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Annual Energy Outlook (AEO) Retrospective Review: Evaluation of AEO2018 and Previous Reference Case Projections

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AEO Retrospective Review: Evaluation of AEO2018 and Previous Reference Case Projections

The U.S. Energy Information Administration (EIA) produces projections of U.S. energy production, consumption, and prices each year in the *Annual Energy Outlook* (AEO). The AEO is produced on an alternating cycle: a full AEO (including complete documentation and a large number of alternative cases) followed by a shorter AEO (more limited documentation and only a few alternative cases). Each year that a full AEO is released, EIA also produces the *AEO Retrospective Review* (AEO Retrospective). The *AEO Retrospective* compares recent history with the Reference case projections from previous editions of the AEO. The *AEO Retrospective* shows the relationship between past AEO projections and actual energy indicators, and it informs discussions about the underlying models.

The projections presented in the AEO are not statements of what will happen but of what may happen given the assumptions in the underlying National Energy Modeling System (NEMS). These assumptions include projections of oil prices and gross domestic product (GDP) and are publically available.¹ The AEO Reference case projection generally assumes that other trends are consistent with historical and current market behavior, technological and demographic changes, and current laws and regulations.

Although the *AEO Retrospective* focuses on the Reference case projections, readers are encouraged to review the full range of cases in the AEO, which illustrate the uncertainty inherent in long-term projections. Beyond the Reference case, the discussion and analysis in each year's AEO typically include Low and High Economic Growth cases and Low and High Oil Price cases. Recent AEOs have also included alternative cases examining the impact of proposed policy changes, variation in the rate of technology improvement, and different assumptions about the size of energy resources.

The *AEO Retrospective* summarizes the relationship between the Reference case projections and realized energy usage by comparing absolute differences and the average absolute percent differences for many of the major measures published in AEOs from 1994 to 2018.² The average absolute percent difference is the simple mean of the absolute values of the percentage difference between the Reference case projections and the actual values. Most historical data are from the *Monthly Energy Review* (MER), which can be accessed from the EIA [open data API](#).³

Table 1 provides a summary of 25 comparisons based on 21 primary measures projected in the AEO. Table 2 contains the standard deviations of the percentage forecast errors (between the Reference case projections and the actual values) for every horizon $H=0$ to $H=15$ computed with AEOs from 1994 to

¹ NEMS documentation is available on the EIA website at: <https://www.eia.gov/forecasts/aeo/nems/documentation/>

² The National Energy Modeling System has been used to prepare the AEO since 1994. This publication considers only the projections made after 1994. In addition, the *Annual Energy Outlook 2009* results are from "An Updated *Annual Energy Outlook 2009* Reference Case Reflecting Provisions of the American Recovery and Reinvestment Act and Recent Changes in the Economic Outlook," which is available on the EIA website at: <https://www.eia.gov/analysis/requests/archive/1999/stimulus/>. Further, projections in the 1994 and 1995 AEOs ended in 2010, so entries for these two publications are blank for the later years in Tables 2 through 22.

³ The exceptions include historical data related to Gross Domestic Product from the U.S. Department of Commerce, Bureau of Economic Analysis (BEA).

2018.^{4,5} For price quantities, the standard deviations of the log errors were computed. Tables 3 through 23 show the detailed results that include the Reference case projections, historical values, and percent differences between projected and actual values for all covered years. The detailed tables also provide the average absolute difference across all AEOs for each covered year. Previous-year statistics can change from one year's evaluation to the next because of updates to historical data in the MER and changes in the measurement of GDP. The statistics in Table 1 do not account for the continual improvements made to NEMS in an attempt to more accurately capture developing energy market trends based on more recent experience.

As reflected in the relatively lower average absolute percent differences in the second column of Table 1, measures of energy consumption are projected with greater accuracy than measures of net imports and of energy prices. Energy consumption tends to change at a slower pace than other indicators; many energy-using devices, such as appliances, automobiles, and industrial equipment, are expensive to purchase and have long service lives. The substantial lead time for these large purchases, along with the effects of energy contracts and other mechanisms, tend to slow changes in consumer energy demand.

For the measures with wider deviations, many factors contribute to differences between the AEO Reference case projections and realized outcomes, but two primary contributors are the initial projections of future oil prices and the overall economic activity that are used in NEMS.⁶ These projections can greatly influence the other projections the model makes, which is why each recent AEO includes alternative cases exploring differences in economic growth (Low and High Economic Growth cases) and in oil prices (Low and High Oil Price cases).

In an unbiased projection, with a sufficiently large number of samples, over- or under-estimates over time would occur in equal measure. The third column of Table 1 provides a summary of the percentage of occurrences in which a particular measure was overestimated relative to its actual value out of the total number of annual projections for which an actual value can be compared. A zero represents a measure that was always underestimated, and 100% represents a measure that was always overestimated. In comparing the AEO Reference case projections with realized outcomes from 1994–2017, out of the 25 variables listed in Table 1, projections were overestimated for 15 variables.

Changes in industry-specific market conditions, significant technological breakthroughs, and new laws or regulations subsequent to the publication of an AEO can also lead to differences between projections and realized outcomes. For example, AEO Reference case projections before AEO2018 projected the United States to continue to be a natural gas net importer in 2017.

⁴ The methodology used is derived from Kaack, et al. "Empirical prediction intervals improve energy forecasting," *Proceedings of the National Academies of Sciences*, 114(33) published August 15, 2017.

⁵ *H* is defined as the number of years since the first projection year, which varies by AEO (e.g., *H*=0 corresponds to the year 2017 for AEO2018 and to the year 2016 for AEO2017).

⁶ Although dynamic feedback in the model can modify these initial forecasts, the resulting changes tend to be small.

Table 1. Comparison of AEO Reference case projections with realized outcomes, 1994–2017

Variable	Average absolute percent differences	Percent of projections overestimated
Gross domestic product		
Real gross domestic product (average cumulative growth) ¹ (Table 3)	0.9	55.4
Petroleum		
Imported refiner acquisition cost of crude oil (constant \$) (Table 4a)	41.7	25.4
Imported refiner acquisition cost of crude oil (nominal \$) (Table 4b)	41.0	26.7
Total petroleum consumption (Table 5)	9.5	72.6
Crude oil production (Table 6)	14.3	38.8
Petroleum net imports (Table 7)	59.5	79.2
Natural gas		
Natural gas price, electric power sector (constant \$) ² (Table 8a)	36.0	47.6
Natural gas price, electric power sector (nominal \$) ² (Table 8b)	36.9	49.8
Total natural gas consumption (Table 9)	8.4	62.5
Natural gas production (Table 10)	8.6	48.9
Natural gas net imports (Table 11) ³	292.4	73.6
Coal		
Coal prices to electric generating plants (constant \$) ⁴ (Table 12a)	20.0	35.8
Coal prices to electric generating plants (nominal \$) ⁴ (Table 12b)	19.9	39.1
Total coal consumption (Table 13)	19.6	75.6
Coal production (Table 14)	16.3	76.5
Electricity		
Average electricity prices (constant \$) (Table 15a)	10.4	28.3
Average electricity prices (nominal \$) (Table 15b)	11.2	34.2
Total electricity sales (Table 16)	6.2	64.2
Total Energy, carbon, and intensity		
Total energy consumption (Table 17)	8.2	82.1
Delivered residential energy consumption (Table 18)	6.6	74.3
Delivered commercial energy consumption (Table 19)	6.8	55.7
Delivered industrial energy consumption (Table 20)	11.6	83.4
Delivered transportation energy consumption (Table 21)	9.7	79.8
Total energy related carbon dioxide emissions (Table 22)	11.8	76.2
Energy intensity (energy consumption/real \$ GDP) (Table 23)	9.1	84.4

AEO - Annual Energy Outlook

Source: These statistics summarize the calculations in Tables 3 through 23. The data in Tables 3 through 23 are based on the 1994 through 2018 AEO Reference case projections. Historical data are from the U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC, July 2018), with the series listed under each appendix table, except for GDP data which are from the Bureau of Economic Analysis, U.S. Dept. of Commerce, September 2014, <http://www.bea.gov/national/xls/gdplev.xlsx>

¹ The basis for GDP comparison is the projection differences in the cumulative average growth rate of real GDP from the first year shown for each AEO. The summary information for projection differences given for GDP growth rates is absolute percentage point differences; for all other AEO concepts, the comparison basis is absolute percent differences.

² As of 2013, EIA no longer reports the wellhead price of natural gas. With the 2015 edition of the *Retrospective*, the natural gas price to the electric power sector replaced the wellhead price.

³ As natural gas net imports have approached zero, the average absolute percent difference has increased significantly.

⁴ Beginning in AEO2003, EIA electric generating projections incorporated combined heat and power (CHP) electricity generation in electricity generating plants. Before AEO2003, coal price projections reflected data collected, estimated, and reported to electric utilities and excluded CHP power generation.

Table 2. Standard deviations of forecast errors (log errors for prices)

Variable	H=0	H=1	H=2	H=3	H=4	H=5	H=6	H=7	H=8	H=9	H=10	H=11	H=12	H=13	H=14	H=15
Gross domestic product																
Real gross domestic product (average cumulative growth) ¹ (Table 2)	0.007	0.010	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.011	0.011	0.010	0.009	0.008	0.007
Petroleum																
Imported refiner acquisition cost of crude oil (constant \$) (Table 3a)	0.049	0.190	0.370	0.454	0.554	0.615	0.642	0.674	0.698	0.659	0.570	0.529	0.465	0.397	0.410	0.404
Imported refiner acquisition cost of crude oil (nominal \$) (Table 3b)	0.048	0.195	0.378	0.465	0.564	0.625	0.653	0.687	0.715	0.676	0.587	0.541	0.480	0.411	0.423	0.396
Total petroleum consumption (Table 4)	0.009	0.021	0.036	0.047	0.059	0.074	0.084	0.093	0.104	0.113	0.118	0.123	0.121	0.114	0.102	0.087
Crude oil production (Table 5)	0.017	0.056	0.101	0.135	0.157	0.172	0.177	0.177	0.176	0.174	0.175	0.188	0.198	0.203	0.200	0.189
Petroleum net imports (Table 6)	0.036	0.089	0.154	0.228	0.292	0.374	0.440	0.536	0.606	0.675	0.802	0.927	1.015	1.125	1.128	1.120
Natural gas																
Natural gas price, electric power sector (constant \$) ² (Table 7a)	0.057	0.219	0.338	0.392	0.459	0.506	0.543	0.568	0.610	0.619	0.614	0.592	0.569	0.519	0.443	0.379
Natural gas price, electric power sector (nominal \$) ² (Table 7b)	0.057	0.222	0.342	0.396	0.461	0.508	0.543	0.564	0.606	0.612	0.600	0.573	0.546	0.492	0.420	0.354
Total natural gas consumption (Table 8)	0.020	0.037	0.062	0.076	0.090	0.104	0.116	0.127	0.133	0.127	0.103	0.084	0.072	0.061	0.051	0.046
Natural gas production (Table 9)	0.015	0.040	0.069	0.084	0.104	0.123	0.142	0.162	0.176	0.181	0.173	0.161	0.144	0.122	0.092	0.058
Natural gas net imports (Table 10) ³	0.111	0.706	0.376	0.594	0.537	1.907	2.602	5.336	5.631	4.935	9.324	13.16 4	11.71 6	17.79 5	17.42 0	16.27 0
Coal																
Coal prices to electric generating plants (constant \$) ⁴ (Table 11a)	0.028	0.068	0.111	0.154	0.195	0.225	0.255	0.278	0.297	0.310	0.315	0.308	0.285	0.278	0.266	0.231
Coal prices to electric generating plants (nominal \$) ⁴ (Table 11b)	0.030	0.072	0.120	0.167	0.211	0.244	0.277	0.304	0.326	0.343	0.350	0.342	0.319	0.310	0.299	0.268
Total coal consumption (Table 12)	0.021	0.050	0.081	0.107	0.121	0.142	0.176	0.218	0.253	0.280	0.300	0.314	0.320	0.324	0.329	0.320
Coal production (Table 13)	0.022	0.045	0.083	0.106	0.112	0.115	0.127	0.163	0.193	0.208	0.226	0.243	0.256	0.266	0.273	0.281
Electricity																
Average electricity prices (constant \$) (Table 14a)	0.022	0.038	0.067	0.084	0.102	0.116	0.126	0.130	0.133	0.141	0.139	0.132	0.122	0.113	0.114	0.114

Average electricity prices (nominal \$) (Table 14b)	0.022	0.042	0.078	0.101	0.122	0.138	0.152	0.159	0.167	0.177	0.176	0.168	0.158	0.151	0.157	0.165
Total electricity sales (Table 15)	0.008	0.015	0.024	0.033	0.040	0.050	0.058	0.067	0.077	0.087	0.097	0.109	0.119	0.124	0.124	0.120
Total energy, carbon, and intensity																
Total energy consumption (Table 16)	0.009	0.019	0.028	0.035	0.041	0.051	0.058	0.063	0.070	0.077	0.081	0.087	0.091	0.090	0.089	0.084
Delivered residential energy consumption (Table 17)	0.023	0.043	0.039	0.043	0.047	0.054	0.062	0.065	0.071	0.080	0.088	0.095	0.101	0.097	0.105	0.112
Delivered commercial energy consumption (Table 18)	0.020	0.032	0.040	0.053	0.062	0.070	0.082	0.091	0.100	0.111	0.117	0.125	0.128	0.130	0.135	0.133
Delivered industrial energy consumption (Table 19)	0.019	0.034	0.046	0.050	0.057	0.065	0.070	0.075	0.087	0.089	0.075	0.074	0.068	0.057	0.042	0.037
Delivered transportation energy consumption (Table 20)	0.016	0.024	0.031	0.037	0.046	0.055	0.065	0.077	0.090	0.101	0.110	0.121	0.127	0.128	0.123	0.115
Total energy related carbon dioxide emissions (Table 21)	0.020	0.028	0.038	0.048	0.060	0.076	0.087	0.099	0.111	0.123	0.134	0.146	0.152	0.154	0.150	0.140
Energy intensity (energy consumption / real \$ gdp) (Table 22)	0.032	0.038	0.045	0.053	0.060	0.065	0.069	0.073	0.079	0.083	0.088	0.090	0.091	0.091	0.088	0.088

Sources: AEO Reference case projections for 1994 to 2018. Methodology derived from Kaack et al. "Empirical Prediction Intervals Improve Energy Forecasting," *Proceedings of the National Academies of Sciences*, 114(33), 2017.

Standard deviations are of the percentage projection error, except for the price quantities, which are given as the log of the error. H represents the years since the first projection year, which varies by AEO (e.g., H=0 corresponds to the year 2017 for AEO2018 and to the year 2016 for AEO2017).

Appendix

Tables 3 through 23

NOTE: Shading in the following tables indicates the degree of overestimation (blue) or underestimation (green).

