

**Table E1.gen. Electricity generation: World, High 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	738	381	197	110	73	59	-8.6%
Natural gas	6,700	6,671	6,940	7,359	8,309	9,577	11,144	1.8%
Coal	9,696	9,537	9,826	10,206	10,501	10,658	10,665	0.3%
Nuclear	2,666	2,786	3,015	3,164	3,199	3,245	3,323	0.8%
Renewables	8,450	10,099	12,835	15,710	18,535	21,600	24,522	3.9%
Hydro	4,320	4,725	5,045	5,277	5,378	5,512	5,681	1.0%
Wind	1,967	2,384	3,355	4,480	5,610	6,469	6,822	4.5%
Geothermal	67	110	190	213	245	250	254	4.9%
Solar	1,421	2,241	3,559	5,042	6,464	8,484	10,815	7.5%
Other	675	639	686	697	838	885	951	1.2%
<b>Net generation to grid</b>	<b>28,246</b>	<b>29,830</b>	<b>32,998</b>	<b>36,637</b>	<b>40,654</b>	<b>45,153</b>	<b>49,714</b>	<b>2.0%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836 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, High 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	75	34	16	6	6	-10.9%
Natural gas	2,260	2,024	1,954	1,909	2,025	2,122	2,208	-0.1%
Coal	934	864	510	542	582	576	547	-1.9%
Nuclear	889	891	890	843	757	733	717	-0.8%
Renewables	2,493	2,926	3,937	4,553	5,054	5,607	6,228	3.3%
Hydro	1,472	1,551	1,655	1,725	1,728	1,735	1,738	0.6%
Wind	611	719	1,189	1,429	1,614	1,844	2,048	4.4%
Geothermal	25	21	38	41	46	50	54	2.7%
Solar	260	529	957	1,268	1,582	1,900	2,318	8.1%
Other	124	106	99	90	84	78	70	-2.1%
<b>Net generation to grid</b>	<b>6,734</b>	<b>6,864</b>	<b>7,366</b>	<b>7,880</b>	<b>8,434</b>	<b>9,044</b>	<b>9,707</b>	<b>1.3%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836 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, High 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	8	7	7	5	5	-2.9%
Natural gas	1,686	1,425	1,240	1,137	1,198	1,266	1,324	-0.9%
Coal	849	799	436	402	361	332	287	-3.8%
Nuclear	772	782	753	704	644	644	639	-0.7%
Renewables	1,003	1,368	2,215	2,647	2,966	3,234	3,563	4.6%
Hydro	276	300	297	292	287	287	283	0.1%
Wind	440	514	943	1,089	1,135	1,169	1,222	3.7%
Geothermal	16	17	20	24	29	33	37	3.1%
Solar	205	468	883	1,170	1,445	1,680	1,961	8.4%
Other	67	69	71	73	70	65	59	-0.4%
<b>Net generation to grid</b>	<b>4,321</b>	<b>4,384</b>	<b>4,652</b>	<b>4,897</b>	<b>5,175</b>	<b>5,482</b>	<b>5,818</b>	<b>1.1%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836 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, High 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	-13.1%
Natural gas	81	86	144	180	200	204	215	3.5%
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	624	723	822	2.2%
Hydro	399	417	430	430	430	430	430	0.3%
Wind	41	45	64	106	185	285	383	8.3%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	6	6	6	6	6	6	6	0.0%
Other	5	3	4	2	3	2	2	-2.8%
<b>Net generation to grid</b>	<b>656</b>	<b>650</b>	<b>724</b>	<b>797</b>	<b>875</b>	<b>967</b>	<b>1,065</b>	<b>1.7%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	-19.0%
Natural gas	191	195	212	241	288	316	336	2.0%
Coal	9	9	19	19	19	19	19	2.8%
Nuclear	11	11	20	28	23	17	17	1.4%
Renewables	86	84	105	118	133	169	208	3.2%
Hydro	32	34	39	39	39	39	40	0.8%
