

**Table E1.gen. Electricity generation: World, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	733	737	377	194	106	67	54	-8.9%
Natural gas	6,699	6,610	6,453	6,308	6,441	6,662	6,890	0.1%
Coal	9,696	9,205	8,517	8,507	8,404	8,138	8,069	-0.7%
Nuclear	2,666	2,786	3,020	3,142	3,150	3,184	3,169	0.6%
Renewables	8,447	9,969	12,175	13,843	15,422	17,146	18,477	2.8%
Hydro	4,320	4,690	4,913	5,099	5,310	5,410	5,493	0.9%
Wind	1,967	2,314	3,169	3,641	4,175	4,655	4,785	3.2%
Geothermal	67	110	158	200	225	229	238	4.7%
Solar	1,421	2,223	3,280	4,238	5,032	6,095	7,121	5.9%
Other	672	631	655	665	680	757	840	0.8%
<b>Net generation to grid</b>	<b>28,242</b>	<b>29,306</b>	<b>30,542</b>	<b>31,994</b>	<b>33,522</b>	<b>35,197</b>	<b>36,660</b>	<b>0.9%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Im\_230821.151939 and Annual Energy Outlook 2023 (March 2023), [www.eia.gov/aeo](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E2.gen. Electricity generation: Americas, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	158	159	74	33	15	5	5	-11.6%
Natural gas	2,260	1,975	1,724	1,570	1,641	1,637	1,697	-1.0%
Coal	934	818	356	352	362	363	386	-3.1%
Nuclear	889	891	896	820	707	684	661	-1.1%
Renewables	2,490	2,894	3,917	4,471	4,807	5,175	5,485	2.9%
Hydro	1,472	1,535	1,590	1,659	1,708	1,725	1,721	0.6%
Wind	611	712	1,234	1,453	1,582	1,727	1,786	3.9%
Geothermal	25	21	32	40	44	47	52	2.6%
Solar	260	522	968	1,238	1,412	1,616	1,866	7.3%
Other	122	103	93	81	61	59	60	-2.5%
<b>Net generation to grid</b>	<b>6,731</b>	<b>6,737</b>	<b>6,967</b>	<b>7,247</b>	<b>7,532</b>	<b>7,864</b>	<b>8,233</b>	<b>0.7%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Im\_230821.151939 and Annual Energy Outlook 2023 (March 2023), [www.eia.gov/aeo](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E3.gen. Electricity generation: United States, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	11	10	7	7	6	4	4	-3.4%
Natural gas	1,686	1,377	1,094	932	1,011	1,021	1,071	-1.6%
Coal	849	754	306	290	256	224	209	-4.9%
Nuclear	772	782	758	681	594	594	583	-1.0%
Renewables	1,003	1,363	2,277	2,702	2,907	3,128	3,343	4.4%
Hydro	276	300	295	289	287	285	274	0.0%
Wind	440	513	997	1,168	1,217	1,263	1,276	3.9%
Geothermal	16	17	20	23	26	30	34	2.9%
Solar	205	467	900	1,160	1,320	1,494	1,709	7.9%
Other	67	67	65	63	58	55	50	-1.0%
<b>Net generation to grid</b>	<b>4,321</b>	<b>4,286</b>	<b>4,442</b>	<b>4,612</b>	<b>4,774</b>	<b>4,971</b>	<b>5,210</b>	<b>0.7%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Im\_230821.151939 and Annual Energy Outlook 2023 (March 2023), [www.eia.gov/aeo](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E4.gen. Electricity generation: Canada, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	5	5	0	0	0	0	0	-14.0%
Natural gas	81	85	117	125	126	122	140	2.0%
Coal	39	18	0	0	0	0	0	-100.0%
Nuclear	79	71	77	72	51	39	28	-3.7%
Renewables	452	470	503	544	623	695	739	1.8%
