

Table E1.cap. Electricity installed generating capacity: World, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	391	378	223	148	111	100	96	-4.9%
Natural gas	1,931	2,044	2,166	2,255	2,411	2,601	2,781	1.3%
Coal	2,271	2,319	2,179	2,185	2,210	2,245	2,275	0.0%
Nuclear	400	425	422	446	451	456	468	0.6%
Renewables	3,297	4,075	5,016	5,729	6,554	7,433	8,244	3.3%
Hydro	1,211	1,317	1,376	1,415	1,437	1,468	1,501	0.8%
Wind	873	1,030	1,325	1,554	1,818	2,019	2,107	3.2%
Geothermal	15	17	27	30	33	34	35	3.1%
Solar	1,019	1,506	2,071	2,505	3,025	3,666	4,348	5.3%
Other	179	205	218	225	239	246	253	1.2%
Battery storage	52	70	126	241	388	664	945	10.9%
Pumped hydro	169	200	211	213	213	213	213	0.8%
Total capacity	8,511	9,512	10,344	11,216	12,339	13,712	15,022	2.0%

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.

Table E2.cap. Electricity installed generating capacity: Americas, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	141	127	88	65	58	55	55	-3.3%
Natural gas	629	659	734	778	813	847	905	1.3%
Coal	227	193	124	118	111	112	108	-2.6%
Nuclear	114	115	112	105	92	89	87	-1.0%
Renewables	788	969	1,299	1,497	1,658	1,859	2,095	3.6%
Hydro	362	376	383	386	388	389	391	0.3%
Wind	200	238	374	435	469	519	578	3.9%
Geothermal	4	4	5	6	6	7	7	1.9%
Solar	159	288	472	604	728	877	1,051	7.0%
Other	62	63	64	65	66	67	68	0.3%
Battery storage	6	18	32	55	99	136	164	12.3%
Pumped hydro	23	23	23	23	23	23	23	0.0%
Total capacity	1,929	2,104	2,411	2,639	2,853	3,121	3,435	2.1%

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.

Table E3.cap. Electricity installed generating capacity: United States, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	75	60	59	54	54	54	54	-1.2%
Natural gas	445	465	526	559	592	626	676	1.5%
Coal	201	167	105	94	80	77	73	-3.6%
Nuclear	95	96	92	85	76	76	76	-0.8%
Renewables	389	542	854	1,024	1,142	1,272	1,420	4.7%
Hydro	79	79	80	80	80	80	80	0.0%
Wind	145	171	301	345	350	358	374	3.4%
Geothermal	3	3	3	3	4	4	5	2.5%
Solar	125	251	432	557	669	790	920	7.4%
Other	37	38	38	39	40	41	41	0.4%
Battery storage	6	18	32	55	99	136	164	12.3%
Pumped hydro	22	22	22	22	22	22	22	0.0%
Total capacity	1,234	1,371	1,690	1,893	2,065	2,263	2,484	2.5%

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.

