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Report Annual Energy Outlook 2016
Scenario ref2016 Reference case
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8. Electricity Supply, Disposition, Prices, and Emissions

(billion kilowatthours, unless otherwise noted)

Supply, Disposition, Prices, and Emissions	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2015-2040
Net Generation by Fuel Type																												
Electric Power Sector 1/																												
Power Only 2/																												
Coal	1,549	1,320	1,322	1,331	1,353	1,354	1,355	1,314	1,263	1,239	1,188	1,145	1,109	1,059	1,015	970	938	939	944	937	931	928	917	915	903	893	884	-1.6%
Petroleum	26	23	22	20	19	13	13	13	12	12	12	11	11	10	10	10	9	9	9	9	9	8	8	8	8	7	7	-4.6%
Natural Gas 3/	911	1,114	1,094	1,076	1,041	1,013	947	909	939	984	1,065	1,129	1,192	1,259	1,316	1,376	1,412	1,410	1,408	1,427	1,449	1,460	1,500	1,510	1,550	1,588	1,618	1.5%
Nuclear Power	797	798	781	786	771	770	777	787	789	789	789	789	789	789	789	789	789	789	789	789	789	789	789	789	789	789	789	0.0%
Pumped Storage/Other 4/	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0.1%
Renewable Sources 5/	505	493	539	589	626	694	757	842	887	905	912	918	922	931	945	955	969	990	1,020	1,042	1,062	1,094	1,105	1,143	1,160	1,176	1,205	3.6%
Distributed Generation (Natural Gas)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	- -
Total	**3,790**	**3,751**	**3,762**	**3,805**	**3,814**	**3,848**	**3,853**	**3,867**	**3,894**	**3,934**	**3,970**	**3,996**	**4,027**	**4,052**	**4,079**	**4,105**	**4,121**	**4,142**	**4,173**	**4,207**	**4,244**	**4,284**	**4,324**	**4,370**	**4,414**	**4,458**	**4,508**	**0.7%**
Combined Heat and Power 6/																												
Coal	20	23	22	22	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	-0.4%
Petroleum	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.0%
Natural Gas	120	136	136	144	140	143	143	141	141	141	140	143	143	146	146	146	147	146	144	143	143	142	142	139	140	140	139	0.1%
Renewable Sources	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0.1%
Total	**150**	**164**	**163**	**171**	**166**	**169**	**168**	**167**	**167**	**167**	**167**	**169**	**169**	**172**	**173**	**172**	**173**	**172**	**171**	**170**	**169**	**169**	**168**	**165**	**166**	**166**	**165**	**0.0%**
Total Net Electric Power Sector Generation	**3,939**	**3,915**	**3,925**	**3,977**	**3,980**	**4,016**	**4,021**	**4,035**	**4,061**	**4,101**	**4,137**	**4,165**	**4,196**	**4,225**	**4,252**	**4,277**	**4,294**	**4,314**	**4,344**	**4,377**	**4,413**	**4,452**	**4,492**	**4,535**	**4,580**	**4,624**	**4,673**	**0.7%**
Less Direct Use	16	18	18	18	18	18	18	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	-0.1%
Net Available to the Grid	**3,924**	**3,897**	**3,907**	**3,959**	**3,962**	**3,999**	**4,004**	**4,017**	**4,043**	**4,083**	**4,119**	**4,148**	**4,179**	**4,207**	**4,234**	**4,259**	**4,276**	**4,296**	**4,327**	**4,359**	**4,395**	**4,435**	**4,475**	**4,517**	**4,563**	**4,607**	**4,656**	**0.7%**
End-Use Sector 7/																												
Coal	12	12	12	12	12	12	12	12	12	12	12	13	13	13	13	13	13	13	13	13	13	13	13	14	14	14	14	0.6%
Petroleum	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	-0.4%
