

Table A14. World carbon dioxide emissions from power generation by region and fossil fuel type, Low Zero-carbon Technology Cost 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	55	23	10	3	3	-11.3%
Natural gas	852	740	605	502	520	486	411	-2.6%
Coal	907	800	346	296	278	215	152	-6.2%
Total	1,851	1,649	1,006	821	808	704	566	-4.1%
United States								
Liquid fuels	8	8	5	5	4	3	3	-4.0%
Natural gas	646	521	383	297	313	281	207	-4.0%
Coal	842	748	281	203	167	108	45	-9.9%
Total	1,496	1,277	670	504	485	392	255	-6.1%
Canada								
Liquid fuels	2	2	0	0	0	0	0	-10.3%
Natural gas	27	29	16	3	2	3	3	-8.0%
Coal	33	16	0	0	0	0	0	-100.0%
Total	61	48	16	3	2	3	3	-10.5%
Mexico								
Liquid fuels	28	36	19	9	3	0	0	-18.4%
Natural gas	70	73	76	79	89	91	92	1.0%
Coal	7	8	19	21	21	21	21	4.1%
Total	105	117	114	110	113	113	113	0.3%
Brazil								
Liquid fuels	10	14	6	1	0	0	0	-15.0%
Natural gas	28	36	46	37	29	25	23	-0.8%
Coal	9	10	8	9	13	9	9	0.1%
Total	47	60	60	46	43	34	32	-1.4%
Other Americas								
Liquid fuels	44	50	25	8	3	0	0	-17.4%
Natural gas	81	80	84	86	86	86	86	0.2%
Coal	17	19	38	63	77	77	77	5.5%
Total	142	149	147	158	165	163	163	0.5%
Europe and Eurasia								
Liquid fuels	58	80	81	56	43	41	40	-1.3%
Natural gas	701	702	750	771	816	861	902	0.9%
Coal	848	802	655	650	630	674	715	-0.6%
Total	1,607	1,583	1,486	1,477	1,489	1,576	1,656	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	352	392	-0.7%
Total	784	807	749	726	689	728	765	-0.1%
Russia								
Liquid fuels	13	19	16	5	4	3	2	-6.8%
Natural gas	315	295	290	323	349	372	391	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	-0.8%
Natural gas	123	109	95	95	121	148	173	1.2%
Coal	187	157	167	181	181	181	181	-0.1%
Total	315	269	265	279	305	333	357	0.5%
Asia Pacific								
Liquid fuels	49	55	33	18	10	7	5	-7.6%
Natural gas	618	656	646	623	637	632	643	0.1%
Coal	7,386	7,344	8,056	8,224	7,810	7,292	6,565	-0.4%
Total	8,052	8,055	8,734	8,865	8,456	7,931	7,213	-0.4%
Japan								
Liquid fuels	9	13	9	5	3	3	3	-4.1%
Natural gas	145	145	134	117	103	95	95	-1.5%
Coal	251	249	147	158	158	158	158	-1.6%
Total	406	406	290	280	264	256	256	-1.6%

South Korea								
Liquid fuels	2	3	4	3	2	2	2	0.1%
Natural gas	69	65	60	53	49	44	44	-1.6%
Coal	130	128	134	143	147	151	151	0.5%
Total	202	196	198	199	198	197	197	-0.1%
Australia and New Zealand								
Liquid fuels	1	1	0	0	0	0	0	-7.3%
Natural gas	22	21	23	18	14	11	11	-2.5%
Coal	123	111	125	129	135	125	129	0.2%
Total	145	133	147	147	149	136	140	-0.1%
China								
Liquid fuels	2	2	1	0	0	0	0	-11.2%
Natural gas	121	147	155	190	247	257	268	2.9%
Coal	5,206	5,136	5,344	5,380	4,988	4,574	3,930	-1.0%
Total	5,328	5,286	5,499	5,570	5,234	4,831	4,198	-0.8%
India								
Liquid fuels	3	2	1	0	0	0	0	-14.5%
Natural gas	24	24	26	26	26	26	26	0.2%
Coal	1,077	1,148	1,489	1,434	1,397	1,223	1,135	0.2%
Total	1,104	1,174	1,515	1,460	1,423	1,248	1,161	0.2%
Other Asia Pacific								
Liquid fuels	33	34	18	10	5	2	0	-14.5%
Natural gas	237	254	249	219	198	199	199	-0.6%
Coal	598	573	817	980	985	1,062	1,062	2.1%
Total	867	860	1,084	1,209	1,188	1,262	1,261	1.3%
Africa and Middle East								
Liquid fuels	205	230	119	50	21	8	2	-15.2%
Natural gas	587	612	628	687	719	735	720	0.7%
Coal	212	181	196	221	262	241	218	0.1%
Total	1,004	1,024	943	958	1,002	985	939	-0.2%
Africa								
Liquid fuels	31	31	12	2	0	0	0	-16.5%
Natural gas	166	167	170	181	195	203	212	0.9%
Coal	212	181	196	221	262	241	217	0.1%
Total	409	378	377	404	458	444	430	0.2%
Middle East								
Liquid fuels	174	200	107	48	21	8	2	-15.0%
Natural gas	421	445	459	506	524	533	507	0.7%
Coal	0	0	0	0	0	0	0	-6.1%
Total	595	645	566	554	545	541	509	-0.6%
World								
Liquid fuels	404	475	288	146	84	59	50	-7.2%
Natural gas	2,757	2,710	2,630	2,584	2,691	2,715	2,675	-0.1%
Coal	9,352	9,127	9,252	9,390	8,981	8,422	7,649	-0.7%
Total	12,514	12,312	12,170	12,121	11,755	11,196	10,374	-0.7%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lz_230821.151531 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.