

Table A14. World carbon dioxide emissions from power generation by region and fossil fuel type, Reference case

million metric tons of carbon dioxide

Region and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas								
Liquid fuels	92	109	56	23	11	4	4	-10.7%
Natural gas	852	749	635	573	604	624	634	-1.1%
Coal	907	799	408	439	439	434	403	-2.9%
Total	1,851	1,658	1,098	1,035	1,054	1,062	1,040	-2.0%
United States								
Liquid fuels	8	8	5	5	4	3	3	-3.2%
Natural gas	646	529	422	367	394	413	424	-1.5%
Coal	842	747	344	340	297	276	244	-4.3%
Total	1,496	1,284	771	712	696	693	671	-2.8%
Canada								
Liquid fuels	2	2	0	0	0	0	0	-10.3%
Natural gas	27	30	7	2	3	2	2	-8.8%
Coal	33	16	0	0	0	0	0	-100.0%
Total	61	49	7	2	3	2	2	-11.3%
Mexico								
Liquid fuels	28	36	19	9	3	0	0	-18.4%
Natural gas	70	73	76	81	92	95	96	1.1%
Coal	7	8	18	21	21	21	21	4.1%
Total	105	117	114	111	116	116	118	0.4%
Brazil								
Liquid fuels	10	14	6	1	0	0	0	-14.8%
Natural gas	28	36	46	37	29	27	25	-0.4%
Coal	9	10	8	9	14	9	9	0.1%
Total	47	60	60	46	43	36	34	-1.2%
Other Americas								
Liquid fuels	44	50	25	8	3	0	0	-17.4%
Natural gas	81	80	84	86	86	86	86	0.3%
Coal	17	19	38	69	107	128	128	7.4%
Total	142	149	147	164	196	215	215	1.5%
Europe and Eurasia								
Liquid fuels	58	80	81	55	42	41	39	-1.4%
Natural gas	701	706	750	771	819	868	920	1.0%
Coal	848	815	663	649	629	690	714	-0.6%
Total	1,607	1,601	1,493	1,476	1,491	1,598	1,673	0.1%
Western Europe								
Liquid fuels	40	57	62	47	35	35	35	-0.5%
Natural gas	263	297	365	353	346	341	338	0.9%
Coal	481	453	323	326	308	368	392	-0.7%
Total	784	807	749	726	689	743	764	-0.1%
Russia								
Liquid fuels	13	19	16	5	4	3	2	-6.8%
Natural gas	315	295	290	323	349	371	390	0.8%
Coal	179	192	166	143	142	142	142	-0.8%
Total	508	507	472	471	495	516	534	0.2%
Eastern Europe and Eurasia								
Liquid fuels	4	4	3	3	3	3	3	-1.3%
Natural gas	123	113	95	95	125	156	192	1.6%
Coal	187	170	174	180	180	180	180	-0.1%
Total	315	286	272	279	308	339	375	0.6%
Asia Pacific								
Liquid fuels	49	55	33	18	10	7	6	-7.4%
Natural gas	618	656	653	641	673	751	827	1.0%
Coal	7,386	7,346	8,075	8,401	8,328	8,273	8,351	0.4%
Total	8,052	8,057	8,760	9,059	9,011	9,031	9,183	0.5%
Japan								
Liquid fuels	9	13	9	5	3	3	3	-4.0%
Natural gas	145	145	134	117	105	106	103	-1.2%
Coal	251	249	147	162	162	162	162	-1.6%
Total	406	406	290	284	270	271	267	-1.5%

South Korea								
Liquid fuels	2	3	4	3	2	2	2	0.5%
Natural gas	69	65	60	55	50	48	48	-1.3%
Coal	130	129	134	143	147	150	150	0.5%
Total	202	197	198	200	200	200	200	0.0%
Australia and New Zealand								
Liquid fuels	1	1	0	0	0	0	0	-7.3%
Natural gas	22	21	23	18	14	15	15	-1.4%
Coal	123	111	127	138	138	139	139	0.4%
Total	145	133	150	156	153	154	154	0.2%
China								
Liquid fuels	2	2	1	0	0	0	0	-11.0%
Natural gas	121	148	158	202	279	358	437	4.7%
Coal	5,206	5,118	5,324	5,439	5,191	4,959	4,917	-0.2%
Total	5,328	5,268	5,482	5,642	5,470	5,318	5,354	0.0%
India								
Liquid fuels	3	2	1	0	0	0	0	-14.5%
Natural gas	24	24	29	29	29	29	29	0.7%
Coal	1,077	1,146	1,492	1,498	1,516	1,535	1,489	1.2%
Total	1,104	1,172	1,521	1,528	1,546	1,564	1,518	1.1%
Other Asia Pacific								
Liquid fuels	33	34	18	10	5	2	0	-14.5%
Natural gas	237	254	249	219	195	195	195	-0.7%
Coal	598	593	851	1,020	1,173	1,328	1,494	3.3%
Total	867	880	1,118	1,249	1,372	1,525	1,689	2.4%
Africa and Middle East								
Liquid fuels	205	230	119	55	21	8	2	-15.2%
Natural gas	587	612	632	688	722	758	791	1.1%
Coal	212	187	210	263	237	269	270	0.9%
Total	1,004	1,029	962	1,006	980	1,035	1,063	0.2%
Africa								
Liquid fuels	31	31	12	7	0	0	0	-16.3%
Natural gas	166	167	172	181	194	207	224	1.1%
Coal	212	186	210	263	237	269	270	0.9%
Total	409	384	394	451	431	476	494	0.7%
Middle East								
Liquid fuels	174	200	107	48	21	8	2	-15.0%
Natural gas	421	445	461	507	528	551	567	1.1%
Coal	0	0	0	0	0	0	0	-5.9%
Total	595	645	568	555	549	559	569	-0.2%
World								
Liquid fuels	404	475	288	152	84	60	51	-7.1%
Natural gas	2,757	2,723	2,670	2,673	2,818	3,001	3,172	0.5%
Coal	9,353	9,147	9,355	9,752	9,633	9,666	9,737	0.1%
Total	12,514	12,345	12,313	12,577	12,535	12,727	12,959	0.1%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. Net carbon dioxide emissions represent gross emissions less CCS (carbon captured and sequestered) emissions from CCS capable units during the power generation.