Natural Gas	97	99	101	102	108	110	111	113	116	118	121	124	128	131	135	139	143	147	152	156	160	165	169	173	177	180	183	2.5%
Other Gaseous Fuels 8/	11	11	11	11	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	2.5%
Renewable Sources 9/	45	49	54	58	63	69	75	81	85	87	90	93	97	101	106	110	115	120	125	130	134	139	144	149	154	159	165	5.0%
Other 10/	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0.0%
Total End-Use Sector Net Generation	**170**	**176**	**183**	**189**	**208**	**215**	**223**	**231**	**238**	**243**	**248**	**255**	**263**	**270**	**279**	**287**	**296**	**305**	**315**	**324**	**333**	**343**	**352**	**361**	**370**	**379**	**387**	**3.2%**
Less Direct Use	121	127	133	139	167	174	181	188	194	199	204	210	216	223	230	238	246	254	262	270	278	286	294	302	309	317	324	3.8%
Total Sales to the Grid	**49**	**49**	**49**	**50**	**41**	**41**	**42**	**43**	**43**	**44**	**45**	**45**	**46**	**47**	**48**	**49**	**51**	**52**	**53**	**54**	**56**	**57**	**58**	**60**	**61**	**62**	**63**	**1.0%**
Total Net Electricity Generation by Fuel																												
Coal	1,582	1,355	1,357	1,365	1,386	1,387	1,388	1,347	1,296	1,273	1,222	1,179	1,143	1,093	1,050	1,005	972	974	978	972	965	962	952	949	938	928	919	-1.5%
Petroleum	30	26	24	22	21	15	15	15	14	14	14	13	13	12	12	12	11	11	11	11	11	10	10	10	10	10	9	-4.0%
Natural Gas	1,129	1,348	1,330	1,323	1,289	1,266	1,201	1,164	1,196	1,244	1,327	1,396	1,464	1,537	1,598	1,662	1,702	1,704	1,705	1,727	1,753	1,768	1,813	1,824	1,868	1,910	1,942	1.5%
Nuclear Power	797	798	781	786	771	770	777	787	789	789	789	789	789	789	789	789	789	789	789	789	789	789	789	789	789	789	789	0.0%
Renewable Sources 5,9/	554	546	598	652	694	767	836	927	976	997	1,007	1,015	1,024	1,037	1,055	1,070	1,088	1,114	1,149	1,176	1,201	1,238	1,254	1,297	1,319	1,340	1,374	3.8%
Other 11/	18	17	17	17	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	1.8%
Total Net Electricity Generation	**4,109**	**4,090**	**4,108**	**4,165**	**4,188**	**4,232**	**4,244**	**4,266**	**4,298**	**4,343**	**4,385**	**4,420**	**4,459**	**4,495**	**4,530**	**4,564**	**4,590**	**4,619**	**4,659**	**4,701**	**4,746**	**4,795**	**4,845**	**4,896**	**4,950**	**5,003**	**5,060**	**0.9%**
Net Generation to the Grid	**3,972**	**3,946**	**3,956**	**4,008**	**4,003**	**4,040**	**4,046**	**4,060**	**4,086**	**4,127**	**4,164**	**4,193**	**4,225**	**4,254**	**4,282**	**4,309**	**4,327**	**4,348**	**4,380**	**4,414**	**4,451**	**4,492**	**4,533**	**4,577**	**4,624**	**4,669**	**4,719**	**0.7%**
Net Imports	**52**	**57**	**52**	**23**	**57**	**57**	**57**	**62**	**62**	**61**	**59**	**58**	**56**	**55**	**52**	**51**	**50**	**51**	**48**	**47**	**47**	**46**	**45**	**45**	**44**	**44**	**43**	**-1.1%**
Electricity Sales by Sector																												
Residential	1,407	1,402	1,409	1,420	1,420	1,416	1,395	1,387	1,385	1,388	1,393	1,393	1,396	1,401	1,407	1,413	1,416	1,421	1,427	1,436	1,446	1,457	1,470	1,482	1,495	1,508	1,523	0.3%
Commercial	1,352	1,360	1,352	1,359	1,362	1,370	1,374	1,381	1,391	1,401	1,413	1,425	1,438	1,451	1,466	1,481	1,491	1,502	1,515	1,530	1,545	1,562	1,578	1,595	1,611	1,629	1,647	0.8%
Industrial	998	959	970	977	1,004	1,036	1,059	1,080	1,097	1,118	1,133	1,145	1,156	1,162	1,162	1,164	1,166	1,169	1,174	1,181	1,189	1,197	1,205	1,216	1,227	1,237	1,249	1.1%
