2.2684
2067	0.0070	2,268,404.89	2,268.40	2.2684
2068	0.0070	2,268,404.89	2,268.40	2.2684
2069	0.0070	2,268,404.89	2,268.40	2.2684
2070	0.0070	2,268,404.89	2,268.40	2.2684
2071	0.0070	2,268,404.89	2,268.40	2.2684
2072	0.0070	2,268,404.89	2,268.40	2.2684
2073	0.0070	2,268,404.89	2,268.40	2.2684
2074	0.0070	2,268,404.89	2,268.40	2.2684
2075	0.0070	2,268,404.89	2,268.40	2.2684
2076	0.0070	2,268,404.89	2,268.40	2.2684
2077	0.0070	2,268,404.89	2,268.40	2.2684
2078	0.0070	2,268,404.89	2,268.40	2.2684
2079	0.0070	2,268,404.89	2,268.40	2.2684
2080	0.0070	2,268,404.89	2,268.40	2.2684
2081	0.0070	2,268,404.89	2,268.40	2.2684
2082	0.0070	2,268,404.89	2,268.40	2.2684
2083	0.0070	2,268,404.89	2,268.40	2.2684
2084	0.0070	2,268,404.89	2,268.40	2.2684
2085	0.0070	2,268,404.89	2,268.40	2.2684
2086	0.0070	2,268,404.89	2,268.40	2.2684
2087	0.0070	2,268,404.89	2,268.40	2.2684
2088	0.0070	2,268,404.89	2,268.40	2.2684
Total		277,717,570.59	277,717.57	277.72

LON07

Year	kgCO ₂ e/kWh	Annual (kgCO ₂ e)	Annual (tCO ₂ e)	Annual (ktCO ₂ e)
2029	0.0750	42,629,553.30	42,629.55	42.6296
2030	0.0690	39,219,189.04	39,219.19	39.2192
2031	0.0650	36,945,612.86	36,945.61	36.9456
2032	0.0520	29,556,490.29	29,556.49	29.5565
2033	0.0410	23,304,155.80	23,304.16	23.3042
2034	0.0350	19,893,791.54	19,893.79	19.8938
2035	0.0310	17,620,215.36	17,620.22	17.6202
2036	0.0280	15,915,033.23	15,915.03	15.9150
2037	0.0250	14,209,851.10	14,209.85	14.2099
2038	0.0210	11,936,274.92	11,936.27	11.9363
2039	0.0180	10,231,092.79	10,231.09	10.2311
2040	0.0180	10,231,092.79	10,231.09	10.2311
2041	0.0170	9,662,698.75	9,662.70	9.6627
2042	0.0150	8,525,910.66	8,525.91	8.5259
2043	0.0130	7,389,122.57	7,389.12	7.3891
2044	0.0120	6,820,728.53	6,820.73	6.8207
2045	0.0120	6,820,728.53	6,820.73	6.8207
2046	0.0110	6,252,334.48	6,252.33	6.2523
2047	0.0090	5,115,546.40	5,115.55	5.1155
2048	0.0090	5,115,546.40	5,115.55	5.1155
2049	0.0080	4,547,152.35	4,547.15	4.5472
2050	0.0070	3,978,758.31	3,978.76	3.9788
2051	0.0070	3,978,758.31	3,978.76	3.9788
2052	0.0070	3,978,758.31	3,978.76	3.9788
2053	0.0070	3,978,758.31	3,978.76	3.9788
2054	0.0070	3,978,758.31	3,978.76	3.9788
2055	0.0070	3,978,758.31	3,978.76	3.9788
2056	0.0070	3,978,758.31	3,978.76	3.9788
2057	0.0070	3,978,758.31	3,978.76	3.9788
2058	0.0070	3,978,758.31	3,978.76	3.9788
2059	0.0070	3,978,758.31	3,978.76	3.9788
2060	0.0070	3,978,758.31	3,978.76	3.9788
2061	0.0070	3,978,758.31	3,978.76	3.9788
2062	0.0070	3,978,758.31	3,978.76	3.9788
2063	0.0070	3,978,758.31	3,978.76	3.9788