Table 3. Real Gross Domestic Product growth trends, projected vs. actual (Continued)

Historical real GDP growth trend

(cumulative average percent growth in historical real GDP from first year shown for each AEO)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	2.75	3.39	3.17	3.32	3.55	3.70	3.84	3.87	3.55	3.37	3.32	3.36	3.36	3.31	3.20	2.98	2.63	2.63								
AEO 1995		4.04	3.38	3.52	3.76	3.90	4.03	4.04	3.65	3.44	3.38	3.41	3.41	3.35	3.24	3.00	2.63	2.62								
AEO 1996			2.72	3.26	3.66	3.86	4.02	4.04	3.59	3.37	3.30	3.35	3.35	3.29	3.18	2.92	2.53	2.53	2.48	2.47	2.42	2.43	2.45			
AEO 1997				3.80	4.14	4.24	4.35	4.30	3.74	3.46	3.38	3.42	3.41	3.35	3.21	2.94	2.52	2.52	2.46	2.45	2.41	2.42	2.44			
AEO 1998					4.49	4.47	4.54	4.43	3.73	3.40	3.32	3.38	3.37	3.30	3.16	2.87	2.42	2.43	2.38	2.37	2.33	2.34	2.37	2.32	2.32	
AEO 1999						4.45	4.57	4.41	3.54	3.19	3.12	3.22	3.23	3.17	3.03	2.72	2.25	2.28	2.23	2.23	2.19	2.21	2.25	2.21	2.21	
AEO 2000							4.69	4.39	3.24	2.87	2.86	3.01	3.06	3.01	2.87	2.55	2.06	2.10	2.06	2.07	2.04	2.08	2.12	2.09	2.10	
AEO 2001								4.09	2.52	2.28	2.41	2.68	2.79	2.77	2.65	2.32	1.80	1.86	1.84	1.87	1.86	1.90	1.96	1.94	1.95	
AEO 2002									0.98	1.38	1.85	2.33	2.53	2.56	2.45	2.10	1.55	1.64	1.64	1.69	1.69	1.75	1.82	1.80	1.83	
AEO 2003										1.79	2.30	2.79	2.93	2.88	2.69	2.26	1.62	1.72	1.71	1.75	1.75	1.81	1.88	1.86	1.88	
AEO 2004											2.81	3.29	3.31	3.15	2.87	2.34	1.59	1.71	1.70	1.75	1.74	1.81	1.89	1.86	1.89	
AEO 2005												3.79	3.57	3.26	2.89	2.25	1.39	1.55	1.56	1.63	1.64	1.72	1.82	1.79	1.83	
AEO 2006													3.34	3.01	2.59	1.87	0.92	1.19	1.25	1.37	1.40	1.52	1.64	1.63	1.68	
AEO 2007														2.67	2.22	1.38	0.32	0.76	0.90	1.09	1.16	1.32	1.47	1.47	1.54	
AEO 2008															1.78	0.74	-0.45	0.29	0.55	0.83	0.95	1.15	1.34	1.35	1.44	
AEO 2009																-0.29	-1.54	-0.20	0.25	0.64	0.81	1.06	1.28	1.31	1.40	
AEO 2010																	-2.78	-0.16	0.43	0.87	1.03	1.29	1.51	1.51	1.59	
AEO 2011																		2.53	2.07	2.12	2.01	2.12	2.24	2.13	2.15	
AEO 2012																			1.60	1.91	1.83	2.02	2.19	2.07	2.10	
AEO 2013																			2.22	1.95	2.16	2.33	2.16	2.18		
AEO 2014																					1.68	2.12	2.37	2.15	2.17	
AEO 2015																						2.57	2.72	2.30	2.30	
AEO 2016																							2.86	2.17	2.21	
AEO 2017																								1.49	1.88	
AEO 2018																									2.27	
Growth rate, Real GDP*	2.75	4.04	2.72	3.80	4.49	4.45	4.69	4.09	0.98	1.79	2.81	3.79	3.34	2.67	1.78	-0.29	-2.78	2.53	1.60	2.22	1.68	2.57	2.86	1.49	2.27	

* These are historical annual growth rates in real GDP (2009 chained dollars). The annual changes are compounded and averaged in the table above beginning with the first year for each AEO.

Sources: Projections: Annual Energy Outlook, Reference case projections, various editions.

Historical Data: Bureau of Economic Analysis, U.S. Dept. of Commerce, June 2016. Shading indicates overestimation (blue) or underestimation (green).

Table 4a. Imported refiner acquisition cost of crude oil, projected vs. actual

Projected price in constant dollars

(constant dollars per barrel in dollar year specific to each AEO)

AEO \$ Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	1992	16.69	16.43	16.99	17.66	18.28	19.06	19.89	20.72	21.65	22.61	23.51	24.29	24.90	25.60	26.30	27.00	27.64	28.16							
AEO 1995	1993		14.90	16.41	16.90	17.45	18.00	18.53	19.13	19.65	20.16	20.63	21.08	21.50	21.98	22.44	22.94	23.50	24.12							
AEO 1996	1994			16.81	16.98	17.37	17.98	18.61	19.27	19.92	20.47	20.97	21.41	21.86	22.25	22.61	22.97	23.34	23.70	24.08	24.45	24.79	25.11	25.43		
AEO 1997	1995				19.52	18.54	18.21	18.22	18.20	18.64	18.99	19.28	19.50	19.72	19.89	20.03	20.16	20.29	20.41	20.54	20.68	20.79	20.88	20.98		
AEO 1998	1996					18.16	17.99	18.57	19.11	19.36	19.51	19.79	19.99	20.22	20.37	20.52	20.66	20.81	20.95	21.10	21.23	21.35	21.48	21.62	21.78	
AEO 1999	1997						12.37	13.25	13.97	15.21	16.24	17.47	18.40	19.25	20.15	20.90	21.04	21.17	21.30	21.43	21.57	21.69	21.79	21.91	22.03	22.19
AEO 2000	1998							17.13	21.19	20.06	20.18	20.28	20.39	20.49	20.59	20.70	20.79	20.90	21.00	21.10	21.21	21.31	21.42	21.53	21.63	21.74
AEO 2001	1999								27.59	23.81	21.44	20.56	20.74	20.83	20.94	21.05	21.14	21.26	21.37	21.47	21.57	21.67	21.78	21.89	22.00	22.12
AEO 2002	2000									22.48	21.11	22.39	22.59	22.73	22.85	22.99	23.11	23.24	23.36	23.49	23.62	23.74	23.88	24.00	24.14	24.27
AEO 2003	2001										23.33	25.83	24.05	23.27	23.43	23.57	23.71	23.85	23.99	24.14	24.28	24.42	24.57	24.72	24.87	25.02
AEO 2004	2002											27.25	23.84	23.30	23.47	23.65	23.83	24.00	24.17	24.37	24.53	24.72	24.90	25.07	25.26	25.45
AEO 2005	2003												35.00	33.99	30.00	27.35	26.15	25.30	25.35	25.69	26.04	26.39	26.75	27.10	27.45	
AEO 2006	2004													49.70	53.95	51.46	48.98	46.49	43.99	43.78	43.59	43.39	43.19	43.00	43.78	
AEO 2007	2005														61.75	59.49	57.23	54.21	51.20	48.48	46.22	45.01	44.41	44.61	45.22	
AEO 2008	2006															62.10	72.77	68.32	65.18	62.67	60.06	57.36	54.67	52.03	49.37	49.50
AEO 2009	2007																96.46	38.75	48.99	61.99	72.15	80.99	88.62	96.77	101.92	106.21
AEO 2010	2008																	56.49	67.40	66.63	72.94	79.09	83.84	86.88	90.10	92.72
AEO 2011	2009																		74.86	80.32	80.65	82.87	85.07	86.83	88.96	91.56
AEO 2012	2010																			99.99	99.08	106.64	110.90	113.97	111.53	113.12
AEO 2013	2011																				101.31	96.02	93.95	92.92	94.04	96.15
AEO 2014	2012																					101.56	98.00	88.93	85.16	83.72
AEO 2015	2013																						90.79	51.26	66.23	70.53
AEO 2016	2015																							46.42	33.53	44.84
AEO 2017	2016																								38.48	45.54
AEO 2018	2017																									46.73
Actual in nominal\$		16.14	15.51	17.14	20.64	18.53	12.04	17.26	27.70	22.00	23.71	27.71	35.90	48.86	59.02	67.04	92.77	59.17	75.86	102.63	101.09	98.11	89.56	46.40	38.75	49.12
Average absolute difference		0.93	0.94	0.33	1.88	0.53	5.90	2.58	5.84	1.77	1.69	3.43	9.06	17.78	22.97	26.30	43.28	18.97	28.15	45.49	45.42	39.81	37.42	27.56	30.72	32.58

Table 4a. Imported refiner acquisition cost of crude oil, projected vs. actual (continued)

Projected vs. actual

(percent difference)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	5.9	10.8	5.8	-7.0	9.1	76.9	30.7	-13.2	16.8	14.9	4.3	-14.6	-33.6	-41.7	-45.9	-59.1	-33.8	-46.8								
AEO 1995		-1.9	-0.2	-13.1	1.7	63.2	19.0	-21.7	3.5	0.1	-10.6	-27.6	-44.0	-51.1	-54.9	-66.0	-45.0	-55.5								
AEO 1996			0.1	-14.5	-0.9	59.6	17.0	-22.8	2.8	-0.5	-11.1	-28.0	-44.2	-51.6	-55.5	-66.7	-46.5	-57.1	-67.1	-65.5	-63.4	-58.6	-18.3			
AEO 1997				-3.7	3.6	58.4	12.2	-28.6	-5.8	-9.6	-19.9	-35.7	-50.7	-57.6	-61.4	-71.4	-54.5	-63.9	-72.6	-71.4	-69.9	-66.3	-34.0			
AEO 1998					-0.3	53.6	12.3	-26.4	-3.9	-8.8	-19.2	-35.3	-50.4	-57.6	-61.4	-71.4	-54.5	-63.8	-72.5	-71.4	-69.8	-66.2	-33.6	-19.0	-34.4	
AEO 1999						3.9	-21.2	-47.1	-25.8	-25.3	-29.9	-41.4	-53.5	-58.5	-61.1	-71.1	-54.1	-63.6	-72.3	-71.2	-69.7	-66.1	-33.4	-18.8	-34.3	
AEO 2000							0.8	-20.6	-3.2	-8.2	-19.5	-35.8	-51.1	-58.1	-61.9	-71.8	-55.2	-64.5	-73.1	-72.0	-70.6	-67.0	-35.3	-21.1	-36.4	
AEO 2001								1.9	13.2	-3.9	-19.6	-35.7	-51.0	-58.0	-61.8	-71.8	-55.1	-64.4	-73.0	-72.0	-70.5	-66.9	-35.2	-21.0	-36.2	
AEO 2002									4.5	-7.5	-14.4	-31.5	-47.7	-55.2	-59.2	-69.8	-52.0	-61.9	-71.1	-70.0	-68.4	-64.6	-30.5	-15.3	-31.6	
AEO 2003										-0.1	-3.5	-28.7	-47.7	-55.1	-59.1	-69.7	-51.9	-61.8	-71.0	-69.8	-68.2	-64.4	-30.0	-14.6	-31.0	
AEO 2004											0.3	-30.4	-48.4	-55.7	-59.6	-70.0	-52.3	-62.1	-71.2	-70.0	-68.3	-64.4	-30.1	-14.6	-30.9	
AEO 2005												0.2	-26.2	-44.4	-54.2	-67.7	-50.7	-61.5	-70.6	-69.2	-67.3	-63.0	-26.9	-10.2	-26.9	
AEO 2006													5.0	-2.7	-16.2	-41.2	-11.8	-34.1	-50.5	-49.1	-46.9	-41.1	14.4	4.0	13.4	
AEO 2007														7.8	-6.1	-33.4	-0.4	-25.7	-46.9	-47.7	-46.7	-41.3	15.0	4.1	13.5	
AEO 2008															-4.9	21.8	-8.3	-33.5	-34.1	-34.1	-29.9	30.1	49.7	20.5		
AEO 2009																6.0	-32.7	-32.8	-35.9	-22.9	-9.3	10.6	135.7	201.1	152.0	
AEO 2010																	-3.8	-9.4	-32.4	-23.5	-13.2	2.7	107.6	161.0	115.7	
AEO 2011																		-0.1	-19.1	-16.1	-9.7	3.4	105.9	155.8	111.4	
AEO 2012																				-0.6	1.9	14.8	33.1	167.0	216.8	158.0
AEO 2013																					2.1	1.3	10.5	113.2	161.7	114.9
AEO 2014																						5.2	13.2	100.4	132.7	83.7
AEO 2015																							3.2	13.7	78.1	52.3
AEO 2016																								0.0	-12.4	-5.9
AEO 2017																									-0.7	-5.6
AEO 2018																										-4.9
Average Absolute Percent Difference		5.9	6.3	2.0	9.6	3.1	52.6	16.2	22.8	8.8	7.9	13.8	28.7	42.6	46.8	48.2	57.8	39.8	46.5	54.9	50.0	45.6	41.8	52.9	62.9	48.4

Sources: Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions, "Imported Crude Oil Price" (average imported refiners' acquisition cost for crude oil, "IRAC").

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opa/data/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.RACPUUS.A Bureau of Economic Analysis, U.S. Dept. of Commerce, June 2016. Shading indicates overestimation (blue) or underestimation (green).

Table 4b. Imported refiner acquisition cost of crude oil, projected vs. actual

Projected price in nominal dollars (nominal dollars per barrel)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	17.06	17.21	18.24	19.43	20.64	22.12	23.76	25.52	27.51	29.67	31.86	34.00	36.05	38.36	40.78	43.29	45.88	48.37							
AEO 1995		15.24	17.27	18.23	19.26	20.39	21.59	22.97	24.33	25.79	27.27	28.82	30.38	32.14	33.89	35.85	37.97	40.28							
AEO 1996			17.16	17.74	18.59	19.72	20.97	22.34	23.81	25.26	26.72	28.22	29.87	31.51	33.13	34.82	36.61	38.48	40.48	42.55	44.65	46.81	49.07		
AEO 1997				19.99	19.42	19.55	20.07	20.59	21.68	22.71	23.75	24.78	25.87	26.94	28.06	29.19	30.38	31.60	32.94	34.32	35.72	37.17	38.73		
AEO 1998					18.54	18.79	19.87	20.95	21.79	22.53	23.46	24.34	25.27	26.04	27.00	28.02	29.09	30.22	31.43	32.72	34.03	35.40	36.86	38.42	40.09
AEO 1999						12.50	13.64	14.67	16.35	17.87	19.64	21.14	22.59	24.20	25.72	26.54	27.42	28.38	29.41	30.52	31.67	32.87	34.21	35.67	37.31
AEO 2000							17.35	21.80	20.99	21.52	22.05	22.62	23.23	23.85	24.51	25.17	25.85	26.52	27.22	27.93	28.67	29.48	30.39	31.36	32.42
AEO 2001								28.21	24.86	22.82	22.36	23.04	23.65	24.25	24.85	25.43	26.05	26.66	27.28	27.93	28.60	29.34	30.17	31.10	32.16
AEO 2002									22.99	21.99	24.00	24.86	25.66	26.50	27.36	28.18	29.03	29.89	30.79	31.80	32.82	33.90	35.00	36.17	37.43
AEO 2003										23.65	26.92	25.70	25.40	26.10	26.75	27.39	28.07	28.79	29.61	30.51	31.47	32.50	33.58	34.71	35.90
AEO 2004											27.65	24.54	24.45	25.14	25.87	26.65	27.50	28.40	29.42	30.45	31.57	32.79	34.05	35.37	36.79
AEO 2005												35.74	35.40	31.78	29.52	28.78	28.43	28.73	29.84	31.01	32.17	33.39	34.65	35.92	37.29
AEO 2006													50.97	56.42	54.75	53.19	51.54	49.79	50.73	51.79	52.88	53.96	55.07	56.98	59.04
AEO 2007														63.64	62.68	61.40	59.20	56.89	54.85	53.24	52.75	52.91	54.04	55.24	56.77
AEO 2008															63.72	75.98	72.58	70.43	68.90	67.16	65.24	63.33	61.38	59.33	60.64
AEO 2009																98.58	99.99	50.84	65.08	76.70	87.64	97.94	109.32	117.78	125.56
AEO 2010																	57.35	69.43	69.54	77.21	85.19	91.87	96.82	102.20	107.12
AEO 2011																		75.52	82.10	83.37	87.10	91.03	94.78	99.05	104.05
AEO 2012																			102.10	102.50	111.15	117.41	122.81	122.33	126.23
AEO 2013																				103.10	99.38	98.61	99.02	101.79	105.65
AEO 2014																					103.07	101.27	93.33	90.75	90.53
AEO 2015																						92.23	53.06	69.90	75.73
AEO 2016																							46.42	34.15	46.63
AEO 2017																								38.48	46.53
AEO 2018																									46.73
Actual in nominal\$	16.14	15.51	17.14	20.64	18.53	12.04	17.26	27.70	22.00	23.71	27.71	35.90	48.86	59.02	67.04	92.77	59.17	75.86	102.63	101.09	98.11	89.56	46.40	38.75	49.12
Average absolute difference	0.92	0.98	0.42	1.79	0.76	6.81	3.38	5.70	2.30	2.25	3.40	9.42	20.05	27.05	31.80	52.97	22.34	33.68	55.47	49.54	43.52	35.69	23.25	26.20	25.29

Table 4b. Imported refiner acquisition cost of crude oil, projected vs. actual (continued)