Transportation	8	9	10	11	11	12	13	15	17	19	21	23	25	27	29	31	32	34	36	37	39	40	41	42	43	44	45	6.7%
Total	**3,765**	**3,729**	**3,740**	**3,766**	**3,797**	**3,834**	**3,841**	**3,863**	**3,890**	**3,926**	**3,959**	**3,986**	**4,014**	**4,041**	**4,064**	**4,089**	**4,105**	**4,126**	**4,152**	**4,184**	**4,218**	**4,256**	**4,294**	**4,334**	**4,377**	**4,418**	**4,464**	**0.7%**
Direct Use	137	144	151	157	185	192	199	206	212	216	221	227	234	241	248	255	263	271	279	287	295	303	311	319	327	334	341	3.5%
Total Electricity Use	**3,902**	**3,873**	**3,892**	**3,923**	**3,982**	**4,025**	**4,039**	**4,068**	**4,101**	**4,142**	**4,180**	**4,213**	**4,248**	**4,282**	**4,312**	**4,344**	**4,368**	**4,397**	**4,431**	**4,471**	**4,513**	**4,559**	**4,605**	**4,654**	**4,704**	**4,752**	**4,805**	**0.9%**
End-Use Prices																												
(2015 cents per kilowatthour)																												
Residential	12.7	12.4	12.3	12.2	12.4	12.7	12.9	12.9	13.0	13.1	13.1	13.2	13.3	13.3	13.3	13.4	13.4	13.4	13.4	13.3	13.3	13.2	13.2	13.1	13.1	13.0	13.0	0.2%
Commercial	10.9	10.5	10.4	10.3	10.4	10.6	10.7	10.8	10.8	10.8	10.8	10.9	10.9	10.9	11.0	11.0	11.0	11.0	10.9	10.8	10.8	10.7	10.6	10.6	10.6	10.5	10.5	0.0%
Industrial	7.2	6.9	6.8	6.8	6.9	7.1	7.1	7.2	7.1	7.2	7.2	7.3	7.3	7.4	7.4	7.5	7.5	7.5	7.5	7.4	7.4	7.3	7.3	7.3	7.3	7.3	7.2	0.2%
Transportation	11.0	10.1	10.1	10.0	10.4	11.0	11.3	11.5	11.7	11.9	12.1	12.3	12.4	12.5	12.6	12.7	12.7	12.7	12.7	12.6	12.5	12.4	12.4	12.3	12.3	12.2	12.1	0.7%
All Sectors Average	**10.5**	**10.3**	**10.2**	**10.1**	**10.2**	**10.4**	**10.5**	**10.6**	**10.5**	**10.6**	**10.6**	**10.7**	**10.7**	**10.7**	**10.8**	**10.8**	**10.9**	**10.9**	**10.8**	**10.7**	**10.7**	**10.6**	**10.6**	**10.6**	**10.5**	**10.5**	**10.5**	**0.1%**
(nominal cents per kilowatthour)																												
Residential	12.5	12.4	12.5	12.7	13.1	13.7	14.2	14.6	15.0	15.4	15.7	16.2	16.6	17.0	17.3	17.7	18.2	18.5	18.9	19.2	19.6	19.9	20.3	20.7	21.1	21.5	21.9	2.3%
Commercial	10.7	10.5	10.6	10.7	11.0	11.5	11.9	12.2	12.5	12.8	13.0	13.4	13.6	13.9	14.2	14.6	14.9	15.2	15.4	15.7	15.9	16.2	16.4	16.7	17.1	17.4	17.6	2.1%
Industrial	7.1	6.9	6.9	7.1	7.3	7.6	7.9	8.1	8.3	8.5	8.7	9.0	9.2	9.4	9.6	9.9	10.2	10.4	10.5	10.7	10.9	11.1	11.3	11.5	11.8	12.0	12.2	2.3%
Transportation	10.9	10.1	10.3	10.4	11.0	11.9	12.5	13.0	13.5	14.0	14.5	15.1	15.5	15.9	16.3	16.8	17.2	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.8	20.1	20.4	2.9%
All Sectors Average	**10.4**	**10.3**	**10.4**	**10.5**	**10.8**	**11.3**	**11.6**	**11.9**	**12.2**	**12.5**	**12.7**	**13.1**	**13.4**	**13.7**	**14.0**	**14.3**	**14.7**	**15.0**	**15.3**	**15.5**	**15.8**	**16.1**	**16.3**	**16.7**	**17.0**	**17.3**	**17.6**	**2.2%**
Prices by Service Category																												
(2015 cents per kilowatthour)																												
Generation	6.8	6.4	6.2	6.1	6.1	6.3	6.4	6.4	6.4	6.6	6.7	6.8	6.9	7.0	7.1	7.3	7.3	7.2	7.1	7.0	6.9	6.8	6.8	6.7	6.7	6.7	6.6	0.1%
Transmission	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.7%
Distribution	2.7	2.8	2.9	2.9	2.9	3.0	3.0	3.0	2.9	2.8	2.7	2.7	2.6	2.5	2.4	2.4	2.3	2.4	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-0.3%
(nominal cents per kilowatthour)																												