Wind	35	33	36	36	36	36	36	0.1%
Geothermal	5	0	8	8	8	8	8	1.5%
Solar	12	16	22	35	50	86	125	8.8%
Other	2	1	1	1	0	0	0	-100.0%
<b>Net generation to grid</b>	<b>342</b>	<b>347</b>	<b>379</b>	<b>419</b>	<b>468</b>	<b>520</b>	<b>579</b>	<b>1.9%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	1	1	1	-11.5%
Natural gas	97	110	110	89	78	75	72	-1.1%
Coal	13	13	13	13	28	13	13	0.0%
Nuclear	14	14	23	23	23	18	18	0.9%
Renewables	534	562	618	709	751	824	873	1.8%
Hydro	410	430	487	539	539	539	539	1.0%
Wind	62	85	90	136	180	254	306	5.9%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	21	21	22	22	22	22	22	0.1%
Other	40	26	19	12	10	8	6	-6.7%
<b>Net generation to grid</b>	<b>681</b>	<b>722</b>	<b>773</b>	<b>836</b>	<b>881</b>	<b>930</b>	<b>977</b>	<b>1.3%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	35	13	4	0	0	-18.4%
Natural gas	205	208	247	261	261	261	261	0.9%
Coal	25	25	42	108	175	212	229	8.3%
Nuclear	12	12	18	15	15	15	15	0.8%
Renewables	419	442	497	535	580	657	763	2.2%
Hydro	354	370	402	425	432	440	447	0.8%
Wind	34	43	56	63	78	100	100	3.9%
Geothermal	5	4	9	9	9	9	9	2.5%
Solar	16	18	24	35	58	106	205	9.5%
Other	10	6	4	3	1	2	2	-4.9%
<b>Net generation to grid</b>	<b>734</b>	<b>761</b>	<b>838</b>	<b>932</b>	<b>1,035</b>	<b>1,146</b>	<b>1,269</b>	<b>2.0%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	117	77	56	43	42	41	-3.7%
Natural gas	1,473	1,506	1,648	1,775	1,960	2,149	2,411	1.8%
Coal	802	756	572	538	652	700	689	-0.5%
Nuclear	995	1,003	1,044	1,062	1,055	1,048	1,051	0.2%
Renewables	1,963	2,186	2,620	3,093	3,364	3,755	4,252	2.8%
Hydro	915	987	1,026	1,056	1,059	1,061	1,061	0.5%
Wind	483	553	632	884	974	1,021	1,092	3.0%
Geothermal	23	39	53	52	59	59	59	3.4%
Solar	218	197	439	588	721	1,015	1,388	6.8%
Other	324	411	469	513	550	600	653	2.5%
<b>Net generation to grid</b>	<b>5,350</b>	<b>5,568</b>	<b>5,960</b>	<b>6,523</b>	<b>7,073</b>	<b>7,695</b>	<b>8,444</b>	<b>1.6%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	98	68	51	38	38	37	-3.4%
Natural gas	777	792	793	758	730	708	697	-0.4%
Coal	501	448	276	264	358	368	354	-1.2%
Nuclear	734	723	733	727	720	714	714	-0.1%
Renewables	1,649	1,864	2,278	2,730	3,011	3,393	3,889	3.1%
Hydro	621	697	731	753	756	756	756	0.7%
Wind	474	544	624	864	955	1,001	1,072	3.0%
Geothermal	22	38	52	51	57	57	57	3.4%
Solar	209	184	417	564	697	984	1,356	6.9%
Other	323	400	454	498	545	595	648	2.5%
<b>Net generation to grid</b>	<b>3,758</b>	<b>3,925</b>	<b>4,148</b>	<b>4,531</b>	<b>4,857</b>	<b>5,220</b>	<b>5,691</b>	<b>1.5%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	-9.9%
Natural gas	499	509	623	725	825	900	1,016	2.6%
Coal	184	188	152	129	150	188	188	0.1%
Nuclear	217	229	234	234	234	234	227	0.2%
Renewables	220	215	222	237	228	228	228	0.1%
Hydro	211	202	206	211	211	211	211	0.0%
Wind	5	2	1	10	10	10	10	2.4%
Geothermal	0	0	0	1	1	1	1	1.0%
Solar	3	3	3	3	3	3	3	0.0%
Other	0	9	13	13	4	4	4	16.6%
<b>Net generation to grid</b>	<b>1,137</b>	<b>1,157</b>	<b>1,237</b>	<b>1,327</b>	<b>1,439</b>	<b>1,551</b>	<b>1,660</b>	<b>1.4%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	3	3	3	3	3	-0.3%