Projected vs. actual (percent difference)																										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	5.7	10.9	6.4	-5.9	11.4	83.7	37.7	-7.9	25.0	25.1	15.0	-5.3	-26.2	-35.0	-39.2	-53.3	-22.5	-36.2								
AEO 1995		-1.8	0.8	-11.7	4.0	69.4	25.1	-17.1	10.6	8.8	-1.6	-19.7	-37.8	-45.5	-49.4	-61.4	-35.8	-46.9								
AEO 1996			0.1	-14.0	0.3	63.8	21.5	-19.3	8.2	6.5	-3.6	-21.4	-38.9	-46.6	-50.6	-62.5	-38.1	-49.3	-60.6	-57.9	-54.5	-47.7	5.8			
AEO 1997				-3.1	4.8	62.4	16.3	-25.7	-1.5	-4.2	-14.3	-31.0	-47.1	-54.3	-58.1	-68.5	-48.7	-58.3	-67.9	-66.1	-63.6	-58.5	-16.5			
AEO 1998					0.0	56.1	15.1	-24.4	-1.0	-5.0	-15.3	-32.2	-48.3	-55.9	-59.7	-69.8	-50.8	-60.2	-69.4	-67.6	-65.3	-60.5	-20.6	-0.9	-18.4	
AEO 1999						3.8	-21.0	-47.0	-25.7	-24.6	-29.1	-41.1	-53.8	-59.0	-61.6	-71.4	-53.7	-62.6	-71.3	-69.8	-67.7	-63.3	-26.3	-8.0	-24.0	
AEO 2000							0.5	-21.3	-4.6	-9.2	-20.4	-37.0	-52.5	-59.6	-63.4	-72.9	-56.3	-65.0	-73.5	-72.4	-70.8	-67.1	-34.5	-19.1	-34.0	
AEO 2001								1.8	13.0	-3.7	-19.3	-35.8	-51.6	-58.9	-62.9	-72.6	-56.0	-64.9	-73.4	-72.4	-70.9	-67.2	-35.0	-19.7	-34.5	
AEO 2002									4.5	-7.3	-13.4	-30.8	-47.5	-55.1	-59.2	-69.6	-50.9	-60.6	-70.0	-68.5	-66.5	-62.1	-24.6	-6.7	-23.8	
AEO 2003										-0.3	-2.9	-28.4	-48.0	-55.8	-60.1	-70.5	-52.6	-62.0	-71.1	-69.8	-67.9	-63.7	-27.6	-10.4	-26.9	
AEO 2004											-0.2	-31.7	-50.0	-57.4	-61.4	-71.3	-53.5	-62.6	-71.3	-69.9	-67.8	-63.4	-26.6	-8.7	-25.1	
AEO 2005												-0.4	-27.6	-46.2	-56.0	-69.0	-52.0	-62.1	-70.9	-69.3	-67.2	-62.7	-25.3	-7.3	-24.1	
AEO 2006													4.3	-4.4	-18.3	-42.7	-12.9	-34.4	-50.6	-48.8	-46.1	-39.8	18.7	47.0	20.2	
AEO 2007														7.8	-6.5	-33.8	0.1	-25.0	-46.6	-47.3	-46.2	-40.9	16.5	42.6	15.6	
AEO 2008															-5.0	-18.1	22.7	-7.2	-32.9	-33.6	-33.5	-29.3	32.3	53.1	23.4	
AEO 2009																6.3	-32.4	-33.0	-36.6	-24.1	-10.7	9.4	135.6	203.9	155.6	
AEO 2010																		-3.1	-8.5	-32.2	-23.6	-13.2	2.6	108.7	163.7	118.1
AEO 2011																			-0.5	-20.0	-17.5	-11.2	1.6	104.3	155.6	111.8
AEO 2012																				-0.5	1.4	13.3	31.1	164.7	215.7	157.0
AEO 2013																					2.0	1.3	10.1	113.4	162.7	115.1
AEO 2014																						5.1	13.1	101.1	134.2	84.3
AEO 2015																							3.0	14.4	80.4	54.2
AEO 2016																								0.0	-11.9	-5.1
AEO 2017																									-0.7	-5.3
AEO 2018																										-4.9
Average absolute percent difference	5.7	6.3	2.4	8.7	4.1	56.5	19.6	20.6	10.5	9.5	12.3	26.2	41.0	45.8	47.4	57.1	37.8	44.4	54.0	49.0	44.4	39.9	50.1	67.6	51.5	

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opa/data/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.RACPU.S.A. Shading indicates overestimation (blue) or underestimation (green).

Table 5. Total petroleum consumption, projected vs. actual

Projected (million barrels)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	6450	6566	6643	6723	6811	6880	6957	7059	7125	7205	7296	7377	7446	7523	7596	7665	7712	7775							
AEO 1995		6398	6544	6555	6676	6745	6822	6888	6964	7048	7147	7245	7337	7406	7472	7537	7581	7621							
AEO 1996			6490	6526	6607	6709	6782	6855	6942	7008	7085	7176	7260	7329	7384	7450	7501	7545	7581	7632	7676	7705	7731		
AEO 1997				6636	6694	6826	6953	7074	7183	7267	7369	7461	7548	7643	7731	7793	7833	7884	7924	7961	8004	8034	8074		
AEO 1998					6895	6906	7066	7161	7278	7400	7488	7597	7719	7859	7959	8074	8190	8286	8361	8455	8503	8564	8634	8689	8741
AEO 1999						6884	7007	7269	7383	7472	7539	7620	7725	7841	7949	8069	8174	8283	8351	8422	8485	8564	8652	8715	8786
AEO 2000							7056	7141	7266	7363	7452	7578	7694	7815	7926	8028	8113	8217	8288	8381	8482	8600	8713	8795	8880
AEO 2001								7119	7314	7431	7528	7634	7740	7853	7963	8074	8179	8285	8385	8482	8603	8730	8856	8976	9089
AEO 2002									7170	7243	7485	7628	7765	7879	8013	8155	8311	8472	8646	8779	8919	9042	9150	9264	9370
AEO 2003										7143	7237	7364	7477	7634	7812	7998	8186	8390	8575	8755	8920	9076	9207	9343	9479
AEO 2004											7259	7359	7408	7772	7916	8063	8168	8290	8433	8602	8773	8920	9052	9170	9292
AEO 2005												7484	7630	7775	7928	8097	8268	8389	8510	8625	8738	8881	9003	9104	9226
AEO 2006													7601	7723	7742	7842	7956	8094	8220	8329	8420	8511	8589	8684	8782
AEO 2007														7546	7644	7721	7805	7880	7991	8077	8177	8250	8342	8438	8502
AEO 2008															7540	7628	7558	7660	7737	7796	7833	7868	7914	7955	7975
AEO 2009																7071	6851	7229	7333	7380	7400	7362	7308	7278	7257
AEO 2010																	6830	7026	7214	7312	7336	7349	7366	7386	7414
AEO 2011																		6926	6973	7293	7402	7427	7461	7493	7512
AEO 2012																			6909	6951	6881	6948	6971	6978	6967
AEO 2013																				6806	6850	6988	7104	7158	7191
AEO 2014																					6803	6826	6996	7069	7113
AEO 2015																						6935	7031	7068	7050
AEO 2016																							7088	7114	7210
AEO 2017																								7151	7231
AEO 2018																									7260
Actual	6291	6467	6469	6701	6796	6905	7125	7211	7172	7213	7312	7588	7593	7551	7548	7136	6852	7001	6892	6767	6921	6974	7079	7206	7255
Average absolute difference	158	84	90	102	105	80	176	154	117	135	139	149	126	192	257	701	987	910	1075	1235	1114	1077	1003	955	929

Table 5. Total petroleum consumption, projected vs. actual (continued)

Projected vs. actual (percent difference)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	2.5	1.5	2.7	0.3	0.2	-0.4	-2.4	-2.1	-0.7	-0.1	-0.2	-2.8	-1.9	-0.4	0.6	7.4	12.6	11.1							
AEO 1995		-1.1	1.2	-2.2	-1.8	-2.3	-4.2	-4.5	-2.9	-2.3	-2.3	-4.5	-3.4	-1.9	-1.0	5.6	10.6	8.9							
AEO 1996			0.3	-2.6	-2.8	-2.8	-4.8	-4.9	-3.2	-2.8	-3.1	-5.4	-4.4	-2.9	-2.2	4.4	9.5	7.8	10.0	12.8	10.9	10.5	9.2		
AEO 1997				-1.0	-1.5	-1.1	-2.4	-1.9	0.2	0.8	0.8	-1.7	-0.6	1.2	2.4	9.2	14.3	12.6	15.0	17.6	15.7	15.2	14.0		
AEO 1998					1.4	0.0	-0.8	-0.7	1.5	2.6	2.4	0.1	1.7	4.1	5.4	13.1	19.5	18.4	21.3	24.9	22.9	22.8	22.0	20.6	20.5
AEO 1999						-0.3	-1.6	0.8	2.9	3.6	3.1	0.4	1.7	3.8	5.3	13.1	19.3	18.3	21.2	24.5	22.6	22.8	22.2	21.0	21.1
AEO 2000							-1.0	-1.0	1.3	2.1	1.9	-0.1	1.3	3.5	5.0	12.5	18.4	17.4	20.3	23.8	22.6	23.3	23.1	22.1	22.4
AEO 2001								-1.3	2.0	3.0	2.9	0.6	1.9	4.0	5.5	13.1	19.4	18.3	21.7	25.3	24.3	25.2	25.1	24.6	25.3
AEO 2002									0.4	0.4	2.4	0.5	2.3	4.4	6.2	14.3	21.3	21.0	25.4	29.7	28.9	29.7	29.2	28.6	29.1
AEO 2003										-1.0	-1.0	-2.9	-1.5	1.1	3.5	12.1	19.5	19.8	24.4	29.4	28.9	30.2	30.1	29.7	30.6
AEO 2004											-0.7	-3.0	0.2	2.9	4.9	13.0	19.2	18.4	22.4	27.1	26.8	27.9	27.9	27.3	28.1
AEO 2005												-1.4	0.5	3.0	5.0	13.5	20.7	19.8	23.5	27.5	26.3	27.4	27.2	26.3	27.2
AEO 2006													0.1	2.3	2.6	9.9	16.1	15.6	19.3	23.1	21.7	22.0	21.3	20.5	21.0
AEO 2007														-0.1	1.3	8.2	13.9	12.6	15.9	19.4	18.2	18.3	17.8	17.1	17.2
AEO 2008															-0.1	6.9	10.3	9.4	12.3	15.2	13.2	12.8	11.8	10.4	9.9
AEO 2009																-0.9	0.0	3.3	6.4	9.0	6.9	5.6	3.2	1.0	0.0
AEO 2010																	-0.3	0.4	4.7	8.0	6.0	5.4	4.1	2.5	2.2
AEO 2011																		-1.1	1.2	7.8	6.9	6.5	5.4	4.0	3.5
AEO 2012																			0.3	2.7	-0.6	-0.4	-1.5	-3.2	-4.0
AEO 2013																				0.6	-1.0	0.2	0.3	-0.7	-0.9
AEO 2014																					-1.7	-2.1	-1.2	-1.9	-2.0
AEO 2015																						-0.5	-0.7	-1.9	-2.8
AEO 2016																							0.1	-1.3	-0.6
AEO 2017																								-0.8	-0.3
AEO 2018																									0.1
Average absolute percent difference	2.5	1.3	1.4	1.5	1.5	1.2	2.5	2.1	1.6	1.9	1.9	2.0	1.7	2.5	3.4	9.8	14.4	13.0	15.6	18.2	16.1	15.4	14.2	12.1	12.8

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.PATCPUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 6. Domestic crude oil production, projected vs. actual

Projected (million barrels)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
AEO 1994	2508	2373	2256	2161	2088	2022	1953	1891	1851	1825	1799	1781	1767	1759	1778	1789	1807	1862									
AEO 1995		2402	2307	2205	2095	2037	1967	1953	1924	1916	1905	1894	1883	1887	1887	1920	1945	1967									
AEO 1996			2387	2310	2248	2172	2113	2062	2011	1978	1953	1938	1916	1920	1927	1949	1971	1986	2000	2018	2055	2095	2121				
AEO 1997				2362	2307	2245	2197	2143	2091	2055	2033	2015	2004	1997	1989	1982	1975	1967	1949	1942	1935	1924	1909				
AEO 1998					2340	2332	2291	2252	2220	2192	2169	2145	2125	2104	2087	2068	2050	2033	2016	1995	1974	1940	1913	1886	1860		
AEO 1999						2340	2309	2296	2265	2207	2171	2141	2122	2114	2092	2074	2057	2040	2025	2010	1992	1971	1947	1924	1901		
AEO 2000							2193	2181	2122	2063	2016	1980	1957	1939	1920	1904	1894	1889	1889	1890	1897	1897	1898	1916	1921		
AEO 2001								2152	2161	2204	2193	2111	2062	1995	1957	1934	1901	1879	1848	1850	1852	1844	1854	1876	1885		
AEO 2002									2133	2135	2074	2008	1962	1944	1943	1913	1880	1855	1842	1848	1912	1974	2028	2084	2109		
AEO 2003										2149	2121	2065	2038	2193	2210	2170	2119	2054	2020	1990	1949	1922	1915	1921	1926		
AEO 2004											2076	2116	2139	2166	2222	2231	2209	2166	2124	2085	2065	2031	2018	1977	1923		
AEO 2005												2059	2124	2200	2221	2243	2257	2198	2152	2123	2081	2044	2006	1954	1936		
AEO 2006													1944	2008	2023	2061	2133	2146	2132	2140	2144	2145	2133	2140	2106		
AEO 2007														1861	2001	2058	2074	2068	2086	2104	2079	2123	2158	2168	2168		
AEO 2008															1862	1876	2064	2165	2166	2168	2192	2206	2247	2273	2287		
AEO 2009																1809	1955	2015	2024	2039	2033	2004	1978	1966	1978		
AEO 2010																	1913	1936	1980	1999	2079	2098	2108	2097	2126		
AEO 2011																		2011	1993	1962	2037	2102	2122	2175	2218		
AEO 2012																			2033	2094	2154	2191	2244	2344	2360		
AEO 2013																					2312	2492	2618	2660	2744	2737	
AEO 2014																						2819	3113	3299	3483	3488	
AEO 2015																							3151	3404	3486	3651	
AEO 2016																								3440	3225	3122	
AEO 2017																										3191	3174
AEO 2018																											3374
Actual	2499	2431	2394	2366	2355	2282	2147	2131	2118	2097	2062	1991	1892	1857	1853	1830	1954	1999	2058	2370	2721	3179	3442	3242	3415		
Average absolute difference	9	44	78	107	139	127	116	107	101	105	94	92	132	163	165	176	103	86	85	338	640	1010	1185	949	1051		

Table 6. Domestic crude oil production, projected vs. actual (continued)

Projected vs. actual (percent difference)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
AEO 1994	0.3	-2.4	-5.8	-8.7	-11.3	-11.4	-9.0	-11.3	-12.6	-13.0	-12.7	-10.6	-6.6	-5.2	-4.1	-2.3	-7.5	-6.9									
AEO 1995		-1.2	-3.7	-6.8	-11.0	-10.7	-8.4	-8.4	-9.2	-8.6	-7.6	-4.9	-0.5	1.6	1.8	4.9	-0.4	-1.6									
AEO 1996			-0.3	-2.3	-4.5	-4.8	-1.6	-3.2	-5.0	-5.6	-5.3	-2.7	1.3	3.4	4.0	6.5	0.9	-0.6	-2.8	-14.8	-24.5	-34.1	-38.4				
AEO 1997				-0.2	-2.0	-1.6	2.4	0.6	-1.2	-2.0	-1.4	1.2	5.9	7.5	7.3	8.3	1.0	-1.6	-5.3	-18.1	-28.9	-39.5	-44.5				
AEO 1998					-0.6	2.2	6.7	5.7	4.8	4.5	5.2	7.7	12.3	13.3	12.6	13.0	4.9	1.7	-2.0	-15.8	-27.5	-39.0	-44.4	-41.8	-45.5		
AEO 1999						2.5	7.6	7.8	7.0	5.3	5.3	7.5	12.2	13.8	12.9	13.3	5.3	2.1	-1.6	-15.2	-26.8	-38.0	-43.4	-40.6	-44.3		
AEO 2000							2.1	2.4	0.2	-1.6	-2.3	-0.6	3.4	4.4	3.6	4.0	-3.1	-5.5	-8.2	-20.2	-30.3	-40.3	-44.9	-40.9	-43.7		
AEO 2001								1.0	2.1	5.1	6.4	6.0	9.0	7.4	5.6	5.6	-2.7	-6.0	-10.2	-21.9	-31.9	-42.0	-46.1	-42.1	-44.8		
AEO 2002									0.7	1.9	0.6	0.9	3.7	4.7	4.9	4.5	-3.8	-7.2	-10.5	-22.0	-29.7	-37.9	-41.1	-35.7	-38.2		
AEO 2003										2.5	2.9	3.7	7.7	18.1	19.3	18.6	8.5	2.8	-1.8	-16.1	-28.4	-39.6	-44.4	-40.7	-43.6		
AEO 2004											0.7	6.3	13.0	16.7	19.9	21.9	13.1	8.4	3.2	-12.0	-24.1	-36.1	-41.4	-39.0	-43.7		
AEO 2005												3.4	12.3	18.5	19.8	22.5	15.5	10.0	4.6	-10.4	-23.5	-35.7	-41.7	-39.7	-43.3		
AEO 2006													2.7	8.2	9.2	12.6	9.2	7.4	3.6	-9.7	-21.2	-32.5	-38.0	-34.0	-38.3		
AEO 2007														0.2	7.9	12.4	6.1	3.5	1.4	-11.2	-23.6	-33.2	-37.3	-33.1	-36.5		
AEO 2008															0.5	2.5	5.6	8.3	5.2	-8.5	-19.4	-30.6	-34.7	-29.9	-33.0		
AEO 2009																-1.2	0.0	0.8	-1.6	-14.0	-25.3	-37.0	-42.5	-39.4	-42.1		
AEO 2010																	-2.1	-3.1	-3.8	-15.7	-23.6	-34.0	-38.8	-35.3	-37.7		
AEO 2011																		0.6	-3.1	-17.2	-25.1	-33.9	-38.4	-32.9	-35.1		
AEO 2012																			-1.2	-11.6	-20.8	-31.1	-34.8	-27.7	-30.9		
AEO 2013																					-2.4	-8.4	-17.6	-22.7	-15.3	-19.8	
AEO 2014																						3.6	-2.1	-4.2	7.4	2.2	
AEO 2015																							-0.9	-1.1	7.6	6.9	
AEO 2016																								-0.1	-0.5	-8.6	
AEO 2017																										-1.6	-7.0
AEO 2018																											-1.2
Average absolute percent difference	0.3	1.8	3.2	4.5	5.9	5.6	5.4	5.0	4.8	5.0	4.6	4.6	7.0	8.8	8.9	9.6	5.3	4.3	4.1	14.3	23.5	31.8	34.4	29.3	30.8		

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.PATCPUSA. Shading indicates overestimation (blue) or underestimation (green).