Table E4.cap. Electricity installed generating capacity: Canada, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	4	4	0	0	0	0	0	-13.5%
Natural gas	33	36	51	60	62	62	68	2.7%
Coal	6	6	0	0	0	0	0	-100.0%
Nuclear	14	14	11	10	7	6	4	-4.4%
Renewables	105	109	119	133	158	190	225	2.8%
Hydro	83	86	89	89	89	89	89	0.3%
Wind	16	17	23	37	62	94	129	7.8%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	4	4	4	4	4	4	4	0.0%
Other	2	2	3	3	3	3	3	1.3%
Battery storage	0	0	0	0	0	0	0	--
Pumped hydro	0	0	0	0	0	0	0	0.0%
Total capacity	161	169	182	203	228	258	298	2.2%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E5.cap. Electricity installed generating capacity: Mexico, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	13	14	7	4	1	0	0	-19.1%
Natural gas	44	45	45	48	53	55	56	0.8%
Coal	9	9	9	9	9	9	9	0.0%
Nuclear	2	2	3	4	3	2	2	1.5%
Renewables	30	33	36	40	45	58	71	3.1%
Hydro	13	14	15	15	15	15	16	0.7%
Wind	8	8	8	8	8	8	8	0.0%
Geothermal	1	1	1	1	1	1	1	0.0%
Solar	8	9	11	15	19	32	46	6.6%
Other	1	1	1	1	1	1	1	0.0%
Battery storage	0	0	0	0	0	0	0	0.0%
Pumped hydro	0	0	0	0	0	0	0	0.0%
Total capacity	98	102	99	105	111	124	138	1.2%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E6.cap. Electricity installed generating capacity: Brazil, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	14	14	6	1	0	0	0	-15.5%
Natural gas	24	27	27	22	18	17	16	-1.4%
Coal	6	6	4	4	4	4	4	-1.3%
Nuclear	2	2	3	3	3	2	2	0.9%
Renewables	161	173	173	174	178	187	195	0.7%
Hydro	112	117	117	117	117	117	117	0.2%
Wind	20	26	27	28	32	41	48	3.3%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	13	13	13	13	13	13	13	0.0%
Other	16	16	16	16	16	16	16	0.0%
Battery storage	0	0	0	0	0	0	0	0.0%
Pumped hydro	0	0	0	0	0	0	0	0.0%
Total capacity	207	222	213	205	203	211	218	0.2%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E7.cap. Electricity installed generating capacity: Other Americas, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	35	35	16	6	2	0	0	-20.2%
Natural gas	84	85	85	88	88	88	88	0.2%
Coal	6	6	6	11	19	23	23	5.0%
Nuclear	2	2	2	2	2	2	2	0.8%
Renewables	103	111	117	126	135	151	183	2.1%
Hydro	75	79	82	85	87	88	90	0.6%
Wind	12	15	16	17	17	18	19	1.6%
Geothermal	1	1	1	1	1	1	1	2.0%
Solar	10	11	13	16	23	38	68	7.2%
Other	5	5	5	6	6	6	6	0.1%
Battery storage	0	0	0	0	0	0	0	0.0%
Pumped hydro	1	1	1	1	1	1	1	0.0%
Total capacity	230	239	227	234	246	265	297	0.9%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E8.cap. Electricity installed generating capacity: Europe and Eurasia, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	77	78	52	39	33	32	32	-3.1%
Natural gas	474	483	508	511	525	543	566	0.6%
Coal	269	272	224	228	228	228	228	-0.6%
Nuclear	168	173	151	156	156	154	155	-0.3%
Renewables	782	908	1,015	1,034	1,067	1,133	1,221	1.6%
Hydro	272	297	300	301	301	302	302	0.4%
Wind	245	283	324	327	330	334	338	1.2%
Geothermal	3	6	8	8	8	8	8	3.1%
Solar	206	247	300	310	334	390	468	3.0%
Other	56	75	83	88	94	99	105	2.2%
Battery storage	0	0	0	0	0	49	98	--
Pumped hydro	50	51	52	52	52	52	52	0.1%
Total capacity	1,820	1,964	2,002	2,021	2,060	2,192	2,352	0.9%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E9.cap. Electricity installed generating capacity: Western Europe, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	60	60	41	30	24	24	23	-3.3%
Natural gas	299	305	305	285	268	257	248	-0.7%
Coal	171	171	118	118	118	118	118	-1.3%
Nuclear	124	127	107	108	109	107	107	-0.5%
Renewables	683	802	908	926	959	1,023	1,108	1.7%
Hydro	191	214	217	217	217	217	217	0.5%
Wind	241	277	318	320	323	327	331	1.1%
Geothermal	3	6	8	8	8	8	8	3.1%
Solar	193	233	286	296	320	375	450	3.1%
Other	55	71	79	85	90	96	101	2.2%
Battery storage	0	0	0	0	0	49	98	--
Pumped hydro	47	48	48	48	48	48	48	0.1%
Total capacity	1,384	1,514	1,528	1,516	1,525	1,625	1,751	0.8%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E10.cap. Electricity installed generating capacity: Russia, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	7	7	3	1	1	1	0	-10.4%