Natural gas	197	205	232	292	405	542	698	4.6%
Coal	117	120	144	144	144	144	147	0.8%
Nuclear	44	52	77	101	101	101	111	3.4%
Renewables	94	107	120	125	125	134	135	1.3%
Hydro	82	88	89	92	92	95	95	0.5%
Wind	4	7	8	9	9	9	9	3.4%
Geothermal	0	0	1	1	1	1	1	--
Solar	6	10	20	21	21	28	29	5.6%
Other	2	2	2	2	1	1	1	-1.2%
<b>Net generation to grid</b>	<b>455</b>	<b>487</b>	<b>575</b>	<b>665</b>	<b>777</b>	<b>924</b>	<b>1,093</b>	<b>3.2%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	50	27	16	12	9	-8.5%
Natural gas	1,617	1,742	1,897	1,966	2,381	3,130	4,119	3.4%
Coal	7,746	7,728	8,521	8,870	8,991	9,107	9,156	0.6%
Nuclear	746	837	993	1,143	1,253	1,329	1,420	2.3%
Renewables	3,725	4,574	5,690	7,356	9,275	11,202	12,791	4.5%
Hydro	1,745	1,949	2,103	2,202	2,257	2,345	2,458	1.2%
Wind	842	1,047	1,421	2,047	2,899	3,479	3,558	5.3%
Geothermal	13	44	68	74	78	78	78	6.7%
Solar	902	1,416	1,986	2,941	3,840	5,096	6,475	7.3%
Other	224	119	112	91	201	204	222	0.0%
<b>Net generation to grid</b>	<b>13,945</b>	<b>14,990</b>	<b>17,151</b>	<b>19,361</b>	<b>21,917</b>	<b>24,779</b>	<b>27,494</b>	<b>2.5%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	-5.6%
Natural gas	363	383	383	339	322	268	268	-1.1%
Coal	291	283	167	188	188	250	261	-0.4%
Nuclear	78	115	139	139	121	102	102	0.9%
Renewables	210	203	261	288	343	375	400	2.3%
Hydro	72	83	86	86	86	86	86	0.6%
Wind	8	8	21	37	59	79	98	9.5%
Geothermal	3	3	3	4	4	4	4	0.8%
Solar	105	101	143	154	164	173	182	2.0%
Other	23	8	8	7	31	34	31	1.1%
<b>Net generation to grid</b>	<b>972</b>	<b>1,014</b>	<b>965</b>	<b>963</b>	<b>980</b>	<b>1,002</b>	<b>1,037</b>	<b>0.2%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	4	3	3	3	3	-3.9%
Natural gas	177	174	182	163	148	148	155	-0.5%
Coal	149	145	144	151	156	156	154	0.1%
Nuclear	201	228	228	228	228	218	214	0.2%
Renewables	50	55	89	131	172	208	231	5.6%
Hydro	3	4	4	5	5	5	5	1.1%
Wind	5	20	41	83	124	160	174	13.7%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	26	26	26	26	26	26	26	0.0%
Other	16	6	17	17	17	17	26	1.7%
<b>Net generation to grid</b>	<b>586</b>	<b>610</b>	<b>646</b>	<b>675</b>	<b>707</b>	<b>732</b>	<b>756</b>	<b>0.9%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	-11.9%
Natural gas	56	52	52	41	36	38	38	-1.4%
Coal	111	105	125	137	139	137	138	0.8%
Nuclear	0	0	0	0	0	0	0	0.0%
Renewables	127	149	169	199	234	266	300	3.1%
Hydro	36	41	45	45	45	45	45	0.8%
Wind	42	57	68	88	99	100	101	3.2%
Geothermal	9	9	9	9	9	9	9	0.0%
Solar	38	41	46	57	80	111	144	4.9%
Other	2	1	1	0	0	0	0	-10.0%
<b>Net generation to grid</b>	<b>298</b>	<b>309</b>	<b>346</b>	<b>378</b>	<b>409</b>	<b>441</b>	<b>476</b>	<b>1.7%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	-16.6%
Natural gas	302	362	446	665	1,117	1,918	2,900	8.4%
Coal	5,248	5,276	5,692	5,690	5,461	5,270	5,111	-0.1%
Nuclear	383	416	538	674	799	903	998	3.5%
Renewables	2,573	3,051	3,584	4,265	5,121	5,676	5,814	3.0%
Hydro	1,221	1,300	1,379	1,428	1,474	1,515	1,551	0.9%
Wind	653	724	911	1,188	1,725	2,245	2,288	4.6%