Table 7. Petroleum net imports, projected vs. actual

Projected (million barrels)																										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	2935	3201	3362	3504	3657	3738	3880	3993	4099	4212	4303	4398	4475	4541	4584	4639	4668	4672								
AEO 1995		2953	3157	3281	3489	3610	3741	3818	3920	4000	4103	4208	4303	4362	4420	4442	4460	4460								
AEO 1996			3011	3106	3219	3398	3519	3679	3807	3891	3979	4070	4165	4212	4260	4289	4303	4322	4325	4347	4344	4318	4303			
AEO 1997				3099	3245	3497	3665	3825	3975	4084	4190	4285	4380	4464	4552	4617	4654	4709	4760	4803	4844	4865	4913			
AEO 1998					3303	3391	3654	3713	3876	4053	4137	4298	4415	4556	4639	4750	4910	4992	5087	5221	5240	5347	5445	5508	5588	
AEO 1999						3380	3442	3888	4022	4153	4238	4336	4441	4545	4652	4780	4888	4999	5073	5144	5215	5294	5387	5460	5550	
AEO 2000							3599	3847	4036	4187	4320	4465	4579	4690	4780	4882	4968	5055	5113	5192	5276	5373	5460	5516	5581	
AEO 2001								3711	3996	4028	4114	4290	4435	4607	4747	4858	4974	5083	5198	5276	5369	5477	5562	5637	5719	
AEO 2002									3850	3992	4191	4395	4561	4653	4749	4903	5068	5211	5360	5468	5521	5586	5628	5695	5795	
AEO 2003										3778	4052	4056	4196	4187	4337	4534	4766	5024	5228	5419	5612	5782	5912	6036	6159	
AEO 2004											4012	4164	4207	4331	4398	4521	4641	4806	4989	5181	5362	5528	5665	5824	5982	
AEO 2005												4255	4346	4306	4420	4555	4693	4881	5038	5173	5317	5463	5621	5766	5879	
AEO 2006													4545	4537	4366	4397	4415	4502	4577	4643	4688	4760	4830	4878	4989	
AEO 2007														4553	4295	4224	4229	4304	4348	4403	4513	4539	4569	4641	4711	
AEO 2008															4416	4,556	4,220	4,158	4,187	4,222	4,210	4,217	4,186	4,185	4,165	
AEO 2009																4,037	3,628	3,688	3,732	3,755	3,763	3,751	3,710	3,684	3,632	
AEO 2010																	3,659	3,659	3,783	3,839	3,766	3,729	3,708	3,703	3,670	
AEO 2011																		3,478	3,506	3,695	3,705	3,649	3,617	3,564	3,494	
AEO 2012																			3,136	3,215	3,109	3,093	3,020	2,862	2,790	
AEO 2013																				2,775	2,642	2,507	2,550	2,482	2,480	
AEO 2014																					2,324	1,973	1,919	1,782	1,804	
AEO 2015																						1,854	1,559	1,433	1,168	
AEO 2016																							1,692	1,698	1,773	
AEO 2017																								1,764	1,734	
AEO 2018																									1,535	
Actual	2780	2940	2878	3110	3343	3564	3618	3813	3979	3849	4102	4427	4580	4523	4393	4068	3528	3446	3084	2706	2277	1849	1697	1755	1362	
Average absolute difference	154	137	298	145	144	135	109	80	78	203	95	165	192	127	156	498	1010	1110	1471	1837	2188	2505	2564	2386	2661	

Table 7. Petroleum net imports, projected vs. actual (continued)

Projected vs. actual (percent difference)																										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	5.5	8.9	16.8	12.7	9.4	4.9	7.2	4.7	3.0	9.4	4.9	-0.7	-2.3	0.4	4.4	14.1	32.3	35.6								
AEO 1995		0.4	9.7	5.5	4.4	1.3	3.4	0.1	-1.5	3.9	0.0	-4.9	-6.0	-3.6	0.6	9.2	26.4	29.4								
AEO 1996			4.6	-0.1	-3.7	-4.6	-2.7	-3.5	-4.3	1.1	-3.0	-8.1	-9.1	-6.9	-3.0	5.4	22.0	25.4	40.2	60.7	90.8	133.6	153.5			
AEO 1997				-0.4	-2.9	-1.9	1.3	0.3	-0.1	6.1	2.2	-3.2	-4.4	-1.3	3.6	13.5	31.9	36.6	54.3	77.5	112.7	163.2	189.4			
AEO 1998					-1.2	-4.9	1.0	-2.6	-2.6	5.3	0.9	-2.9	-3.6	0.7	5.6	16.8	39.1	44.9	64.9	93.0	130.2	189.2	220.8	213.8	310.3	
AEO 1999						-5.2	-4.9	2.0	1.1	7.9	3.3	-2.1	-3.0	0.5	5.9	17.5	38.5	45.1	64.5	90.1	129.0	186.3	217.4	211.1	307.4	
AEO 2000							-0.5	0.9	1.5	8.8	5.3	0.9	0.0	3.7	8.8	20.0	40.8	46.7	65.8	91.9	131.7	190.6	221.7	214.3	309.7	
AEO 2001								-2.7	0.4	4.6	0.3	-3.1	-3.2	1.9	8.1	19.4	41.0	47.5	68.5	95.0	135.8	196.2	227.6	221.2	319.9	
AEO 2002									-3.2	3.7	2.2	-0.7	-0.4	2.9	8.1	20.5	43.6	51.2	73.8	102.1	142.5	200.8	229.1	220.7	318.1	
AEO 2003									-1.9	-1.2	-8.4	-8.4	-7.4	-1.3	11.5	35.1	45.8	69.5	100.3	146.5	212.7	248.3	243.9	352.2		
AEO 2004											-2.2	-6.0	-8.1	-4.2	0.1	11.1	31.5	39.5	61.7	91.5	135.5	199.0	233.7	231.9	339.2	
AEO 2005												-3.9	-5.1	-4.8	0.6	12.0	33.0	41.6	63.3	91.2	133.5	195.5	231.1	228.6	331.6	
AEO 2006													-0.8	0.3	-0.6	8.1	25.1	30.7	48.4	71.6	105.9	157.5	184.6	178.0	266.3	
AEO 2007														0.7	-2.2	3.9	19.9	24.9	41.0	62.7	98.2	145.5	169.2	164.5	245.8	
AEO 2008															0.5	12.0	19.6	20.7	35.8	56.0	85.4	128.1	146.6	138.5	205.8	
AEO 2009																-0.7	2.8	7.0	21.0	38.8	65.3	102.9	118.5	109.9	166.6	
AEO 2010																	3.7	6.2	22.7	41.9	65.4	101.7	118.4	111.0	169.4	
AEO 2011																		0.9	13.7	36.6	62.7	97.4	113.1	103.1	156.5	
AEO 2012																			1.7	18.8	36.6	67.3	77.9	63.1	104.8	
AEO 2013																				2.6	16.0	35.6	50.2	41.4	82.1	
AEO 2014																					2.1	6.7	13.0	1.5	32.4	
AEO 2015																						0.3	-8.2	-18.3	-14.2	
AEO 2016																							-0.3	-3.2	30.2	
AEO 2017																									0.5	27.3
AEO 2018																										12.7
Average absolute percent difference	5.5	4.7	10.4	4.7	4.3	3.8	3.0	2.1	2.0	5.3	2.3	3.7	4.2	2.8	3.6	12.2	28.6	32.2	47.7	67.9	96.1	135.5	151.1	135.9	195.4	

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.PATCPU.S.A. Shading indicates overestimation (blue) or underestimation (green).

Table 8a. Natural gas price, electric power sector, actual vs. projected

Projected price in constant dollars

(constant dollars per million Btu in dollar year specific to each AEO)

AEO \$ Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	1992	2.44	2.48	2.57	2.66	2.70	2.79	2.84	2.92	3.04	3.16	3.25	3.36	3.51	3.60	3.77	3.91	3.97	4.08							
AEO 1995	1993		2.39	2.48	2.42	2.45	2.45	2.53	2.59	2.78	2.91	3.10	3.24	3.38	3.47	3.53	3.61	3.68	3.73							
AEO 1996	1994			2.04	2.10	2.05	2.18	2.19	2.19	2.21	2.22	2.23	2.24	2.26	2.26	2.30	2.33	2.40	2.44	2.53	2.63	2.71	2.83	2.95		
AEO 1997	1995				2.42	2.18	2.18	2.19	2.19	2.19	2.22	2.25	2.27	2.28	2.29	2.31	2.33	2.34	2.32	2.34	2.36	2.37	2.42	2.47		
AEO 1998	1996					2.67	2.43	2.43	2.48	2.53	2.55	2.55	2.60	2.63	2.68	2.73	2.77	2.81	2.84	2.89	2.90	2.93	2.95	2.98	3.00	3.03
AEO 1999	1997						2.42	2.60	2.62	2.67	2.74	2.80	2.87	2.94	3.00	3.03	3.04	3.06	3.08	3.10	3.11	3.12	3.14	3.17	3.20	3.21
AEO 2000	1998							2.48	2.59	2.59	2.62	2.65	2.72	2.79	2.88	2.95	3.01	3.05	3.08	3.11	3.14	3.16	3.18	3.21	3.23	3.25
AEO 2001	1999								3.90	3.79	3.27	2.99	2.88	2.88	2.91	2.93	2.96	2.99	3.03	3.06	3.09	3.14	3.19	3.24	3.30	3.37
AEO 2002	2000									4.39	2.59	2.92	3.12	3.19	3.22	3.26	3.31	3.34	3.38	3.46	3.52	3.57	3.61	3.65	3.69	3.73
AEO 2003	2001										3.07	3.42	3.29	3.27	3.24	3.32	3.48	3.62	3.79	3.88	3.98	4.04	4.11	4.14	4.18	4.17
AEO 2004	2002											5.62	4.50	4.18	4.10	4.14	4.23	4.11	4.04	4.19	4.36	4.54	4.64	4.78	4.82	4.82
AEO 2005	2003												5.98	5.92	5.27	4.83	4.50	4.39	4.27	4.31	4.41	4.54	4.70	4.81	4.77	4.80
AEO 2006	2004													8.09	7.24	6.54	6.22	5.77	5.46	5.26	5.24	5.36	5.28	5.08	5.06	5.10
AEO 2007	2005														6.97	7.12	7.07	6.53	6.22	5.83	5.69	5.50	5.54	5.50	5.60	5.79
AEO 2008	2006															6.90	7.24	7.40	6.96	6.65	6.49	6.25	6.06	5.93	5.88	5.93
AEO 2009	2007																8.87	4.56	5.13	5.45	5.52	5.54	5.68	5.89	6.08	6.27
AEO 2010	2008																	4.14	4.85	5.82	6.17	5.94	5.90	6.08	6.16	6.17
AEO 2011	2009																		5.07	4.72	4.65	4.64	4.60	4.67	4.71	4.75
AEO 2012	2010																			4.66	4.35	4.42	4.39	4.55	4.49	4.48
AEO 2013	2011																				3.32	3.72	3.76	3.84	4.28	4.45
AEO 2014	2012																					4.32	4.47	4.43	4.47	4.69
AEO 2015	2013																						5.25	4.65	4.78	4.85
AEO 2016	2015																							3.35	3.57	4.00
AEO 2017	2016																								3.02	3.53
AEO 2018	2017																									3.47
Actual in nominal\$		2.54	2.22	1.97	2.62	2.71	2.32	2.55	4.27	4.48	3.59	5.41	5.96	8.24	6.92	7.12	9.02	4.81	5.15	4.78	3.45	4.37	5.03	3.27	2.88	3.39
Average absolute difference		0.04	0.29	0.48	0.22	0.25	0.23	0.19	1.26	1.18	0.56	1.84	2.03	3.49	2.21	2.02	3.17	0.87	0.78	0.74	1.49	1.02	1.16	2.02	2.42	2.11

Table 8a. Natural gas price, electric power sector, actual vs. projected (continued)

Projected vs. actual

(percent difference)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017			
AEO 1994	-1.6	17.0	39.5	10.4	10.3	34.2	26.4	-20.6	-19.5	6.1	-26.2	-28.7	-44.5	-30.1	-26.9	-39.0	17.0	13.6										
AEO 1995		10.2	31.5	-1.9	-2.3	15.1	10.0	-31.2	-28.1	-4.6	-31.2	-32.9	-47.8	-34.2	-33.2	-45.0	5.9	1.4										
AEO 1996			6.0	-16.8	-19.8	0.4	-6.9	-43.1	-44.1	-28.7	-51.7	-54.6	-65.8	-57.9	-57.4	-65.2	-32.5	-35.0	-25.9	8.5	-10.3	-17.1	34.8					
AEO 1997				-5.9	-16.5	-1.8	-8.8	-44.3	-45.8	-30.3	-52.1	-54.8	-66.1	-58.3	-58.0	-66.0	-35.4	-39.4	-32.8	-4.4	-22.9	-30.4	10.3					
AEO 1998					0.2	7.7	-0.4	-37.9	-38.3	-21.1	-46.6	-49.3	-61.8	-52.2	-51.3	-60.2	-23.7	-27.1	-18.8	15.4	-6.6	-16.7	30.8	51.2	32.0			
AEO 1999						5.3	4.9	-35.5	-35.9	-16.7	-42.5	-45.0	-57.9	-47.4	-46.9	-57.0	-18.5	-22.4	-14.2	21.3	-2.2	-12.8	36.7	58.4	37.6			
AEO 2000							-1.1	-36.9	-38.7	-21.4	-46.2	-48.4	-60.5	-49.9	-48.8	-58.0	-19.7	-23.3	-15.0	21.1	-1.9	-12.6	37.0	58.3	37.7			
AEO 2001								-6.5	-11.4	-3.1	-40.2	-46.2	-59.8	-50.1	-50.0	-59.2	-22.3	-25.7	-17.5	17.7	-4.0	-13.8	36.4	59.4	40.5			
AEO 2002									0.2	-25.1	-42.8	-42.9	-56.5	-46.0	-45.6	-55.5	-15.1	-18.9	-8.8	31.1	6.8	-4.6	50.3	73.9	52.1			
AEO 2003										-13.1	-34.6	-41.3	-56.4	-47.0	-45.9	-54.2	-10.2	-11.1	0.0	44.7	18.0	6.2	66.4	93.0	66.4			
AEO 2004											5.9	-20.8	-45.1	-33.9	-33.5	-45.2	0.5	-6.6	6.4	56.3	30.8	18.2	89.5	118.9	89.5			
AEO 2005												3.2	-23.8	-16.7	-23.8	-42.9	5.2	-3.2	7.2	55.0	28.1	17.3	86.7	112.6	84.8			
AEO 2006													1.3	11.4	0.4	-23.1	34.7	20.4	27.5	79.3	47.2	28.3	92.0	119.5	91.4			
AEO 2007														3.9	5.8	-15.4	47.5	32.9	36.8	88.5	46.3	30.4	101.5	135.1	110.2			
AEO 2008															-0.5	-15.9	62.3	44.3	51.5	108.5	61.3	38.3	110.8	139.7	109.1			
AEO 2009																												
AEO 2010																0.3	-2.7	3.5	21.0	72.7	39.3	26.4	103.9	141.4	115.2			
AEO 2011																	-13.4	-4.0	26.6	89.4	46.5	28.7	106.3	139.9	107.8			
AEO 2012																					-0.4	1.9	41.6	13.5	-0.5	57.3	82.1	58.8
AEO 2013																						-0.5	31.1	7.0	-6.2	51.4	71.4	47.8
AEO 2014																							-2.0	-12.0	-21.3	25.3	60.2	43.9
AEO 2015																							0.5	-8.1	41.8	64.3	49.0	
AEO 2016																								6.2	46.6	72.8	51.5	
AEO 2017																									2.6	25.4	21.6	
AEO 2018																										4.6	5.9	
Average absolute percent difference		1.6	13.6	25.6	8.7	9.8	10.7	8.4	32.0	29.1	17.0	38.2	39.0	49.8	38.5	35.2	43.9	21.6	18.5	18.4	43.8	21.3	17.2	58.0	84.1	59.8		