Hydro	399	417	430	430	430	430	430	0.3%
Wind	41	45	64	106	184	257	302	7.4%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	6	6	6	6	6	6	5	-0.5%
Other	5	3	4	2	2	2	2	-2.8%
<b>Net generation to grid</b>	<b>656</b>	<b>648</b>	<b>697</b>	<b>742</b>	<b>799</b>	<b>856</b>	<b>907</b>	<b>1.2%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E5.gen. Electricity generation: Mexico, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	46	48	23	12	5	0	0	-19.1%
Natural gas	191	195	195	190	200	202	196	0.1%
Coal	9	9	9	12	19	19	19	2.8%
Nuclear	11	11	20	28	23	17	17	1.4%
Renewables	85	77	100	113	123	146	169	2.5%
Hydro	32	35	39	39	39	39	40	0.8%
Wind	35	29	36	36	36	36	36	0.1%
Geothermal	5	0	5	8	8	8	8	1.9%
Solar	12	12	20	30	40	63	86	7.4%
Other	2	1	1	1	0	0	0	-100.0%
<b>Net generation to grid</b>	<b>342</b>	<b>340</b>	<b>347</b>	<b>355</b>	<b>370</b>	<b>384</b>	<b>401</b>	<b>0.6%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E6.gen. Electricity generation: Brazil, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	23	23	9	1	0	0	0	-16.0%
Natural gas	97	110	110	89	73	60	58	-1.9%
Coal	13	13	9	9	9	9	19	1.4%
Nuclear	14	14	23	23	23	18	18	0.9%
Renewables	531	560	556	602	633	669	675	0.9%
Hydro	410	430	432	486	528	539	539	1.0%
Wind	62	83	83	83	83	108	108	2.0%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	21	21	22	22	22	22	22	0.1%
Other	38	26	19	12	0	0	6	-6.6%
<b>Net generation to grid</b>	<b>678</b>	<b>720</b>	<b>707</b>	<b>725</b>	<b>738</b>	<b>757</b>	<b>770</b>	<b>0.5%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E7.gen. Electricity generation: Other Americas, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	73	74	34	13	4	0	0	-18.4%
Natural gas	205	208	208	233	233	233	233	0.4%
Coal	25	25	32	42	79	111	139	6.3%
Nuclear	12	12	18	15	15	15	15	0.8%
Renewables	419	424	481	510	522	537	558	1.0%
Hydro	354	353	394	415	424	431	438	0.8%
Wind	34	43	55	61	62	63	64	2.3%
Geothermal	5	4	7	9	9	9	9	2.5%
Solar	16	17	20	21	24	31	44	3.7%
Other	10	6	4	3	1	1	2	-5.5%
<b>Net generation to grid</b>	<b>734</b>	<b>743</b>	<b>773</b>	<b>812</b>	<b>852</b>	<b>895</b>	<b>945</b>	<b>0.9%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E8.gen. Electricity generation: Europe and Eurasia, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	117	116	75	53	40	39	38	-4.0%
Natural gas	1,473	1,499	1,541	1,522	1,527	1,560	1,593	0.3%
Coal	802	742	535	523	517	502	586	-1.1%
Nuclear	995	1,003	1,044	1,062	1,055	1,036	954	-0.2%
Renewables	1,963	2,166	2,351	2,577	2,848	3,094	3,203	1.8%
Hydro	915	973	972	982	1,047	1,056	1,060	0.5%
Wind	483	552	633	636	727	914	954	2.5%
Geothermal	23	39	41	40	41	41	45	2.5%
Solar	218	197	247	426	506	520	544	3.3%
Other	324	405	458	493	528	563	599	2.2%
<b>Net generation to grid</b>	<b>5,350</b>	<b>5,526</b>	<b>5,545</b>	<b>5,737</b>	<b>5,987</b>	<b>6,231</b>	<b>6,373</b>	<b>0.6%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.