2064	0.0070	3,978,758.31	3,978.76	3.9788
2065	0.0070	3,978,758.31	3,978.76	3.9788
2066	0.0070	3,978,758.31	3,978.76	3.9788
2067	0.0070	3,978,758.31	3,978.76	3.9788
2068	0.0070	3,978,758.31	3,978.76	3.9788
2069	0.0070	3,978,758.31	3,978.76	3.9788
2070	0.0070	3,978,758.31	3,978.76	3.9788
2071	0.0070	3,978,758.31	3,978.76	3.9788
2072	0.0070	3,978,758.31	3,978.76	3.9788
2073	0.0070	3,978,758.31	3,978.76	3.9788
2074	0.0070	3,978,758.31	3,978.76	3.9788
2075	0.0070	3,978,758.31	3,978.76	3.9788
2076	0.0070	3,978,758.31	3,978.76	3.9788
2077	0.0070	3,978,758.31	3,978.76	3.9788
2078	0.0070	3,978,758.31	3,978.76	3.9788
2079	0.0070	3,978,758.31	3,978.76	3.9788
2080	0.0070	3,978,758.31	3,978.76	3.9788
2081	0.0070	3,978,758.31	3,978.76	3.9788
2082	0.0070	3,978,758.31	3,978.76	3.9788
2083	0.0070	3,978,758.31	3,978.76	3.9788
2084	0.0070	3,978,758.31	3,978.76	3.9788
2085	0.0070	3,978,758.31	3,978.76	3.9788
2086	0.0070	3,978,758.31	3,978.76	3.9788
2087	0.0070	3,978,758.31	3,978.76	3.9788
2088	0.0070	3,978,758.31	3,978.76	3.9788
Total		487,113,695.71	487,113.70	487.11

LON08

Year	kgCO ₂ e/kWh	Annual (kgCO ₂ e)	Annual (tCO ₂ e)	Annual (ktCO ₂ e)
2029	0.0750	20,102,543.63	20,102.54	20.1025
2030	0.0690	18,494,340.14	18,494.34	18.4943
2031	0.0650	17,422,204.48	17,422.20	17.4222
2032	0.0520	13,937,763.58	13,937.76	13.9378
2033	0.0410	10,989,390.52	10,989.39	10.9894
2034	0.0350	9,381,187.03	9,381.19	9.3812
2035	0.0310	8,309,051.37	8,309.05	8.3091
2036	0.0280	7,504,949.62	7,504.95	7.5049
2037	0.0250	6,700,847.88	6,700.85	6.7008

2038	0.0210	5,628,712.22	5,628.71	5.6287
2039	0.0180	4,824,610.47	4,824.61	4.8246
2040	0.0180	4,824,610.47	4,824.61	4.8246
2041	0.0170	4,556,576.56	4,556.58	4.5566
2042	0.0150	4,020,508.73	4,020.51	4.0205
2043	0.0130	3,484,440.90	3,484.44	3.4844
2044	0.0120	3,216,406.98	3,216.41	3.2164
2045	0.0120	3,216,406.98	3,216.41	3.2164
2046	0.0110	2,948,373.07	2,948.37	2.9484
2047	0.0090	2,412,305.24	2,412.31	2.4123
2048	0.0090	2,412,305.24	2,412.31	2.4123
2049	0.0080	2,144,271.32	2,144.27	2.1443
2050	0.0070	1,876,237.41	1,876.24	1.8762
2051	0.0070	1,876,237.41	1,876.24	1.8762
2052	0.0070	1,876,237.41	1,876.24	1.8762
2053	0.0070	1,876,237.41	1,876.24	1.8762
2054	0.0070	1,876,237.41	1,876.24	1.8762
2055	0.0070	1,876,237.41	1,876.24	1.8762
2056	0.0070	1,876,237.41	1,876.24	1.8762
2057	0.0070	1,876,237.41	1,876.24	1.8762
2058	0.0070	1,876,237.41	1,876.24	1.8762
2059	0.0070	1,876,237.41	1,876.24	1.8762
2060	0.0070	1,876,237.41	1,876.24	1.8762
2061	0.0070	1,876,237.41	1,876.24	1.8762
2062	0.0070	1,876,237.41	1,876.24	1.8762
2063	0.0070	1,876,237.41	1,876.24	1.8762
2064	0.0070	1,876,237.41	1,876.24	1.8762
2065	0.0070	1,876,237.41	1,876.24	1.8762
2066	0.0070	1,876,237.41	1,876.24	1.8762
2067	0.0070	1,876,237.41	1,876.24	1.8762
2068	0.0070	1,876,237.41	1,876.24	1.8762
2069	0.0070	1,876,237.41	1,876.24	1.8762
2070	0.0070	1,876,237.41	1,876.24	1.8762
2071	0.0070	1,876,237.41	1,876.24	1.8762
2072	0.0070	1,876,237.41	1,876.24	1.8762
2073	0.0070	1,876,237.41	1,876.24	1.8762
2074	0.0070	1,876,237.41	1,876.24	1.8762
2075	0.0070	1,876,237.41	1,876.24	1.8762
2076	0.0070	1,876,237.41	1,876.24	1.8762