Sources: Projections: Annual Energy Outlook, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.NGEIU.A & TOTAL.NGTXXU.A. Shading indicates overestimation (blue) or underestimation (green). Bureau of Economic Analysis, U.S. Dept. of Commerce, June 2016. Shading indicates overestimation (blue)

Table 8b. Natural gas price, electric power sector, actual vs. projected

Projected price in nominal dollars
(nominal dollars per million Btu)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	2.49	2.60	2.76	2.93	3.05	3.24	3.39	3.60	3.86	4.15	4.40	4.70	5.08	5.39	5.85	6.27	6.59	7.01							
AEO 1995		2.44	2.61	2.61	2.70	2.78	2.95	3.11	3.44	3.72	4.10	4.43	4.78	5.07	5.33	5.64	5.95	6.23							
AEO 1996			2.08	2.19	2.20	2.39	2.47	2.54	2.64	2.74	2.84	2.95	3.09	3.21	3.37	3.54	3.76	3.96	4.26	4.57	4.87	5.27	5.70		
AEO 1997				2.48	2.29	2.34	2.41	2.47	2.54	2.65	2.77	2.89	3.00	3.10	3.24	3.37	3.51	3.60	3.76	3.92	4.07	4.32	4.55		
AEO 1998					2.72	2.54	2.60	2.72	2.85	2.95	3.03	3.16	3.29	3.45	3.62	3.79	3.96	4.13	4.33	4.50	4.69	4.90	5.11	5.33	5.58
AEO 1999						2.45	2.68	2.76	2.87	3.02	3.15	3.29	3.45	3.60	3.72	3.84	3.96	4.10	4.25	4.39	4.55	4.74	4.94	5.18	5.40
AEO 2000							2.52	2.67	2.71	2.79	2.88	3.02	3.16	3.34	3.50	3.64	3.77	3.89	4.01	4.13	4.25	4.38	4.53	4.68	4.85
AEO 2001								3.99	3.96	3.48	3.25	3.20	3.27	3.38	3.45	3.57	3.67	3.78	3.89	4.00	4.14	4.30	4.47	4.67	4.90
AEO 2002									4.49	2.70	3.13	3.44	3.61	3.74	3.88	4.04	4.18	4.32	4.53	4.74	4.94	5.13	5.33	5.52	5.75
AEO 2003										3.12	3.56	3.51	3.57	3.60	3.76	4.02	4.26	4.55	4.76	5.00	5.21	5.43	5.62	5.84	5.98
AEO 2004											5.71	4.64	4.39	4.39	4.53	4.74	4.71	4.75	5.06	5.41	5.80	6.11	6.50	6.75	6.97
AEO 2005												6.11	6.17	5.58	5.21	4.95	4.93	4.91	5.07	5.33	5.61	5.95	6.23	6.33	6.52
AEO 2006													8.29	7.58	6.96	6.76	6.40	6.18	6.10	6.23	6.53	6.60	6.51	6.65	6.88
AEO 2007														7.18	7.50	7.58	7.13	6.91	6.60	6.56	6.44	6.60	6.66	6.90	7.27
AEO 2008															7.08	7.56	7.52	7.31	7.26	7.11	7.02	7.00	7.07	7.27	7.52
AEO 2009																9.07	4.70	5.32	5.73	5.87	5.99	6.28	6.66	7.03	7.41
AEO 2010																	4.20	4.99	6.07	6.53	6.40	6.47	6.77	6.99	7.13
AEO 2011																		5.12	4.82	4.81	4.87	4.92	5.10	5.25	5.40
AEO 2012																			4.76	4.51	4.61	4.65	4.90	4.92	5.00
AEO 2013																				3.38	3.85	3.94	4.09	4.64	4.89
AEO 2014																					4.39	4.62	4.65	4.77	5.07
AEO 2015																						5.33	4.82	5.05	5.20
AEO 2016																							3.39	3.67	4.21
AEO 2017																								3.66	3.99
AEO 2018																								3.53	3.99
Actual in nominal\$	2.54	2.22	1.97	2.62	2.71	2.32	2.55	4.27	4.48	3.59	5.41	5.96	8.24	6.92	7.12	9.02	4.81	5.15	4.78	3.45	4.37	5.03	3.27	2.88	3.39
Average absolute difference	0.04	0.30	0.52	0.22	0.26	0.30	0.24	1.29	1.22	0.60	1.94	2.20	4.01	2.58	2.44	3.87	1.07	1.00	0.77	1.62	0.93	0.77	2.14	2.63	2.27

Table 8b. Natural gas price, electric power sector, actual vs. projected (continued)

Projected vs. actual
(percent difference)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	-1.7	17.2	40.3	11.7	12.6	39.4	33.1	-15.7	-13.8	15.5	-18.6	-21.0	-38.3	-22.0	-17.9	-30.5	37.0	36.0								
AEO 1995		10.3	32.7	-0.3	-0.1	19.5	15.7	-27.2	-23.2	3.7	-24.3	-25.6	-42.0	-26.6	-25.1	-37.4	23.6	20.9								
AEO 1996			6.0	-16.3	-18.8	3.0	-3.3	-40.5	-41.1	-23.7	-47.6	-50.4	-62.5	-53.7	-52.6	-60.8	-21.9	-23.1	-11.0	32.4	11.5	4.8	74.4			
AEO 1997				-5.4	-15.6	0.7	-5.5	-42.0	-43.3	-26.2	-48.8	-51.5	-63.6	-55.1	-54.5	-62.6	-27.1	-30.1	-21.5	13.5	-6.7	-14.2	39.4			
AEO 1998					0.6	9.4	2.1	-36.2	-36.4	-17.8	-44.0	-46.9	-60.1	-50.2	-49.2	-58.0	-17.6	-19.8	-9.5	30.4	7.5	-2.6	56.5	85.0	64.3	
AEO 1999						5.3	5.2	-35.4	-35.9	-16.0	-41.8	-44.7	-58.1	-48.0	-47.7	-57.4	-17.7	-20.3	-11.1	27.2	4.1	-5.7	51.4	79.6	59.1	
AEO 2000							-1.3	-37.5	-39.6	-22.3	-46.8	-49.4	-61.6	-51.7	-50.9	-59.6	-21.7	-24.6	-16.3	19.6	-2.7	-12.8	38.6	62.5	42.8	
AEO 2001								-6.5	-11.6	-3.0	-39.9	-46.3	-60.3	-51.2	-51.5	-60.5	-23.7	-26.7	-18.8	15.9	-5.2	-14.5	36.8	61.9	44.2	
AEO 2002									0.2	-24.8	-42.2	-42.3	-56.2	-45.9	-45.5	-55.2	-13.2	-16.0	-5.2	37.4	13.0	1.9	63.2	91.5	69.4	
AEO 2003											-13.2	-34.2	-41.0	-56.7	-47.9	-47.1	-55.4	-11.5	-11.7	-0.6	44.8	19.2	8.1	72.0	102.4	76.3
AEO 2004												5.4	-22.2	-46.8	-36.5	-36.4	-47.5	-2.0	-7.7	5.8	56.8	32.8	21.6	98.9	133.9	105.4
AEO 2005													2.6	-25.2	-19.3	-26.7	-45.1	2.5	-4.7	6.0	54.2	28.4	18.2	90.6	119.4	92.0
AEO 2006														0.7	9.5	-2.2	-25.0	33.1	20.0	27.5	80.4	49.5	31.2	99.3	130.5	102.8
AEO 2007															3.9	5.3	-15.9	48.2	34.2	37.8	89.9	47.5	31.3	104.1	139.3	114.1
AEO 2008																-0.5	-16.1	63.5	46.1	52.9	110.1	62.7	39.5	114.4	145.2	114.1
AEO 2009																	0.6	-2.2	3.3	19.7	69.9	37.3	24.9	103.8	143.8	118.4
AEO 2010																		-12.7	-3.1	27.0	89.1	46.5	28.6	107.4	142.4	110.1
AEO 2011																			-0.7	0.8	39.1	11.6	-2.2	56.1	81.9	59.1
AEO 2012																				-0.5	30.4	5.6	-7.6	50.1	70.7	47.2
AEO 2013																					-2.1	-11.9	-21.6	25.4	60.8	44.0
AEO 2014																						0.4	-8.2	42.3	65.4	49.4
AEO 2015																							6.0	47.5	75.0	53.3
AEO 2016																								3.7	27.4	23.9
AEO 2017																									6.1	7.8
AEO 2018																										3.9
Average absolute percent difference	1.7	13.8	26.3	8.4	9.5	12.9	9.4	30.1	27.2	16.6	35.8	37.0	48.6	37.3	34.2	43.0	22.3	19.4	16.0	46.8	21.3	15.3	65.5	91.2	66.7	

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.NGEIUS.A & TOTAL.NGTXKUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 9. Total natural gas consumption, projected vs. actual

Projected (trillion cubic feet)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	19.87	20.21	20.64	20.99	21.20	21.42	21.60	21.99	22.37	22.63	22.95	23.22	23.58	23.82	24.09	24.13	24.02	24.14							
AEO 1995		20.82	20.66	20.85	21.21	21.65	21.95	22.12	22.25	22.43	22.62	22.87	23.08	23.36	23.61	24.08	24.23	24.59							
AEO 1996			21.32	21.64	22.11	22.21	22.26	22.34	22.46	22.74	23.14	23.63	24.08	24.25	24.63	25.11	25.56	26.00	26.63	27.21	27.61	28.26	28.70		
AEO 1997				22.15	22.75	23.24	23.64	23.86	24.13	24.65	25.34	25.82	26.22	26.52	27.00	27.35	27.70	28.01	28.47	28.90	29.31	29.99	30.16		
AEO 1998					21.84	23.03	23.84	24.08	24.44	24.81	25.33	25.72	26.22	26.65	27.22	27.84	28.35	28.84	29.17	29.62	30.06	30.28	30.61	30.85	31.42
AEO 1999						21.35	22.36	22.54	23.18	23.65	24.17	24.57	25.19	25.77	26.41	26.92	27.42	28.02	28.50	29.12	29.53	30.23	30.81	31.21	31.61
AEO 2000							21.46	22.36	22.19	22.42	22.92	23.27	23.91	24.53	25.25	25.84	26.22	26.95	27.47	27.98	28.50	29.13	29.88	30.25	30.67
AEO 2001								22.00	22.67	23.55	24.37	24.96	25.24	25.70	26.01	26.59	27.24	28.05	28.61	29.33	30.04	30.78	31.61	32.34	33.00
AEO 2002									22.22	23.89	24.73	25.20	25.50	26.00	26.43	26.96	27.46	28.13	28.93	29.59	30.15	30.74	31.34	31.88	32.41
AEO 2003										23.20	24.00	24.48	24.60	24.98	25.21	25.98	26.52	27.06	27.68	28.32	28.71	29.15	29.50	29.96	30.33
AEO 2004											22.09	23.17	23.53	24.04	24.50	25.12	25.43	26.15	26.71	27.18	27.51	27.80	28.03	28.51	28.96
AEO 2005												22.14	22.32	22.64	23.07	23.95	24.64	25.44	26.23	26.83	27.28	27.70	27.96	28.44	29.05
AEO 2006													22.21	22.17	22.38	22.87	23.05	23.35	23.84	24.43	24.93	25.33	25.91	26.32	26.48
AEO 2007														21.72	22.68	23.40	23.77	24.02	24.18	24.57	24.80	25.09	25.32	25.53	25.60
AEO 2008															22.90	23.12	23.31	23.25	23.37	23.54	23.35	23.42	23.66	23.83	23.78
AEO 2009																23.04	22.55	21.89	21.45	21.11	21.10	21.00	21.04	21.10	21.18
AEO 2010																	22.59	21.99	21.82	21.32	21.32	21.22	21.18	21.86	22.07
AEO 2011																		23.83	23.86	23.91	24.44	24.72	25.11	25.10	25.20
AEO 2012																			24.52	25.20	24.35	24.89	25.39	25.39	25.37
AEO 2013																				25.63	25.30	25.00	25.30	26.23	26.07
AEO 2014																					25.65	25.20	25.51	26.33	26.31
AEO 2015																						27.12	26.56	27.04	26.39
AEO 2016																							27.47	27.78	28.10
AEO 2017																								27.68	27.85
AEO 2018																									26.68
Actual	20.79	21.25	22.21	22.61	22.74	22.25	22.41	23.33	22.24	23.03	22.28	22.40	22.01	21.70	23.10	23.28	22.91	24.09	24.48	25.54	26.16	26.70	27.47	27.49	27.09
Average absolute difference	0.92	0.73	1.33	1.20	0.92	0.69	0.72	0.99	0.65	0.75	1.54	1.73	2.27	2.74	1.84	1.97	2.47	2.11	2.46	2.39	2.49	2.59	2.53	2.51	2.64

Table 9. Total natural gas consumption, projected vs. actual (continued)

Projected vs. actual (percent difference)																										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	-4.4	-4.9	-7.1	-7.2	-6.8	-3.7	-3.6	-5.8	0.6	-1.7	3.0	3.6	7.1	9.8	4.3	3.7	4.8	0.2								
AEO 1995		-2.0	-7.0	-7.8	-6.7	-2.7	-2.0	-5.2	0.1	-2.6	1.5	2.1	4.8	7.7	2.2	3.4	5.8	2.1								
AEO 1996			-4.0	-4.3	-2.8	-0.2	-0.6	-4.3	1.0	-1.2	3.9	5.5	9.4	11.8	6.6	7.9	11.6	7.9	8.8	6.5	5.6	5.9	4.5			
AEO 1997				-2.0	0.1	4.5	5.5	2.3	8.5	7.0	13.8	15.3	19.1	22.2	16.9	17.5	20.9	16.3	16.3	13.2	12.1	12.3	9.8			
AEO 1998					-3.9	3.5	6.4	3.2	9.9	7.7	13.7	14.8	19.1	22.8	17.8	19.6	23.7	19.7	19.2	16.0	14.9	13.4	11.4	12.2	16.0	
AEO 1999						-4.0	-0.2	-3.4	4.2	2.7	8.5	9.7	14.4	18.7	14.3	15.6	19.7	16.3	16.4	14.0	12.9	13.2	12.1	13.6	16.7	
AEO 2000							-4.2	-4.2	-0.2	-2.6	2.9	3.9	8.6	13.1	9.3	11.0	14.4	11.9	12.2	9.5	9.0	9.1	8.7	10.0	13.2	
AEO 2001								-5.7	1.9	2.3	9.4	11.4	14.7	18.4	12.6	14.2	18.9	16.4	16.9	14.9	14.9	15.3	15.1	17.7	21.8	
AEO 2002									-0.1	3.7	11.0	12.5	15.8	19.8	14.4	15.8	19.9	16.8	18.2	15.9	15.3	15.1	14.1	16.0	19.6	
AEO 2003										0.8	7.7	9.3	11.8	15.1	9.1	11.6	15.7	12.3	13.1	10.9	9.8	9.2	7.4	9.0	11.9	
AEO 2004											-0.8	3.4	6.9	10.8	6.0	7.9	11.0	8.6	9.1	6.4	5.2	4.1	2.0	3.7	6.9	
AEO 2005												-1.2	1.4	4.3	-0.1	2.9	7.5	5.6	7.1	5.1	4.3	3.7	1.8	3.5	7.2	
AEO 2006													0.9	2.2	-3.1	-1.7	0.6	-3.0	-2.6	-4.4	-4.7	-5.1	-5.7	-4.3	-2.3	
AEO 2007														0.1	-1.8	0.5	3.7	-0.3	-1.2	-3.8	-5.2	-6.0	-7.8	-7.1	-5.5	
AEO 2008																-0.9	-0.7	1.8	-3.5	-4.5	-7.8	-10.7	-12.3	-13.3	-12.2	
AEO 2009																	-1.0	-1.6	-9.1	-12.4	-17.3	-19.3	-21.3	-23.4	-21.8	
AEO 2010																		-1.4	-6.5	-10.2	-14.6	-18.5	-20.2	-20.9	-18.5	
AEO 2011																			-1.1	-2.5	-6.4	-8.6	-7.4	-8.6	-7.0	
AEO 2012																				0.2	-1.3	-6.9	-6.8	-7.6	-6.4	
AEO 2013																					0.3	-3.3	-6.3	-7.9	-4.6	-3.8
AEO 2014																						-1.9	-5.6	-7.2	-4.2	-2.9
AEO 2015																							1.6	-3.3	-1.6	-2.6
AEO 2016																								0.0	1.1	3.7
AEO 2017																									0.7	2.8
AEO 2018																										-1.5
Average absolute percent difference	4.4	3.4	6.0	5.3	4.0	3.1	3.2	4.2	2.9	3.2	6.9	7.7	10.3	12.6	8.0	8.5	10.8	8.8	10.1	9.3	9.5	9.7	9.2	9.1	9.7	

Sources: Projections: Annual Energy Outlook, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opa/data/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.NGTC.PUSA. Shading indicates overestimation (blue) or underestimation (green).