Generation	6.7	6.4	6.3	6.3	6.5	6.8	7.0	7.3	7.4	7.8	8.1	8.4	8.6	9.0	9.3	9.6	9.9	10.0	10.0	10.1	10.2	10.3	10.4	10.6	10.8	11.0	11.1	2.2%
Transmission	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.8%
Distribution	2.7	2.8	3.0	3.0	3.1	3.2	3.3	3.4	3.4	3.3	3.3	3.3	3.3	3.2	3.2	3.1	3.2	3.4	3.5	3.6	3.8	3.9	4.0	4.1	4.2	4.3	4.4	1.8%
Electric Power Sector Emissions 1/																												
Sulfur Dioxide (million short tons)	4.05	3.57	1.30	1.26	1.29	1.24	1.20	1.14	1.10	1.09	1.12	1.07	0.99	0.94	0.88	0.81	0.77	0.80	0.85	0.84	0.85	0.84	0.83	0.82	0.82	0.80	0.79	-5.9%
Nitrogen Oxide (million short tons)	1.63	1.41	1.20	1.20	1.18	1.18	1.16	1.11	1.08	1.07	1.02	1.00	0.98	0.95	0.93	0.91	0.91	0.90	0.90	0.91	0.91	0.90	0.90	0.90	0.89	0.88	0.88	-1.9%
Mercury (short tons)	26.77	23.74	5.44	5.49	5.50	5.49	5.55	5.32	5.08	4.96	4.77	4.62	4.47	4.26	4.06	3.88	3.76	3.81	3.90	3.86	3.84	3.82	3.77	3.75	3.68	3.62	3.57	-7.3%

1/ Includes electricity-only and combined heat and power plants that have a regulatory status.
2/ Includes plants that only produce electricity and that have a regulatory status.
3/ Includes electricity generation from fuel cells.
4/ Includes non-biogenic municipal waste. The U.S. Energy Information Administration estimates that in 2014 approximately 7 billion kilowatthours of electricity were generated from a municipal waste stream containing petroleum-derived plastics and other non-renewable sources. See U.S. Energy Information Administration, Methodology for Allocating Municipal Solid Waste to Biogenic and Non-Biogenic Energy (Washington, DC, May 2007).
5/ Includes conventional hydroelectric, geothermal, wood, wood waste, biogenic municipal waste, landfill gas, other biomass, solar, and wind power.
6/ Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report North American Industry Classification System code 22 or that have a regulatory status).
7/ Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors that have a non-regulatory status; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.
8/ Includes refinery gas and still gas.
9/ Includes conventional hydroelectric, geothermal, wood, wood waste, all municipal waste, landfill gas, other biomass, solar, and wind power.
10/ Includes batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.
11/ Includes pumped storage, non-biogenic municipal waste, refinery gas, still gas, batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.
- - = Not applicable.
Note: Totals may not equal sum of components due to independent rounding. Data for 2014 are model results and may differ from official EIA data reports.
Sources: 2014 electric power sector generation; sales to the grid; net imports; electricity sales; and electricity end-use prices: U.S. Energy Information Administration (EIA), Monthly Energy Review, February 2016 and supporting databases. 2014 emissions: U.S. Environmental Protection Agency, Clean Air Markets Database.
2014 prices by service category: EIA, AEO2016 National Energy Modeling System run ref2016.d032416a.
2015: EIA, Short-Term Energy Outlook, February 2016 and EIA, AEO2016 National Energy Modeling System run ref2016.d032416a.
Projections: EIA, AEO2016 National Energy Modeling System run ref2016.d032416a.