**Table E9.gen. Electricity generation: Western Europe, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	97	97	66	49	36	35	35	-3.6%
Natural gas	777	792	792	743	707	676	650	-0.6%
Coal	501	445	265	255	242	226	311	-1.7%
Nuclear	734	723	733	727	720	702	616	-0.6%
Renewables	1,649	1,861	2,041	2,260	2,506	2,739	2,837	2.0%
Hydro	621	697	706	712	754	754	754	0.7%
Wind	474	544	625	626	717	901	934	2.4%
Geothermal	22	38	40	40	40	40	44	2.5%
Solar	209	184	225	404	482	495	519	3.3%
Other	323	398	444	478	514	549	586	2.2%
<b>Net generation to grid</b>	<b>3,758</b>	<b>3,918</b>	<b>3,897</b>	<b>4,035</b>	<b>4,211</b>	<b>4,379</b>	<b>4,448</b>	<b>0.6%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E10.gen. Electricity generation: Russia, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	17	16	6	2	2	1	1	-10.9%
Natural gas	499	502	543	591	604	616	629	0.8%
Coal	184	185	148	121	121	121	121	-1.5%
Nuclear	217	229	234	234	234	234	227	0.2%
Renewables	220	197	193	193	218	226	237	0.3%
Hydro	211	188	177	177	201	207	211	0.0%
Wind	5	1	1	1	2	3	10	2.4%
Geothermal	0	0	0	0	0	0	0	-0.6%
Solar	3	2	1	1	3	3	3	0.0%
Other	0	6	13	13	13	13	13	21.9%
<b>Net generation to grid</b>	<b>1,137</b>	<b>1,129</b>	<b>1,123</b>	<b>1,141</b>	<b>1,179</b>	<b>1,198</b>	<b>1,215</b>	<b>0.2%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E11.gen. Electricity generation: Eastern Europe and Eurasia, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	3	3	2	2	2	2	2	-0.9%
Natural gas	197	205	205	188	215	268	315	1.7%
Coal	117	112	122	147	154	154	154	1.0%
Nuclear	44	52	77	101	101	101	111	3.4%
Renewables	94	107	118	124	124	129	129	1.1%
Hydro	82	88	89	92	92	95	95	0.5%
Wind	4	7	7	9	9	10	10	3.8%
Geothermal	0	0	0	0	1	1	1	--
Solar	6	10	20	21	21	22	22	4.6%
Other	2	2	1	2	1	1	1	-1.5%
<b>Net generation to grid</b>	<b>455</b>	<b>479</b>	<b>525</b>	<b>562</b>	<b>596</b>	<b>655</b>	<b>710</b>	<b>1.6%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E12.gen. Electricity generation: Asia Pacific, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	110	108	49	27	15	11	8	-8.8%
Natural gas	1,617	1,738	1,766	1,645	1,578	1,628	1,644	0.1%
Coal	7,746	7,454	7,403	7,417	7,259	7,024	6,822	-0.5%
Nuclear	746	837	993	1,143	1,253	1,329	1,420	2.3%
Renewables	3,725	4,507	5,357	6,140	7,038	8,061	8,866	3.1%
Hydro	1,745	1,949	2,101	2,173	2,253	2,299	2,338	1.1%
Wind	842	986	1,188	1,431	1,745	1,890	1,921	3.0%
Geothermal	13	44	67	74	78	78	78	6.7%
Solar	902	1,410	1,901	2,373	2,878	3,661	4,353	5.8%
Other	224	119	100	89	84	132	176	-0.9%