Table 10. Natural gas production, projected vs. actual

Projected (trillion cubic feet)	Projected vs. actual																												
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017				
AEO 1994	17.71	17.68		18.12	18.25	18.43	18.58	18.93	19.28	19.51	19.80	19.92	20.13	20.18	20.38	20.35	20.16	20.19											
AEO 1995		18.28	17.84	17.92	18.21	18.63	18.92	19.08	19.20	19.36	19.52	19.75	19.94	20.17	20.28	20.60	20.59	20.88											
AEO 1996			18.90	19.15	19.52	19.59	19.59	19.65	19.73	19.97	20.36	20.82	21.25	21.37	21.68	22.11	22.47	22.83	23.36	23.81	24.11	24.65	24.97						
AEO 1997				19.10	19.70	20.17	20.32	20.54	20.77	21.26	21.90	22.31	22.66	22.93	23.38	23.68	23.99	24.25	24.65	25.03	25.37	25.99	26.10						
AEO 1998					18.85	19.06	20.35	20.27	20.60	20.94	21.44	21.81	22.25	22.65	23.18	23.75	24.23	24.70	24.97	25.34	25.70	25.85	26.12	26.30	26.82				
AEO 1999						18.80	19.13	19.28	19.82	20.23	20.77	21.05	21.57	21.98	22.47	22.85	23.26	23.77	24.15	24.69	25.02	25.64	26.11	26.44	26.77				
AEO 2000							18.36	18.89	18.47	18.50	18.88	19.15	19.70	20.27	20.90	21.42	21.74	22.46	22.92	23.35	23.82	24.38	25.03	25.31	25.66				
AEO 2001								18.61	18.89	19.67	20.28	20.65	20.81	21.11	21.34	21.81	22.36	23.14	23.60	24.19	24.81	25.47	26.24	26.89	27.49				
AEO 2002									19.28	19.54	20.20	20.52	20.73	21.25	21.70	22.29	22.80	23.48	24.21	24.75	25.26	25.78	26.32	26.81	27.27				
AEO 2003										19.37	19.99	20.15	20.14	20.43	20.51	21.09	21.46	21.88	22.39	22.91	23.22	23.57	23.83	23.89	23.93				
AEO 2004												19.57	19.51	19.58	19.66	19.95	20.21	20.25	20.50	20.80	21.11	21.30	21.43	21.62	21.58	21.99			
AEO 2005													18.91	19.27	19.24	19.49	19.90	20.44	20.42	20.91	21.17	21.07	21.16	20.77	20.85	21.63			
AEO 2006														18.14	18.16	18.00	18.38	18.47	18.58	18.92	19.13	19.59	19.71	20.36	21.04	21.30			
AEO 2007															18.57	19.12	19.41	19.41	19.35	19.22	19.45	19.30	19.66	19.60	19.61	19.74			
AEO 2008																19.00	19.18	19.28	19.29	19.26	19.40	19.41	19.39	19.52	19.64	19.62			
AEO 2009																	20.48	20.61	20.02	19.81	19.59	19.45	19.22	19.10	19.05	19.11			
AEO 2010																		20.60	20.01	19.46	19.28	18.90	18.91	19.29	19.30	19.42			
AEO 2011																			21.28	21.06	21.27	21.73	22.02	22.43	22.47	22.65			
AEO 2012																					22.95	23.66	22.76	23.14	23.65	24.00	24.23		
AEO 2013																						23.91	24.00	23.85	24.03	25.13	25.40		
AEO 2014																							24.19	24.28	24.63	25.68	26.38		
AEO 2015																									25.57	26.43	27.30	27.18	
AEO 2016																										27.24	27.44	28.19	
AEO 2017																											26.53	27.85	
AEO 2018																												27.10	
Actual	18.10	18.82	18.60	18.85	18.90	19.02	18.83	19.18	19.62	18.93	19.10	18.59	18.05	18.50	19.27	20.16	20.62	21.32	22.90	24.03	24.21	25.73	27.10	26.66	26.85				
Average absolute difference	0.39	0.84	0.56	0.55	0.56	0.49	0.70	0.53	0.60	0.99	1.19	1.79	2.42	2.12	1.72	1.41	1.36	1.59	1.88	2.12	2.17	2.79	3.62	3.08	2.96				

Table 10. Natural gas production, projected vs. actual (continued)

Projected vs. actual (percent difference)	Projected vs. actual																															
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017							
AEO 1994		-2.1	-6.1	-4.1	-3.9	-3.5	-3.1	-1.3	-1.3	-1.7	3.1	3.7	7.1	11.5	9.1	5.8	0.9	-2.2	-5.3													
AEO 1995			-2.9	-3.3	-5.0	-3.7	-2.1	0.5	-0.5	-2.1	2.3	2.2	6.2	10.5	9.0	5.3	2.2	-0.2	-2.0													
AEO 1996				1.6	1.6	3.3	3.0	4.0	2.4	0.6	5.5	6.6	12.0	17.7	15.5	12.5	9.7	9.0	7.1	2.0	-0.9	-0.4	-4.2	-7.8								
AEO 1997					1.3	4.2	6.0	7.9	7.1	5.9	12.3	14.7	20.0	25.5	23.9	21.4	17.5	16.3	13.8	7.6	4.1	4.8	1.0	-3.7								
AEO 1998						-0.3	0.2	8.1	5.7	5.0	10.7	12.3	17.3	23.3	22.4	20.3	17.8	17.5	15.9	9.0	5.4	6.2	0.5	-3.6	-1.4	-0.1						
AEO 1999							-1.2	1.6	0.5	1.0	6.9	8.7	13.2	19.5	18.8	16.6	13.4	12.8	11.5	5.5	2.7	3.4	-0.4	-3.6	-0.8	-0.3						
AEO 2000								-2.5	-1.5	-5.9	-2.2	-1.1	3.0	9.1	9.5	8.5	6.3	5.4	0.1	-2.8	-1.6	-5.3	-7.6	-5.1	-4.4							
AEO 2001									-3.0	-3.7	3.9	6.2	11.1	15.3	14.1	10.8	8.2	8.4	8.6	3.0	0.7	2.5	-1.0	-3.2	0.8	2.4						
AEO 2002										-1.7	3.2	5.7	10.4	14.8	14.9	12.6	10.6	10.6	10.2	5.7	3.0	4.4	0.2	-2.9	0.5	1.5						
AEO 2003											2.3	4.7	8.4	11.6	10.4	6.5	4.6	4.1	2.6	-2.2	-4.7	-4.1	-8.4	-12.1	-10.4	-10.9						
AEO 2004												2.4	4.9	8.5	6.3	3.6	0.3	-1.8	-3.8	-9.2	-12.1	-12.0	-16.7	-20.2	-19.1	-18.1						
AEO 2005												1.7	6.8	4.0	1.2	-1.3	-0.9	-4.2	-8.7	-11.9	-12.9	-17.8	-23.3	-21.8	-19.5							
AEO 2006													0.5	-1.9	-6.6	-8.8	-10.4	-12.8	-17.4	-20.4	-24.8	-24.8	-21.1	-20.7								
AEO 2007														0.4	-0.7	-3.7	-5.9	-9.2	-16.1	-19.1	-20.3	-23.6	-27.7	-26.5	-26.5							
AEO 2008															-1.4	-4.9	-6.5	-9.5	-15.9	-19.3	-19.8	-24.6	-28.0	-26.3	-26.9							
AEO 2009																1.6	-0.1	-6.1	-13.5	-18.5	-19.7	-25.3	-28.5	-28.6	-28.8							
AEO 2010																		-0.1	-6.1	-15.0	-19.8	-21.9	-26.5	-28.8	-27.6	-27.7						
AEO 2011																			-0.2	-8.1	-11.5	-10.2	-14.4	-17.2	-15.7	-15.7						
AEO 2012																				0.2	-1.6	-6.0	-10.1	-12.7	-10.0	-9.8						
AEO 2013																					-0.5	-0.8	-7.3	-11.3	-5.7	-5.4						
AEO 2014																						-0.1	-5.6	-9.1	-3.7	-1.8						
AEO 2015																							-0.6	-2.5	2.4	1.2						
AEO 2016																								0.5	2.9	5.0						
AEO 2017																										-0.5	3.7					
AEO 2018																																
difference	2.1	4.5	3.0	2.9	3.0	2.6	3.7	2.8	3.1	5.2	6.2	9.6	13.4	11.4	8.9	7.0	6.6	7.5	8.2	8.8	8.9	10.8	13.3	11.5	11.0							

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTALNGRPUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 11. Natural gas net imports, projected vs. actual

Projected vs. actual (trillion cubic feet)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AE0 1994	2.02	2.40	2.66	2.74	2.81	2.85	2.89	2.93	2.95	2.97	3.00	3.16	3.31	3.50	3.57	3.63	3.74	3.85							
AE0 1995		2.46	2.54	2.80	2.87	2.87	2.89	2.90	2.90	2.92	2.95	2.97	3.00	3.03	3.19	3.35	3.51	3.60							
AE0 1996			2.56	2.75	2.85	2.88	2.93	2.98	3.02	3.06	3.07	3.09	3.12	3.17	3.23	3.29	3.37	3.46	3.56	3.68	3.79	3.90	4.02		
AE0 1997				2.82	2.96	3.16	3.43	3.46	3.50	3.53	3.58	3.64	3.69	3.74	3.78	3.83	3.87	3.92	3.97	4.04	4.11	4.17	4.23		
AE0 1998					2.95	3.19	3.53	3.84	3.87	3.89	3.94	3.98	4.02	4.06	4.11	4.16	4.22	4.28	4.34	4.42	4.51	4.58	4.64	4.71	4.76
AE0 1999						2.92	3.16	3.29	3.41	3.44	3.47	3.59	3.68	3.85	4.00	4.12	4.21	4.35	4.45	4.52	4.61	4.69	4.78	4.86	4.93
AE0 2000							3.42	3.65	3.85	4.00	4.10	4.14	4.19	4.24	4.32	4.38	4.45	4.52	4.57	4.64	4.70	4.77	4.85	4.94	5.01
AE0 2001								3.51	3.76	3.88	4.07	4.33	4.48	4.65	4.74	4.86	4.97	5.06	5.16	5.26	5.36	5.43	5.50	5.57	5.62
AE0 2002									3.68	3.74	4.04	4.31	4.50	4.58	4.68	4.72	4.80	4.89	4.97	5.06	5.13	5.20	5.26	5.31	5.36
AE0 2003										3.17	3.32	3.67	3.86	3.98	4.17	4.41	4.62	4.78	4.88	5.01	5.08	5.19	5.27	5.66	5.99
AE0 2004											3.51	3.60	3.87	4.28	4.43	4.78	5.04	5.50	5.76	5.90	6.05	6.20	6.24	6.76	6.79
AE0 2005												3.28	3.37	3.64	3.75	4.13	4.20	4.94	5.16	5.50	6.05	6.38	7.02	7.43	7.26
AE0 2006													3.39	3.65	4.00	4.09	4.16	4.35	4.49	4.86	4.90	5.17	5.10	4.83	4.74
AE0 2007														3.29	3.43	3.87	4.24	4.55	4.84	5.00	5.38	5.31	5.62	5.80	5.73
AE0 2008															3.80	3.85	3.95	3.85	4.01	4.02	3.83	3.92	4.03	4.08	4.04
AE0 2009																3.03	2.73	2.34	1.99	1.76	1.79	1.80	1.86	1.96	1.98
AE0 2010																	2.76	2.82	2.78	2.62	2.36	2.32	2.38	2.48	2.57
AE0 2011																		2.74	2.75	2.64	2.72	2.71	2.69	2.63	2.55
AE0 2012																			1.90	1.64	1.59	1.74	1.73	1.37	1.12
AE0 2013																				1.72	1.69	1.45	1.42	1.25	0.83
AE0 2014																					1.34	1.35	1.08	0.76	0.03
AE0 2015																						1.14	0.80	0.35	-0.46
AE0 2016																							0.95	0.40	0.04
AE0 2017																								0.94	0.29
AE0 2018																									-0.09
Actual	2.21	2.46	2.69	2.78	2.84	2.99	3.42	3.54	3.60	3.50	3.26	3.40	3.61	3.46	3.79	3.02	2.68	2.60	1.96	1.52	1.31	1.18	0.93	0.67	-0.13
Average absolute difference	0.19	0.03	0.10	0.03	0.06	0.14	0.28	0.32	0.33	0.35	0.43	0.43	0.40	0.50	0.40	1.01	1.37	1.52	2.14	2.50	2.63	2.69	2.86	2.99	3.45

Table 11. Natural gas net imports, projected vs. actual (continued)