2077	0.0070	1,876,237.41	1,876.24	1.8762
2078	0.0070	1,876,237.41	1,876.24	1.8762
2079	0.0070	1,876,237.41	1,876.24	1.8762
2080	0.0070	1,876,237.41	1,876.24	1.8762
2081	0.0070	1,876,237.41	1,876.24	1.8762
2082	0.0070	1,876,237.41	1,876.24	1.8762
2083	0.0070	1,876,237.41	1,876.24	1.8762
2084	0.0070	1,876,237.41	1,876.24	1.8762
2085	0.0070	1,876,237.41	1,876.24	1.8762
2086	0.0070	1,876,237.41	1,876.24	1.8762
2087	0.0070	1,876,237.41	1,876.24	1.8762
2088	0.0070	1,876,237.41	1,876.24	1.8762
Total		229,705,065.16	229,705.07	229.71

Innovation Hub

Year	kgCO ₂ e/kWh	Annual (kgCO ₂ e)	Annual (tCO ₂ e)	Annual (ktCO ₂ e)
2029	0.0750	21,454.05	21.45	0.0215
2030	0.0690	19,737.73	19.74	0.0197
2031	0.0650	18,593.51	18.59	0.0186
2032	0.0520	14,874.81	14.87	0.0149
2033	0.0410	11,728.21	11.73	0.0117
2034	0.0350	10,011.89	10.01	0.0100
2035	0.0310	8,867.67	8.87	0.0089
2036	0.0280	8,009.51	8.01	0.0080
2037	0.0250	7,151.35	7.15	0.0072
2038	0.0210	6,007.13	6.01	0.0060
2039	0.0180	5,148.97	5.15	0.0051
2040	0.0180	5,148.97	5.15	0.0051
2041	0.0170	4,862.92	4.86	0.0049
2042	0.0150	4,290.81	4.29	0.0043
2043	0.0130	3,718.70	3.72	0.0037
2044	0.0120	3,432.65	3.43	0.0034
2045	0.0120	3,432.65	3.43	0.0034
2046	0.0110	3,146.59	3.15	0.0031
2047	0.0090	2,574.49	2.57	0.0026
2048	0.0090	2,574.49	2.57	0.0026
2049	0.0080	2,288.43	2.29	0.0023
2050	0.0070	2,002.38	2.00	0.0020

2051	0.0070	2,002.38	2.00	0.0020
2052	0.0070	2,002.38	2.00	0.0020
2053	0.0070	2,002.38	2.00	0.0020
2054	0.0070	2,002.38	2.00	0.0020
2055	0.0070	2,002.38	2.00	0.0020
2056	0.0070	2,002.38	2.00	0.0020
2057	0.0070	2,002.38	2.00	0.0020
2058	0.0070	2,002.38	2.00	0.0020
2059	0.0070	2,002.38	2.00	0.0020
2060	0.0070	2,002.38	2.00	0.0020
2061	0.0070	2,002.38	2.00	0.0020
2062	0.0070	2,002.38	2.00	0.0020
2063	0.0070	2,002.38	2.00	0.0020
2064	0.0070	2,002.38	2.00	0.0020
2065	0.0070	2,002.38	2.00	0.0020
2066	0.0070	2,002.38	2.00	0.0020
2067	0.0070	2,002.38	2.00	0.0020
2068	0.0070	2,002.38	2.00	0.0020
2069	0.0070	2,002.38	2.00	0.0020
2070	0.0070	2,002.38	2.00	0.0020
2071	0.0070	2,002.38	2.00	0.0020
2072	0.0070	2,002.38	2.00	0.0020
2073	0.0070	2,002.38	2.00	0.0020
2074	0.0070	2,002.38	2.00	0.0020
2075	0.0070	2,002.38	2.00	0.0020
2076	0.0070	2,002.38	2.00	0.0020
2077	0.0070	2,002.38	2.00	0.0020
2078	0.0070	2,002.38	2.00	0.0020
2079	0.0070	2,002.38	2.00	0.0020
2080	0.0070	2,002.38	2.00	0.0020
2081	0.0070	2,002.38	2.00	0.0020
2082	0.0070	2,002.38	2.00	0.0020
2083	0.0070	2,002.38	2.00	0.0020
2084	0.0070	2,002.38	2.00	0.0020
2085	0.0070	2,002.38	2.00	0.0020
2086	0.0070	2,002.38	2.00	0.0020
2087	0.0070	2,002.38	2.00	0.0020
2088	0.0070	2,002.38	2.00	0.0020
Total		245,148.28	245.15	0.25