Natural gas	136	137	162	182	198	210	224	1.8%
Coal	55	55	55	55	55	55	55	0.0%
Nuclear	30	31	32	32	32	32	31	0.2%
Renewables	59	62	62	62	62	62	62	0.2%
Hydro	54	54	54	54	54	54	54	0.0%
Wind	1	3	3	3	3	3	3	2.4%
Geothermal	0	0	0	0	0	0	0	0.4%
Solar	2	2	2	2	2	2	2	0.0%
Other	1	3	3	3	3	3	3	2.5%
Battery storage	0	0	0	0	0	0	0	--
Pumped hydro	1	1	1	1	1	1	1	0.0%
Total capacity	288	293	315	333	348	361	373	0.9%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E11.cap. Electricity installed generating capacity: Eastern Europe and Eurasia, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	10	10	8	8	8	8	8	-0.8%
Natural gas	38	41	41	44	60	76	94	3.3%
Coal	43	45	51	55	55	55	55	0.9%
Nuclear	15	15	12	16	16	16	17	0.6%
Renewables	40	44	45	46	46	49	52	0.9%
Hydro	26	29	29	30	30	30	30	0.5%
Wind	2	3	3	4	4	4	4	2.4%
Geothermal	0	0	0	0	0	0	0	--
Solar	11	12	12	12	12	14	16	1.3%
Other	0	1	1	1	1	1	1	2.9%
Battery storage	0	0	0	0	0	0	0	0.0%
Pumped hydro	2	2	2	2	2	2	2	0.6%
Total capacity	148	158	159	172	187	207	229	1.6%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E12.cap. Electricity installed generating capacity: Asia Pacific, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	93	93	44	25	14	11	9	-8.1%
Natural gas	460	520	540	546	611	705	770	1.9%
Coal	1,725	1,803	1,781	1,788	1,820	1,853	1,889	0.3%
Nuclear	108	126	146	168	183	193	206	2.3%
Renewables	1,633	2,042	2,474	2,945	3,549	4,103	4,529	3.7%
Hydro	523	577	620	651	666	680	693	1.0%
Wind	417	485	583	748	974	1,120	1,143	3.7%
Geothermal	6	6	9	10	11	11	11	2.0%
Solar	628	909	1,196	1,470	1,824	2,218	2,607	5.2%
Other	59	65	66	67	75	75	75	0.9%
Battery storage	46	52	95	186	289	478	683	10.1%
Pumped hydro	91	120	131	133	133	133	133	1.3%
Total capacity	4,158	4,756	5,212	5,791	6,599	7,477	8,218	2.5%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E13.cap. Electricity installed generating capacity: Japan, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	35	35	19	11	7	7	7	-5.6%
Natural gas	95	101	101	89	81	78	78	-0.7%
Coal	64	65	42	41	41	41	41	-1.6%
Nuclear	14	20	25	25	21	18	18	0.9%
Renewables	108	112	118	125	139	153	166	1.6%
Hydro	22	22	22	22	22	22	22	0.0%
Wind	4	4	4	5	13	21	28	6.9%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	76	81	86	93	99	105	111	1.3%
Other	5	5	5	5	5	5	5	0.1%
Battery storage	0	0	0	0	0	0	0	0.0%
Pumped hydro	28	28	28	28	28	28	28	0.0%
Total capacity	344	362	332	318	317	325	338	-0.1%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E14.cap. Electricity installed generating capacity: South Korea, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	5	5	2	2	1	1	1	-4.4%
Natural gas	43	46	46	41	38	36	36	-0.7%
Coal	43	46	46	46	46	46	46	0.3%
Nuclear	27	31	31	31	31	29	29	0.2%
Renewables	22	27	33	45	57	70	80	4.8%
Hydro	2	2	2	2	2	2	2	1.1%
Wind	2	7	13	25	37	50	60	13.1%
Geothermal	0	0	0	0	0	0	0	--
Solar	16	16	16	16	16	16	16	0.0%
Other	2	2	2	2	2	2	2	0.0%
Battery storage	0	0	0	0	0	0	0	--
Pumped hydro	5	5	5	5	5	5	5	0.0%
Total capacity	144	158	162	169	177	187	196	1.1%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E15.cap. Electricity installed generating capacity: Australia and New Zealand, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	2	2	0	0	0	0	0	-11.7%
Natural gas	25	25	25	20	16	18	18	-1.1%
Coal	28	28	28	28	28	28	28	0.0%
Nuclear	0	0	0	0	0	0	0	0.0%
Renewables	48	56	62	70	84	93	106	2.9%
Hydro	12	14	16	16	16	16	16	1.1%
Wind	11	16	18	21	24	24	25	2.9%
Geothermal	1	1	1	1	1	1	1	0.0%
Solar	23	24	26	31	42	50	63	3.7%
Other	1	1	1	1	1	1	1	0.1%
Battery storage	0	0	0	0	1	3	7	--
Pumped hydro	2	4	4	4	4	4	4	3.1%
Total capacity	105	115	119	123	133	146	164	1.6%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E16.cap. Electricity installed generating capacity: China, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	5	5	1	0	0	0	0	-16.3%