Projected vs. actual (percent difference)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AE0 1994	-8.6	-2.5	-1.0	-1.6	-1.0	-4.8	-15.5	-17.2	-18.1	-15.1	-8.1	-7.2	-8.4	1.1	-5.7	20.2	39.6	47.9							
AE0 1995		-0.1	-5.5	0.6	1.2	-4.1	-15.5	-18.0	-19.5	-16.6	-9.6	-12.8	-17.0	-12.5	-15.7	10.9	31.0	38.3							
AE0 1996			-4.7	-1.2	0.5	-3.8	-14.4	-15.8	-16.2	-12.6	-5.9	-9.2	-13.6	-8.4	-14.7	8.9	25.8	32.9	81.4	142.3	189.1	230.2	330.0		
AE0 1997				1.3	4.3	5.6	0.2	-2.2	-2.9	0.9	9.7	6.9	2.1	8.0	-0.1	26.8	44.5	50.5	102.2	166.0	213.5	253.0	352.5		
AE0 1998					4.0	6.6	3.2	8.6	7.4	11.3	20.6	16.8	11.3	17.3	8.5	37.9	57.6	64.3	121.1	190.9	243.7	287.4	396.8	601.7	-3888.3
AE0 1999						-2.4	-7.5	-6.9	-5.3	-1.7	6.4	5.4	1.9	11.1	5.7	36.3	57.0	67.2	126.7	197.7	251.6	296.8	411.5	624.1	-4018.6
AE0 2000							-0.1	3.0	6.7	14.4	25.5	21.6	16.0	22.5	14.0	45.1	66.0	73.4	132.9	205.3	258.5	303.7	419.1	636.0	-4082.7
AE0 2001								-0.6	4.4	10.8	24.6	27.3	23.9	34.3	25.2	60.8	85.4	94.3	162.6	246.4	308.8	359.6	488.3	730.1	-4572.9
AE0 2002									2.2	7.0	23.7	26.7	24.6	32.3	23.6	56.2	79.3	87.8	153.3	233.2	291.4	340.1	462.3	691.2	-4362.7
AE0 2003											1.6	7.9	6.8	15.1	10.3	46.0	72.4	83.8	148.7	229.6	287.9	339.1	463.3	743.8	-4864.3
AE0 2004											7.5	5.8	7.1	23.5	17.0	58.3	88.1	111.1	193.2	288.3	361.1	425.1	567.0	908.0	-5505.0
AE0 2005												-3.7	-6.7	5.2	-1.0	36.7	56.8	89.7	163.0	261.9	361.6	439.9	650.8	1006.7	-5873.0
AE0 2006													-6.0	5.3	5.6	35.4	55.3	66.9	128.7	219.8	273.7	338.0	445.8	620.2	-3867.1
AE0 2007														-5.0	-9.4	28.3	58.2	74.7	146.4	229.3	310.6	349.5	501.2	764.1	-4657.7
AE0 2008															0.5	27.3	47.3	47.7	104.0	164.9	192.1	231.7	331.2	508.6	-3318.0
AE0 2009																0.3	2.1	-10.2	1.5	16.0	36.2	52.0	98.5	191.6	-1674.7
AE0 2010																	3.0	8.3	41.4	72.6	79.7	96.1	154.2	269.6	-2147.7
AE0 2011																		5.3	40.2	74.0	107.1	129.2	187.6	291.6	-2127.6
AE0 2012																			-3.3	7.8	21.1	47.6	84.9	103.8	-992.9
AE0 2013																				13.1	29.0	22.5	52.0	86.4	-758.0
AE0 2014																					2.2	13.9	16.0	12.6	-123.9
AE0 2015																						-3.7	-14.7	-47.6	268.0
AE0 2016																							2.1	-41.1	-130.7
AE0 2017																								39.9	-334.0
AE0 2018																									-27.7
Average absolute percent difference	8.6	1.3	3.7	1.2	2.2	4.5	8.1	9.0	9.2	10.0	13.0	12.6	11.2	14.4	10.5	33.5	51.1	58.6	108.9	164.4	201.0	228.0	306.2	445.9	2742.6

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opa/data/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTALNGNIPUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 12a. Coal prices to electric generating plants, projected vs. actual

Projected price in constant Dollars

(constant dollars per million Btu in dollar year specific to each AEO)

AEO \$ Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	1992	1.47	1.48	1.53	1.57	1.58	1.57	1.61	1.63	1.68	1.69	1.70	1.72	1.70	1.76	1.79	1.81	1.88	1.92						
AEO 1995	1993		1.39	1.39	1.38	1.40	1.40	1.39	1.39	1.42	1.41	1.43	1.44	1.45	1.46	1.46	1.47	1.50							
AEO 1996	1994			1.32	1.29	1.28	1.27	1.26	1.25	1.27	1.27	1.27	1.27	1.28	1.27	1.28	1.27	1.28	1.26	1.28	1.29	1.30	1.28	1.28	
AEO 1997	1995				1.33	1.32	1.31	1.31	1.29	1.30	1.29	1.26	1.24	1.24	1.25	1.24	1.22	1.21	1.20	1.17	1.16	1.14	1.12	1.11	
AEO 1998	1996					1.25	1.23	1.22	1.20	1.19	1.17	1.16	1.15	1.14	1.12	1.11	1.10	1.10	1.09	1.07	1.06	1.05	1.04	1.03	1.01
AEO 1999	1997						1.23	1.21	1.19	1.18	1.17	1.16	1.15	1.14	1.12	1.11	1.09	1.07	1.06	1.04	1.03	1.01	1.00	0.99	0.98
AEO 2000	1998							1.26	1.24	1.19	1.16	1.14	1.12	1.11	1.10	1.10	1.09	1.06	1.07	1.06	1.05	1.04	1.04	1.03	1.01
AEO 2001	1999								1.20	1.19	1.18	1.16	1.15	1.13	1.12	1.10	1.08	1.06	1.05	1.04	1.04	1.03	1.02	1.01	1.01
AEO 2002	2000									1.20	1.16	1.15	1.15	1.13	1.10	1.09	1.07	1.06	1.05	1.05	1.04	1.03	1.02	1.01	1.01
AEO 2003	2001										1.22	1.22	1.22	1.22	1.21	1.20	1.19	1.18	1.17	1.17	1.16	1.16	1.15	1.15	1.14
AEO 2004	2002											1.24	1.23	1.23	1.22	1.23	1.23	1.23	1.22	1.22	1.22	1.22	1.22	1.21	1.21
AEO 2005	2003												1.28	1.29	1.29	1.28	1.28	1.27	1.25	1.24	1.24	1.24	1.23	1.23	1.23
AEO 2006	2004													1.50	1.53	1.51	1.50	1.47	1.48	1.45	1.44	1.43	1.41	1.40	1.39
AEO 2007	2005														1.67	1.69	1.70	1.70	1.71	1.67	1.64	1.62	1.61	1.60	1.59
AEO 2008	2006															1.73	1.77	1.82	1.84	1.81	1.78	1.76	1.75	1.74	1.72
AEO 2009	2007																1.93	1.98	1.86	1.87	1.86	1.88	1.90	1.91	1.92
AEO 2010	2008																	2.15	1.99	1.98	1.99	1.99	2.01	1.99	2.00
AEO 2011	2009																		2.26	2.22	2.16	2.12	2.10	2.11	2.13
AEO 2012	2010																			2.34	2.38	2.37	2.38	2.35	2.34
AEO 2013	2011																				2.41	2.34	2.40	2.40	2.46
AEO 2014	2012																					2.37	2.33	2.40	2.42
AEO 2015	2013																						2.35	2.34	2.33
AEO 2016	2015																							2.19	2.10
AEO 2017	2016																								2.14
AEO 2018	2017																								2.15
Actual in nominal\$		1.39	1.36	1.32	1.29	1.27	1.25	1.22	1.20	1.23	1.25	1.28	1.36	1.54	1.69	1.77	2.07	2.21	2.27	2.39	2.38	2.34	2.37	2.22	2.11
Average absolute difference		0.12	0.12	0.15	0.17	0.16	0.16	0.18	0.19	0.17	0.15	0.14	0.14	0.18	0.23	0.24	0.40	0.47	0.48	0.55	0.63	0.56	0.65	0.65	0.62

Table 12a. Coal prices to electric generating plants, projected vs. actual (continued)

Projected vs. actual

(percent difference)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	8.7	14.2	23.9	32.4	37.2	40.1	50.2	57.6	61.8	62.9	63.2	59.7	43.9	39.9	39.5	23.0	20.5	21.3							
AEO 1995		4.8	9.9	13.6	18.7	22.0	26.7	31.3	33.6	32.8	34.1	30.6	19.9	13.4	11.1	-3.1	-7.9	-7.4							
AEO 1996			2.2	4.2	6.3	8.3	12.5	16.3	15.3	16.7	16.8	12.8	3.6	-3.3	-4.8	-17.5	-21.5	-23.7	-24.8	-22.4	-19.8	-20.1	-14.1		
AEO 1997				4.8	7.1	9.3	14.5	17.2	17.3	16.1	13.1	8.2	-2.0	-6.6	-9.4	-22.3	-27.3	-29.2	-33.0	-31.9	-30.7	-31.6	-26.7		
AEO 1998					-0.1	1.0	4.7	6.7	5.3	4.1	2.4	-2.1	-11.5	-17.9	-20.3	-31.1	-35.2	-36.9	-39.5	-39.0	-37.7	-37.9	-33.7	-30.3	-28.8
AEO 1999						-0.7	2.3	4.5	3.3	2.2	0.9	-3.6	-12.9	-19.4	-21.8	-33.1	-37.7	-39.3	-42.2	-41.7	-40.6	-41.0	-37.2	-33.9	-32.6
AEO 2000							5.2	7.2	2.2	0.2	-2.4	-6.7	-15.9	-21.5	-23.5	-33.7	-38.9	-39.4	-41.7	-40.9	-39.5	-39.7	-35.3	-31.8	-30.2
AEO 2001								2.0	0.6	0.2	-1.6	-6.0	-15.3	-21.6	-24.6	-35.4	-40.0	-41.3	-43.7	-42.8	-41.2	-41.4	-37.2	-33.4	-31.6
AEO 2002									-0.7	-3.8	-4.8	-8.0	-17.8	-24.6	-26.9	-37.1	-41.3	-42.7	-44.5	-43.8	-42.5	-42.6	-38.7	-35.1	-33.7
AEO 2003										-1.2	-4.9	-12.6	-18.8	-21.3	-32.0	-36.4	-37.7	-39.8	-38.8	-36.9	-36.8	-32.1	-27.9	-26.0	
AEO 2004											-1.2	-4.9	-13.4	-19.0	-21.0	-30.8	-34.7	-35.8	-37.8	-36.4	-34.2	-34.3	-29.1	-24.7	-22.4
AEO 2005												-3.0	-11.2	-16.4	-18.8	-29.4	-33.9	-35.7	-38.0	-36.9	-34.9	-34.6	-29.5	-25.0	-22.4
AEO 2006													0.2	-3.8	-6.6	-19.4	-25.3	-25.9	-29.6	-28.6	-26.7	-27.2	-21.9	-17.2	-15.0
AEO 2007														1.9	1.1	-11.2	-16.4	-17.3	-21.7	-21.3	-19.5	-19.5	-13.8	-8.6	-5.8
AEO 2008															0.5	-10.6	-13.3	-13.6	-17.3	-17.0	-15.2	-15.4	-9.2	-3.9	-0.8
AEO 2009																-4.9	-7.8	-14.7	-16.8	-15.6	-11.7	-10.2	-2.9	4.0	7.9
AEO 2010																	-1.9	-10.5	-13.7	-11.5	-8.2	-7.7	0.3	6.0	9.7
AEO 2011																		0.9	-3.8	-4.5	-2.9	-3.8	4.6	12.3	16.4
AEO 2012																			0.1	4.0	6.9	8.1	14.9	21.9	27.6
AEO 2013																				2.9	3.4	6.5	14.9	25.6	30.5
AEO 2014																					3.1	1.7	13.2	21.6	28.9
AEO 2015																						1.0	8.6	15.0	20.0
AEO 2016																							-1.5	0.8	3.4
AEO 2017																								1.3	6.8
AEO 2018																									3.2
Average absolute percent difference		8.7	9.5	12.0	13.8	13.9	13.6	16.6	17.9	15.6	14.0	12.9	12.6	13.9	16.3	16.8	23.4	25.9	26.3	28.7	26.7	24.0	23.1	20.0	19.0

Sources: Projections: Annual Energy Outlook , Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opa/data/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.CLERDUS.A Bureau of Economic Analysis, U.S. Dept. of Commerce, June 2016. Shading indicates overestimation (blue) or underestimation (green).

Table 12b. Coal prices to electric generating plants, projected vs. actual

Projected price in nominal dollars
(nominal dollars per million Btu)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	1.50	1.55	1.64	1.73	1.78	1.82	1.92	2.01	2.13	2.22	2.30	2.41	2.46	2.64	2.78	2.90	3.12	3.30							
AEO 1995		1.42	1.46	1.49	1.55	1.59	1.62	1.67	1.76	1.80	1.89	1.97	2.05	2.13	2.21	2.28	2.38	2.50							
AEO 1996			1.35	1.35	1.37	1.39	1.42	1.46	1.50	1.56	1.62	1.67	1.75	1.80	1.87	1.92	2.01	2.05	2.16	2.25	2.33	2.39	2.47		
AEO 1997				1.36	1.38	1.40	1.44	1.46	1.51	1.54	1.55	1.58	1.62	1.70	1.74	1.77	1.81	1.85	1.87	1.93	1.96	2.00	2.06		
AEO 1998					1.28	1.28	1.30	1.32	1.34	1.36	1.37	1.39	1.42	1.45	1.47	1.51	1.55	1.58	1.61	1.64	1.68	1.72	1.76	1.80	1.84
AEO 1999						1.24	1.25	1.25	1.27	1.29	1.31	1.32	1.33	1.35	1.36	1.37	1.39	1.42	1.43	1.46	1.48	1.51	1.54	1.58	1.62
AEO 2000							1.28	1.27	1.24	1.24	1.24	1.25	1.26	1.28	1.30	1.32	1.32	1.35	1.37	1.39	1.41	1.42	1.45	1.48	1.51
AEO 2001								1.22	1.24	1.25	1.26	1.29	1.30	1.30	1.30	1.30	1.31	1.33	1.34	1.36	1.38	1.40	1.43	1.46	1.49
AEO 2002									1.22	1.21	1.23	1.27	1.27	1.28	1.29	1.31	1.33	1.35	1.38	1.40	1.42	1.45	1.48	1.51	1.54
AEO 2003										1.23	1.27	1.30	1.34	1.35	1.36	1.37	1.39	1.40	1.43	1.46	1.49	1.52	1.56	1.60	1.63
AEO 2004											1.26	1.27	1.29	1.31	1.34	1.37	1.41	1.44	1.48	1.52	1.56	1.60	1.65	1.70	1.75
AEO 2005												1.31	1.34	1.37	1.38	1.41	1.42	1.44	1.46	1.49	1.53	1.56	1.60	1.63	1.68
AEO 2006													1.53	1.60	1.61	1.63	1.63	1.68	1.68	1.71	1.74	1.77	1.80	1.83	1.87
AEO 2007														1.72	1.78	1.83	1.86	1.89	1.89	1.89	1.90	1.92	1.94	1.96	1.99
AEO 2008															1.78	1.85	1.93	1.99	1.99	1.99	2.00	2.02	2.05	2.07	2.11
AEO 2009																1.97	2.05	1.93	1.97	1.97	2.04	2.10	2.15	2.22	2.28
AEO 2010																	2.18	2.05	2.07	2.10	2.15	2.19	2.24	2.26	2.31
AEO 2011																		2.28	2.27	2.23	2.23	2.24	2.31	2.37	2.43
AEO 2012																			2.39	2.46	2.47	2.52	2.53	2.56	2.64
AEO 2013																				2.45	2.42	2.51	2.55	2.66	2.72
AEO 2014																					2.41	2.41	2.52	2.58	2.69
AEO 2015																						2.39	2.43	2.46	2.53
AEO 2016																							2.21	2.16	2.19
AEO 2017																								2.17	2.26
AEO 2018																								2.18	2.18
Actual in nominal\$	1.39	1.36	1.32	1.29	1.27	1.25	1.22	1.20	1.23	1.25	1.28	1.36	1.54	1.69	1.77	2.07	2.21	2.27	2.39	2.38	2.34	2.37	2.22	2.11	2.08
Average absolute difference	0.12	0.13	0.17	0.19	0.20	0.21	0.25	0.26	0.24	0.23	0.23	0.23	0.27	0.32	0.34	0.51	0.57	0.59	0.64	0.58	0.50	0.48	0.38	0.35	0.35

Table 12b. Coal prices to electric generating plants, projected vs. actual (continued)