<b>Net generation to grid</b>	<b>13,944</b>	<b>14,644</b>	<b>15,569</b>	<b>16,373</b>	<b>17,143</b>	<b>18,053</b>	<b>18,759</b>	<b>1.1%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E13.gen. Electricity generation: Japan, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	29	29	15	9	6	6	6	-5.8%
Natural gas	363	383	383	339	301	283	275	-1.0%
Coal	291	283	167	144	144	144	144	-2.5%
Nuclear	78	115	139	139	121	102	102	0.9%
Renewables	210	203	216	265	316	349	363	2.0%
Hydro	72	83	83	86	86	86	86	0.6%
Wind	8	8	8	14	37	57	76	8.5%
Geothermal	3	3	3	4	4	4	4	0.8%
Solar	105	101	114	154	164	173	182	2.0%
Other	23	8	8	7	26	30	16	-1.2%
<b>Net generation to grid</b>	<b>972</b>	<b>1,014</b>	<b>920</b>	<b>896</b>	<b>887</b>	<b>884</b>	<b>890</b>	<b>-0.3%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E14.gen. Electricity generation: South Korea, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	8	7	3	3	2	2	2	-4.8%
Natural gas	177	174	174	159	147	136	136	-0.9%
Coal	149	139	145	152	157	161	161	0.3%
Nuclear	201	228	228	228	228	218	214	0.2%
Renewables	50	53	69	83	92	114	125	3.3%
Hydro	3	4	4	5	5	5	5	1.1%
Wind	5	18	33	37	46	66	77	10.4%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	26	26	26	26	26	26	26	0.0%
Other	16	6	6	15	15	17	17	0.2%
<b>Net generation to grid</b>	<b>586</b>	<b>602</b>	<b>620</b>	<b>624</b>	<b>626</b>	<b>631</b>	<b>638</b>	<b>0.3%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E15.gen. Electricity generation: Australia and New Zealand, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	4	4	0	0	0	0	0	-12.4%
Natural gas	56	52	52	41	32	36	36	-1.5%
Coal	111	102	123	138	140	139	138	0.8%
Nuclear	0	0	0	0	0	0	0	0.0%
Renewables	127	149	162	182	213	233	260	2.6%
Hydro	36	41	45	45	45	45	45	0.8%
Wind	42	57	61	70	77	82	83	2.4%
Geothermal	9	9	9	9	9	9	9	0.0%
Solar	38	41	46	58	83	97	123	4.3%
Other	2	1	1	0	0	0	0	-10.0%
<b>Net generation to grid</b>	<b>298</b>	<b>307</b>	<b>337</b>	<b>361</b>	<b>385</b>	<b>408</b>	<b>434</b>	<b>1.3%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E16.gen. Electricity generation: China, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	13	12	1	0	0	0	0	-100.0%
Natural gas	302	357	379	392	417	491	514	1.9%
Coal	5,248	5,018	4,740	4,612	4,395	4,157	3,962	-1.0%
Nuclear	383	416	538	674	799	903	998	3.5%
Renewables	2,573	3,066	3,554	3,717	3,929	4,109	4,216	1.8%
Hydro	1,221	1,300	1,379	1,428	1,474	1,515	1,551	0.9%
Wind	653	724	842	958	1,107	1,203	1,203	2.2%
Geothermal	0	0	0	0	0	0	0	0.1%
Solar	575	988	1,291	1,299	1,305	1,307	1,319	3.0%
Other	123	54	42	31	43	83	142	0.5%
<b>Net generation to grid</b>	<b>8,519</b>	<b>8,869</b>	<b>9,214</b>	<b>9,395</b>	<b>9,539</b>	<b>9,661</b>	<b>9,691</b>	<b>0.5%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.