Natural gas	106	144	157	194	280	377	442	5.2%
Coal	1,164	1,203	1,203	1,203	1,203	1,203	1,203	0.1%
Nuclear	55	59	77	96	114	129	142	3.5%
Renewables	1,165	1,431	1,686	1,793	2,002	2,154	2,175	2.3%
Hydro	359	375	398	412	425	437	447	0.8%
Wind	356	380	428	490	616	739	746	2.7%
Geothermal	0	0	0	0	0	0	0	0.1%
Solar	420	646	830	862	930	948	952	3.0%
Other	30	30	30	30	30	30	30	0.0%
Battery storage	46	49	58	64	81	92	95	2.6%
Pumped hydro	47	72	83	84	84	84	84	2.1%
Total capacity	2,587	2,963	3,264	3,434	3,764	4,039	4,141	1.7%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E17.cap. Electricity installed generating capacity: India, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	6	6	1	0	0	0	0	-14.5%
Natural gas	31	31	36	46	56	56	56	2.2%
Coal	291	310	310	310	310	310	310	0.2%
Nuclear	7	7	9	11	12	12	12	1.9%
Renewables	158	237	352	612	868	1,175	1,498	8.4%
Hydro	50	64	64	65	66	66	67	1.0%
Wind	39	68	104	177	250	250	250	6.9%
Geothermal	0	0	0	0	0	0	0	--
Solar	58	94	172	359	541	848	1,170	11.3%
Other	11	11	11	11	11	11	11	0.1%
Battery storage	0	3	37	122	208	384	561	--
Pumped hydro	5	6	6	6	6	6	6	1.0%
Total capacity	498	600	752	1,109	1,460	1,944	2,443	5.8%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E18.cap. Electricity installed generating capacity: Other Asia Pacific, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	40	41	22	12	6	2	0	-14.8%
Natural gas	160	175	176	157	141	141	141	-0.5%
Coal	136	151	151	160	192	225	260	2.4%
Nuclear	6	8	5	5	5	5	5	-0.2%
Renewables	133	179	224	299	400	458	503	4.9%
Hydro	78	100	118	134	135	137	139	2.1%
Wind	5	10	15	30	34	35	35	7.2%
Geothermal	4	4	7	8	9	9	9	2.6%
Solar	35	49	66	109	196	252	295	7.9%
Other	10	16	17	18	26	26	26	3.4%
Battery storage	0	0	0	0	0	0	20	--
Pumped hydro	5	5	5	5	5	5	5	0.0%
Total capacity	480	558	583	638	749	836	935	2.4%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E19.cap. Electricity installed generating capacity: Africa and Middle East, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	79	80	39	19	7	3	1	-15.4%
Natural gas	368	383	383	419	462	505	540	1.4%
Coal	49	51	50	50	50	51	51	0.1%
Nuclear	10	12	13	17	20	20	20	2.6%
Renewables	94	157	228	253	280	337	399	5.3%
Hydro	55	67	73	77	82	97	116	2.7%
Wind	10	24	43	45	46	47	47	5.7%
Geothermal	1	1	5	6	9	9	9	8.5%
Solar	26	61	103	121	140	180	223	7.9%
Other	2	3	4	4	4	4	5	3.7%
Battery storage	0	0	0	0	0	0	0	--
Pumped hydro	5	6	6	6	6	6	6	0.7%
Total capacity	604	688	720	765	826	921	1,016	1.9%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E20.cap. Electricity installed generating capacity: Africa, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	21	21	7	4	0	0	0	-16.1%
Natural gas	122	126	127	148	170	191	210	2.0%
Coal	49	50	50	50	50	50	50	0.1%
Nuclear	2	2	4	6	7	7	7	5.1%
Renewables	64	92	125	146	169	221	279	5.4%
Hydro	39	50	56	60	65	80	98	3.4%
Wind	9	16	26	27	28	28	28	4.3%
Geothermal	1	1	4	6	8	8	8	8.5%
Solar	14	23	36	49	64	101	140	8.5%
Other	2	3	3	4	4	4	4	3.6%
Battery storage	0	0	0	0	0	0	0	--
Pumped hydro	3	4	4	4	4	4	4	0.4%
Total capacity	261	296	318	359	402	474	551	2.7%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.

Table E21.cap. Electricity installed generating capacity: Middle East, Reference case

gigawatts

Fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Liquid fuels	57	59	31	15	7	2	1	-15.2%
Natural gas	246	256	256	271	292	314	330	1.1%
Coal	0	0	0	0	0	0	0	-5.9%
Nuclear	8	10	9	11	12	12	12	1.6%
Renewables	29	64	103	108	111	116	119	5.1%
Hydro	16	17	17	17	17	17	17	0.4%
Wind	1	9	17	18	18	18	18	10.2%
Geothermal	0	0	0	0	0	0	0	--
Solar	12	38	68	72	75	79	83	7.0%
Other	0	0	0	0	0	0	1	5.4%
Battery storage	0	0	0	0	0	0	0	0.0%
Pumped hydro	2	2	2	2	2	2	2	1.4%
Total capacity	343	392	401	406	424	447	464	1.1%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459

Note: Totals may not equal sum of components due to independent rounding.