

Table A14. World carbon dioxide emissions from power generation by region and fossil fuel type, High 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	110	56	24	11	4	4	-10.4%
Natural gas	852	759	729	681	716	773	819	-0.1%
Coal	907	814	569	598	603	613	592	-1.5%
Total	1,851	1,683	1,355	1,303	1,331	1,390	1,416	-1.0%
United States								
Liquid fuels	8	8	6	6	5	4	4	-2.8%
Natural gas	646	540	518	474	504	561	607	-0.2%
Coal	842	762	504	492	453	439	409	-2.5%
Total	1,496	1,310	1,027	972	962	1,004	1,019	-1.4%
Canada								
Liquid fuels	2	2	0	0	0	0	0	-10.3%
Natural gas	27	29	5	3	5	3	3	-7.2%
Coal	33	16	0	0	0	0	0	-100.0%
Total	61	48	5	3	5	3	3	-9.8%
Mexico								
Liquid fuels	28	36	19	9	3	0	0	-18.3%
Natural gas	70	73	77	81	92	96	97	1.2%
Coal	7	8	19	21	21	21	21	4.1%
Total	105	117	115	111	116	117	118	0.4%
Brazil								
Liquid fuels	10	14	6	1	0	0	0	-14.9%
Natural gas	28	36	46	37	29	27	25	-0.5%
Coal	9	10	8	9	13	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	75	115	143	153	8.1%
Total	142	149	147	170	205	230	240	1.9%
Europe and Eurasia								
Liquid fuels	58	80	81	56	43	41	39	-1.3%
Natural gas	701	706	750	772	818	869	931	1.0%
Coal	848	814	663	649	630	721	713	-0.6%
Total	1,607	1,600	1,493	1,476	1,491	1,631	1,683	0.2%
Western Europe								
Liquid fuels	40	57	62	47	35	35	35	-0.5%
Natural gas	263	297	365	353	346	341	341	0.9%
Coal	481	453	323	326	309	399	392	-0.7%
Total	784	807	749	726	690	775	767	-0.1%
Russia								
Liquid fuels	13	19	16	5	4	3	2	-6.8%
Natural gas	315	295	290	323	348	371	394	0.8%
Coal	179	192	166	142	142	142	142	-0.8%
Total	508	507	471	471	493	516	537	0.2%
Eastern Europe and Eurasia								
Liquid fuels	4	4	3	3	3	3	3	-1.0%
Natural gas	123	113	95	96	125	157	196	1.7%
Coal	187	169	174	180	180	180	180	-0.1%
Total	315	286	273	279	308	340	379	0.7%
Asia Pacific								
Liquid fuels	49	55	33	18	10	7	6	-7.4%
Natural gas	618	656	664	657	693	777	841	1.1%
Coal	7,386	7,373	8,088	8,533	8,571	8,472	8,604	0.5%
Total	8,052	8,084	8,785	9,208	9,274	9,256	9,450	0.6%
Japan								
Liquid fuels	9	13	9	5	3	3	3	-4.0%
Natural gas	145	145	134	117	104	105	101	-1.3%
Coal	251	249	147	162	162	162	162	-1.6%
Total	406	406	290	284	269	270	266	-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	127	135	143	147	150	150	0.5%
Total	202	196	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	125	131	135	136	134	0.3%
Total	145	133	148	149	150	151	149	0.1%
China								
Liquid fuels	2	2	1	0	0	0	0	-11.0%
Natural gas	121	148	157	203	280	365	434	4.7%
Coal	5,206	5,135	5,317	5,458	5,241	4,977	4,980	-0.2%
Total	5,328	5,285	5,475	5,660	5,521	5,342	5,414	0.1%
India								
Liquid fuels	3	2	1	0	0	0	0	-14.5%
Natural gas	24	24	41	45	50	50	50	2.7%
Coal	1,077	1,155	1,492	1,591	1,655	1,617	1,541	1.3%
Total	1,104	1,181	1,534	1,636	1,706	1,668	1,591	1.3%
Other Asia Pacific								
Liquid fuels	33	34	18	10	5	2	0	-14.5%
Natural gas	237	254	249	219	194	194	194	-0.7%
Coal	598	597	872	1,048	1,231	1,430	1,637	3.7%
Total	867	884	1,140	1,277	1,429	1,625	1,831	2.7%
Africa and Middle East								
Liquid fuels	205	230	119	50	21	8	2	-15.2%
Natural gas	587	612	630	696	737	790	838	1.3%
Coal	212	187	217	235	243	269	270	0.9%
Total	1,004	1,030	967	981	1,001	1,067	1,110	0.4%
Africa								
Liquid fuels	31	31	12	2	0	0	0	-16.4%
Natural gas	166	167	172	190	209	239	270	1.8%
Coal	212	187	217	235	243	269	270	0.9%
Total	409	384	401	426	452	509	540	1.0%
Middle East								
Liquid fuels	174	200	107	48	21	8	2	-15.0%
Natural gas	421	445	459	506	528	551	568	1.1%
Coal	0	0	0	0	0	0	0	-6.1%
Total	595	645	566	554	549	558	570	-0.2%
World								
Liquid fuels	404	475	289	147	85	60	51	-7.1%
Natural gas	2,757	2,733	2,773	2,805	2,964	3,209	3,429	0.8%
Coal	9,352	9,189	9,537	10,015	10,048	10,075	10,179	0.3%
Total	12,514	12,396	12,599	12,967	13,097	13,344	13,659	0.3%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hz_230821.151430 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.