Geothermal	0	0	0	0	0	0	0	0.1%
Solar	575	973	1,251	1,618	1,778	1,764	1,811	4.2%
Other	123	54	42	31	145	153	164	1.0%
<b>Net generation to grid</b>	<b>8,519</b>	<b>9,116</b>	<b>10,262</b>	<b>11,293</b>	<b>12,498</b>	<b>13,768</b>	<b>14,823</b>	<b>2.0%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	131	131	131	131	131	1.9%
Coal	1,240	1,245	1,473	1,535	1,645	1,530	1,419	0.5%
Nuclear	41	42	52	67	70	70	70	1.9%
Renewables	395	621	949	1,637	2,363	3,516	4,711	9.3%
Hydro	154	195	197	199	201	203	205	1.0%
Wind	119	217	340	561	790	790	790	7.0%
Geothermal	0	0	0	0	0	0	0	0.0%
Solar	99	190	396	863	1,372	2,523	3,716	13.8%
Other	23	18	16	14	0	0	0	-100.0%
<b>Net generation to grid</b>	<b>1,757</b>	<b>1,985</b>	<b>2,606</b>	<b>3,369</b>	<b>4,209</b>	<b>5,246</b>	<b>6,330</b>	<b>4.7%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	29	15	8	3	1	-14.8%
Natural gas	641	699	703	627	627	627	627	-0.1%
Coal	706	674	920	1,169	1,402	1,763	2,073	3.9%
Nuclear	43	36	36	36	36	36	36	-0.6%
Renewables	369	494	639	836	1,042	1,160	1,335	4.7%
Hydro	258	326	393	439	447	491	566	2.8%
Wind	15	20	39	91	102	105	107	7.4%
Geothermal	1	32	55	61	65	65	65	17.9%
Solar	58	85	124	223	419	498	596	8.6%
Other	37	32	28	22	9	0	0	-14.7%
<b>Net generation to grid</b>	<b>1,812</b>	<b>1,956</b>	<b>2,326</b>	<b>2,683</b>	<b>3,115</b>	<b>3,589</b>	<b>4,072</b>	<b>2.9%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	180	80	35	13	3	-15.3%
Natural gas	1,349	1,398	1,443	1,710	1,942	2,176	2,406	2.1%
Coal	214	189	224	257	276	276	273	0.9%
Nuclear	37	54	87	116	135	135	135	4.8%
Renewables	269	413	588	709	843	1,035	1,252	5.6%
Hydro	188	238	261	295	334	370	423	2.9%
Wind	30	65	113	120	122	125	125	5.2%
Geothermal	6	6	32	46	63	63	63	8.6%
Solar	42	99	176	245	321	473	634	10.2%
Other	2	4	6	3	3	4	7	3.7%
<b>Net generation to grid</b>	<b>2,217</b>	<b>2,408</b>	<b>2,522</b>	<b>2,873</b>	<b>3,230</b>	<b>3,635</b>	<b>4,069</b>	<b>2.2%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	0	0	0	-16.3%
Natural gas	358	367	391	505	623	739	871	3.2%
Coal	214	188	224	257	275	276	272	0.9%
Nuclear	13	13	30	43	52	52	52	5.1%
Renewables	227	317	430	540	666	846	1,055	5.6%
Hydro	165	212	232	266	305	341	394	3.2%
Wind	28	46	75	80	82	82	83	4.0%
Geothermal	6	6	32	46	63	63	63	8.6%
Solar	26	48	85	146	213	357	510	11.2%
Other	2	4	5	2	2	3	6	3.4%
<b>Net generation to grid</b>	<b>861</b>	<b>932</b>	<b>1,091</b>	<b>1,348</b>	<b>1,617</b>	<b>1,913</b>	<b>2,252</b>	<b>3.5%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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, High 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	1,052	1,205	1,318	1,437	1,535	1.6%
Coal	0	0	0	0	0	0	0	-5.9%
Nuclear	24	41	58	73	83	83	83	4.6%
Renewables	42	96	158	169	177	189	197	5.7%
Hydro	23	25	29	29	29	29	29	0.8%
Wind	3	19	38	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>1,431</b>	<b>1,525</b>	<b>1,613</b>	<b>1,722</b>	<b>1,817</b>	<b>1.0%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run hm\_230821.151836

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.