**Table E17.gen. Electricity generation: India, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	4	4	1	0	0	0	0	-14.7%
Natural gas	78	73	75	87	88	88	88	0.4%
Coal	1,240	1,274	1,473	1,452	1,473	1,473	1,351	0.3%
Nuclear	41	42	52	67	70	70	70	1.9%
Renewables	395	548	742	1,175	1,590	2,134	2,702	7.1%
Hydro	154	195	197	199	201	203	205	1.0%
Wind	119	159	205	290	377	377	377	4.2%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	99	176	323	673	1,011	1,554	2,119	11.6%
Other	23	18	16	14	0	0	0	-100.0%
<b>Net generation to grid</b>	<b>1,757</b>	<b>1,941</b>	<b>2,342</b>	<b>2,781</b>	<b>3,220</b>	<b>3,765</b>	<b>4,210</b>	<b>3.2%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E18.gen. Electricity generation: Other Asia Pacific, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	52	53	28	15	8	3	1	-14.9%
Natural gas	641	699	703	627	594	594	594	-0.3%
Coal	706	638	755	920	951	951	1,066	1.5%
Nuclear	43	36	36	36	36	36	36	-0.6%
Renewables	369	487	615	719	897	1,122	1,200	4.3%
Hydro	258	326	393	410	443	446	446	2.0%
Wind	15	20	38	62	100	104	104	7.3%
Geothermal	1	32	55	61	65	65	65	17.9%
Solar	58	77	100	163	288	504	584	8.6%
Other	37	32	28	22	0	2	0	-15.3%
<b>Net generation to grid</b>	<b>1,812</b>	<b>1,912</b>	<b>2,137</b>	<b>2,316</b>	<b>2,485</b>	<b>2,705</b>	<b>2,897</b>	<b>1.7%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E19.gen. Electricity generation: Africa and Middle East, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	348	354	179	80	36	13	3	-15.3%
Natural gas	1,349	1,398	1,422	1,571	1,695	1,836	1,957	1.3%
Coal	214	191	224	215	266	250	275	0.9%
Nuclear	37	54	87	116	135	135	135	4.8%
Renewables	269	402	550	655	729	815	924	4.5%
Hydro	188	232	250	285	302	329	374	2.5%
Wind	30	65	113	121	122	124	125	5.2%
Geothermal	6	6	18	46	63	63	63	8.6%
Solar	42	95	165	200	236	297	358	7.9%
Other	2	4	4	3	7	2	4	2.1%
<b>Net generation to grid</b>	<b>2,217</b>	<b>2,399</b>	<b>2,462</b>	<b>2,637</b>	<b>2,861</b>	<b>3,050</b>	<b>3,295</b>	<b>1.4%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E20.gen. Electricity generation: Africa, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	48	47	16	3	1	0	0	-16.2%
Natural gas	358	367	391	423	467	528	589	1.8%
Coal	214	190	223	215	266	250	275	0.9%
Nuclear	13	13	30	43	52	52	52	5.1%
Renewables	227	307	396	486	552	626	728	4.2%
Hydro	165	207	224	256	273	300	345	2.7%
Wind	28	46	76	80	81	81	83	4.0%
Geothermal	6	6	18	46	63	63	63	8.6%
Solar	26	44	75	101	129	180	234	8.2%
Other	2	3	3	2	6	2	4	1.6%
<b>Net generation to grid</b>	<b>861</b>	<b>924</b>	<b>1,056</b>	<b>1,169</b>	<b>1,339</b>	<b>1,457</b>	<b>1,645</b>	<b>2.3%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.

**Table E21.gen. Electricity generation: Middle East, Low Economic Growth case**

billion kilowatthours

<b>Fuel</b>	<b>2022</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>Average annual percentage change, 2022–2050</b>
Liquid fuels	300	307	164	77	34	13	3	-15.2%
Natural gas	990	1,031	1,031	1,148	1,227	1,308	1,367	1.2%
Coal	0	0	0	0	0	0	0	-6.2%
Nuclear	24	41	58	73	83	83	83	4.6%
Renewables	42	96	154	169	177	189	197	5.7%
Hydro	23	25	25	29	29	29	29	0.8%
Wind	3	19	37	40	40	42	42	10.4%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	16	51	91	100	108	117	125	7.5%
Other	0	0	0	0	0	0	1	--
<b>Net generation to grid</b>	<b>1,357</b>	<b>1,475</b>	<b>1,406</b>	<b>1,468</b>	<b>1,522</b>	<b>1,592</b>	<b>1,650</b>	<b>0.7%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lm\_230821.151939

Note: Totals may not equal sum of components due to independent rounding. Net generation to grid represents gross generation minus losses from thermal efficiency and parasitic load.