Projected vs. actual
(percent difference)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	8.5	14.4	24.6	34.0	40.1	45.5	58.2	67.3	73.3	77.4	80.0	77.0	59.8	56.0	56.8	40.2	41.2	45.3							
AEO 1995		4.9	11.0	15.5	21.4	26.7	33.2	39.1	42.7	44.3	47.7	44.8	33.0	26.3	24.6	10.2	7.5	10.3							
AEO 1996			2.1	4.8	7.5	11.2	16.9	21.6	21.5	24.9	26.6	23.1	13.6	6.6	5.7	-7.0	-9.2	-9.7	-9.8	-5.3	-0.3	1.0	11.2		
AEO 1997				5.4	8.4	12.1	18.6	21.9	22.7	22.9	21.0	16.2	5.2	0.6	-1.8	-14.6	-18.0	-18.4	-21.7	-19.1	-16.1	-15.7	-7.4		
AEO 1998					0.2	2.6	7.2	9.6	8.5	8.5	7.4	2.6	-7.6	-14.5	-16.7	-27.3	-30.1	-30.5	-32.6	-31.0	-28.3	-27.5	-20.7	-14.7	-11.4
AEO 1999						-0.7	2.6	4.6	3.4	3.2	2.1	-3.1	-13.3	-20.3	-22.9	-33.7	-37.1	-37.7	-40.1	-38.8	-36.7	-36.3	-30.4	-25.0	-22.0
AEO 2000							5.0	6.2	0.7	-0.9	-3.5	-8.4	-18.2	-24.4	-26.6	-36.3	-40.4	-40.4	-42.5	-41.7	-39.9	-39.9	-34.6	-30.1	-27.6
AEO 2001								2.0	0.4	0.4	-1.2	-6.2	-16.3	-23.3	-26.8	-37.3	-41.2	-42.1	-44.5	-43.6	-41.9	-41.9	-37.0	-32.3	-29.8
AEO 2002									-0.8	-3.5	-3.7	-6.9	-17.3	-24.4	-26.8	-36.7	-40.0	-40.7	-42.4	-41.2	-39.2	-38.7	-33.4	-28.5	-26.2
AEO 2003										-1.3	-0.6	-4.5	-13.2	-20.2	-23.1	-33.7	-37.3	-38.1	-40.1	-38.7	-36.3	-35.7	-29.8	-24.4	-21.6
AEO 2004											-1.7	-6.6	-16.0	-22.2	-24.5	-33.7	-36.4	-36.6	-38.2	-36.2	-33.2	-32.4	-25.6	-19.6	-15.9
AEO 2005												-3.6	-12.8	-19.0	-21.9	-32.1	-35.6	-36.6	-38.7	-37.2	-34.8	-34.1	-28.0	-22.6	-19.3
AEO 2006													-0.4	-5.4	-9.0	-21.4	-26.2	-26.2	-29.7	-28.1	-25.6	-25.5	-19.0	-13.1	-9.9
AEO 2007														1.9	0.7	-11.7	-16.0	-16.5	-21.1	-20.8	-18.9	-18.9	-12.7	-7.0	-4.1
AEO 2008															0.4	-10.8	-12.7	-12.5	-16.5	-16.4	-14.5	-14.6	-7.7	-1.8	1.6
AEO 2009																-4.7	-7.4	-14.9	-17.7	-17.0	-13.0	-11.2	-2.9	5.0	9.5
AEO 2010																	-1.2	-9.6	-13.5	-11.6	-8.2	-7.8	0.8	7.1	10.9
AEO 2011																		0.5	-4.8	-6.1	-4.6	-5.4	3.8	12.2	16.7
AEO 2012																			0.1	3.5	5.5	6.5	13.9	21.4	27.0
AEO 2013																				2.9	3.4	6.1	15.0	26.1	30.6
AEO 2014																					3.0	1.6	13.6	22.3	29.2
AEO 2015																						0.8	9.3	16.4	21.5
AEO 2016																							-0.5	2.5	5.4
AEO 2017																								2.8	8.7
AEO 2018																									5.0
Average absolute percent difference	8.5	9.6	12.6	14.9	15.5	16.5	20.2	21.5	19.3	18.7	17.8	16.9	17.5	18.9	19.2	24.5	25.7	25.9	26.7	24.4	21.2	20.1	17.0	15.2	15.4

Sources: Projections: Annual Energy Outlook, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTALCLERDUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 13. Total coal consumption, projected vs. actual

Projected (million short tons)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	920	928	933	938	943	948	953	958	962	967	978	990	987	992	1006	1035	1061	1079							
AEO 1995		935	940	941	947	948	951	954	958	963	971	984	992	996	1002	1013	1025	1039							
AEO 1996			937	942	954	962	983	990	1004	1017	1027	1033	1046	1067	1070	1071	1074	1082	1087	1094	1103	1113	1120		
AEO 1997				948	970	987	1003	1017	1020	1025	1034	1041	1054	1075	1086	1092	1092	1099	1104	1114	1122	1139	1156		
AEO 1998					1009	1051	1044	1058	1087	1084	1090	1097	1112	1130	1142	1148	1160	1162	1180	1184	1188	1203	1215	1221	1225
AEO 1999						1040	1075	1092	1109	1113	1118	1120	1120	1133	1139	1150	1155	1156	1173	1177	1191	1198	1211	1222	1237
AEO 2000							1053	1086	1103	1124	1142	1164	1175	1184	1189	1194	1199	1195	1200	1206	1213	1219	1232	1237	1249
AEO 2001								1078	1112	1135	1153	1165	1183	1191	1220	1228	1228	1235	1240	1244	1251	1254	1261	1269	1279
AEO 2002									1088	1092	1126	1147	1176	1199	1227	1235	1243	1251	1256	1265	1275	1282	1294	1307	1322
AEO 2003										1040	1059	1082	1106	1138	1172	1185	1200	1218	1231	1239	1250	1261	1282	1297	1316
AEO 2004											1100	1098	1126	1156	1183	1193	1216	1229	1240	1254	1266	1277	1291	1311	1327
AEO 2005												1102	1137	1159	1189	1210	1224	1229	1237	1248	1255	1264	1273	1284	1298
AEO 2006													1144	1150	1172	1196	1224	1233	1245	1264	1268	1272	1276	1290	1308
AEO 2007														1135	1147	1152	1169	1195	1222	1233	1245	1272	1282	1299	1315
AEO 2008															1127	1126	1135	1145	1181	1199	1203	1214	1225	1240	1262
AEO 2009																1109	1077	1117	1152	1178	1192	1205	1202	1214	1223
AEO 2010																	1015	1035	1094	1122	1137	1163	1141	1153	1155
AEO 2011																		1055	1026	1024	1017	1007	1013	1025	1031
AEO 2012																			1039	984	961	938	914	927	936
AEO 2013																				905	934	945	937	880	907
AEO 2014																					942	965	964	917	938
AEO 2015																						933	921	906	924
AEO 2016																							801	801	810
AEO 2017																								716	730
AEO 2018																									728
Actual	944	951	962	1006	1030	1037	1039	1084	1060	1066	1095	1107	1126	1112	1128	1121	997	1049	1003	889	924	917	802	731	717
Average absolute difference	24	20	25	64	65	53	46	57	55	54	52	50	50	55	57	61	150	107	168	274	234	239	342	396	403

Table 13. Total coal consumption, projected vs. actual (continued)

Projected vs. actual (percent difference)																										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	-2.6	-2.4	-3.0	-6.8	-8.4	-8.6	-8.2	-11.6	-9.3	-9.3	-10.7	-10.6	-12.3	-10.8	-10.8	-7.6	6.4	2.9								
AEO 1995		-1.7	-2.3	-6.5	-8.0	-8.6	-8.4	-12.0	-9.6	-9.7	-11.3	-11.1	-11.9	-10.5	-11.2	-9.6	2.8	-0.9								
AEO 1996			-2.6	-6.4	-7.3	-7.2	-5.4	-8.7	-5.3	-4.6	-6.2	-6.7	-7.1	-4.1	-5.1	-4.4	7.7	3.2	8.4	23.0	19.3	21.4	39.7			
AEO 1997				-5.8	-5.8	-4.8	-3.4	-6.2	-3.8	-3.9	-5.6	-6.0	-6.4	-3.4	-3.7	-2.5	9.5	4.8	10.1	25.3	21.4	24.2	44.2			
AEO 1998					-2.0	1.3	0.5	-2.4	2.5	1.7	-0.5	-0.9	-1.3	1.6	1.3	2.5	16.3	10.8	17.7	33.2	28.5	31.2	51.6	67.0	70.9	
AEO 1999						0.3	3.5	0.8	4.6	4.4	2.2	1.1	-0.5	1.9	1.0	2.6	15.8	10.3	17.0	32.4	28.8	30.7	51.1	67.2	72.6	
AEO 2000							1.4	0.2	4.1	5.4	4.3	5.2	4.4	6.5	5.4	6.5	20.2	14.0	19.7	35.6	31.3	33.0	53.7	69.2	74.2	
AEO 2001								-0.6	4.9	6.4	5.3	5.2	5.0	7.1	8.2	9.6	23.2	17.7	23.6	39.9	35.3	36.8	57.3	73.5	78.4	
AEO 2002									2.6	2.4	2.8	3.6	4.4	7.8	8.7	10.2	24.6	19.3	25.2	42.3	37.9	39.9	61.4	78.8	84.4	
AEO 2003											-2.5	-3.2	-2.2	-1.8	2.3	3.9	5.8	20.3	16.2	22.7	39.4	35.3	37.6	60.0	77.4	83.5
AEO 2004											0.4	-0.9	0.0	3.9	4.9	6.5	21.9	17.2	23.7	41.0	36.9	39.3	61.1	79.3	85.1	
AEO 2005												-0.5	0.9	4.2	5.4	8.0	22.7	17.2	23.3	40.3	35.7	37.8	58.8	75.6	81.0	
AEO 2006													1.6	3.4	3.9	6.7	22.8	17.6	24.1	42.1	37.2	38.7	59.1	76.4	82.5	
AEO 2007														2.0	1.7	2.8	17.2	13.9	21.8	38.7	34.7	38.8	60.0	77.6	83.4	
AEO 2008															-0.1	0.5	13.8	9.2	17.8	34.8	30.1	32.4	52.9	69.6	76.0	
AEO 2009																-1.0	7.9	6.5	14.9	32.5	28.9	31.4	49.9	66.1	70.6	
AEO 2010																	1.8	-1.3	9.1	26.2	23.0	26.8	42.3	57.8	61.1	
AEO 2011																		0.6	2.3	15.2	10.0	9.8	26.4	40.2	43.9	
AEO 2012																				3.6	10.7	4.0	2.3	14.1	26.8	30.5
AEO 2013																					1.8	1.0	3.1	16.9	20.4	26.4
AEO 2014																						1.9	5.3	20.3	25.4	30.8
AEO 2015																							1.7	14.9	23.9	28.8
AEO 2016																							-0.1	9.6	12.9	
AEO 2017																								-2.0	1.9	
AEO 2018																									1.5	
Average absolute percent difference	2.6	2.1	2.6	6.4	6.3	5.1	4.4	5.3	5.2	5.0	4.8	4.5	4.4	4.9	5.0	5.4	15.0	10.2	16.8	30.8	25.3	26.1	42.7	49.3	51.3	

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.CLTCPU.S.A. Shading indicates overestimation (blue) or underestimation (green).

Table 14. Coal production, projected vs. actual

Projected (million short tons)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	991	1013	1032	1042	1048	1057	1064	1072	1077	1089	1097	1111	1108	1114	1129	1159	1187	1209							
AEO 1995		998	1001	1002	1008	1008	1012	1018	1023	1031	1041	1055	1063	1069	1076	1094	1108	1123							
AEO 1996			1028	1035	1033	1036	1052	1061	1076	1091	1102	1110	1122	1142	1147	1153	1159	1170	1177	1192	1206	1221	1231		
AEO 1997				1019	1044	1063	1079	1096	1100	1106	1113	1122	1133	1157	1168	1176	1179	1187	1196	1212	1222	1241	1259		
AEO 1998					1080	1113	1119	1136	1166	1167	1173	1180	1194	1215	1225	1234	1247	1252	1271	1279	1286	1302	1317	1324	1329
AEO 1999						1116	1145	1159	1177	1184	1188	1188	1187	1199	1206	1218	1222	1222	1239	1248	1259	1273	1285	1297	1312
AEO 2000							1111	1127	1143	1165	1180	1201	1208	1216	1222	1228	1232	1228	1238	1245	1248	1259	1265	1277	
AEO 2001								1102	1126	1172	1188	1198	1213	1219	1247	1255	1254	1259	1264	1271	1278	1283	1285	1294	1304
AEO 2002									1158	1132	1152	1172	1198	1220	1248	1257	1265	1271	1279	1289	1296	1304	1316	1329	1344
AEO 2003										1076	1089	1091	1111	1141	1174	1186	1200	1217	1226	1235	1248	1258	1276	1289	1308
AEO 2004											1090	1110	1128	1154	1178	1185	1206	1217	1226	1238	1251	1262	1275	1295	1310
AEO 2005												1114	1165	1164	1193	1211	1223	1225	1228	1238	1245	1252	1260	1270	1283
AEO 2006													1132	1151	1190	1209	1239	1247	1253	1266	1267	1265	1263	1272	1285
AEO 2007														1134	1129	1130	1145	1175	1201	1214	1228	1251	1257	1263	1269
AEO 2008															1141	1138	1139	1152	1186	1200	1199	1202	1206	1221	1226
AEO 2009																1144	1096	1131	1169	1194	1207	1216	1203	1204	1204
AEO 2010																	1068	1049	1107	1138	1149	1170	1146	1157	1158
AEO 2011																		1087	1050	1045	1036	1022	1031	1042	1050
AEO 2012																			1080	1037	1026	1009	984	994	995
AEO 2013																				1021	1024	1037	1043	989	1017
AEO 2014																					1012	1037	1053	1013	1035
AEO 2015																						987	986	978	999
AEO 2016																							873	848	853
AEO 2017																								740	763
AEO 2018																									784
Actual	945	1034	1033	1064	1090	1118	1100	1074	1128	1094	1072	1112	1131	1163	1147	1172	1075	1084	1096	1016	985	1000	896	728	774
Average absolute difference	45	28	12	39	47	52	38	40	41	45	62	40	39	36	46	41	112	110	111	181	209	193	288	426	375

Table 14. Coal production, projected vs. actual (continued)

Projected vs. actual (percent difference)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	4.8	-2.0	-0.1	-2.0	-3.9	-5.4	-3.3	-0.2	-4.5	-0.5	2.4	-0.1	-2.1	-4.2	-1.5	-1.1	10.5	11.5							
AEO 1995		-3.5	-3.1	-5.8	-7.5	-9.8	-8.0	-5.2	-9.3	-5.8	-2.9	-5.2	-6.1	-8.1	-6.2	-6.7	3.1	3.6							
AEO 1996			-0.4	-2.7	-5.2	-7.3	-4.4	-1.2	-4.6	-0.3	2.8	-0.2	-0.9	-1.8	0.0	-1.6	7.9	7.9	7.4	17.3	22.4	22.1	37.4		
AEO 1997				-4.2	-4.2	-4.9	-1.9	2.1	-2.5	1.1	3.8	0.9	0.1	-0.5	1.9	0.3	9.7	9.5	9.1	19.2	24.0	24.1	40.5		
AEO 1998					-0.9	-0.4	1.7	5.8	3.4	6.7	9.4	6.1	5.5	4.5	6.8	5.3	16.0	15.4	16.0	25.8	30.6	30.2	47.0	81.8	71.7
AEO 1999						-0.1	4.0	8.0	4.3	8.2	10.9	6.8	4.9	3.1	5.2	3.9	13.7	12.7	13.1	22.8	27.8	27.3	43.4	78.1	69.5
AEO 2000							1.0	5.0	1.4	6.5	10.1	8.0	6.7	4.6	6.5	4.8	14.6	13.3	12.5	21.8	26.4	24.8	40.6	73.7	65.0
AEO 2001								2.6	-0.2	7.1	10.9	7.7	7.2	4.9	8.8	7.1	16.7	16.1	15.4	25.0	29.8	28.2	43.4	77.6	68.4
AEO 2002									2.7	3.5	7.5	5.4	5.9	4.9	8.9	7.3	17.7	17.2	16.7	26.8	31.6	30.4	46.8	82.4	73.7
AEO 2003										-1.7	1.6	-1.9	-1.8	-1.9	2.4	1.2	11.7	12.2	11.9	21.5	26.8	25.8	42.5	77.0	69.0
AEO 2004											1.7	-0.2	-0.3	-0.8	2.8	1.2	12.2	12.2	11.9	21.8	27.0	26.2	42.3	77.8	69.2
AEO 2005												0.2	3.0	0.1	4.0	3.3	13.8	12.9	12.1	21.8	26.4	25.2	40.7	74.4	65.7
AEO 2006													0.0	-1.0	3.8	3.1	15.2	15.0	14.3	24.5	28.7	26.5	41.0	74.7	66.0
AEO 2007														-2.5	-1.5	-3.5	6.5	8.4	9.6	19.5	24.7	25.1	40.3	73.3	64.0
AEO 2008															-0.5	-2.9	6.0	6.2	8.2	18.1	21.8	20.2	34.6	67.6	58.4
AEO 2009																-2.3	1.9	4.3	6.7	17.5	22.6	21.6	34.3	65.1	55.6
AEO 2010																	-0.6	-3.3	1.0	11.9	16.7	17.0	27.9	58.9	49.6
AEO 2011																		0.2	-4.2	2.8	5.2	2.2	15.0	43.0	35.6
AEO 2012																			-1.4	2.0	4.2	0.9	9.8	36.5	28.6
AEO 2013																				0.5	4.0	3.7	16.4	35.7	31.4
AEO 2014																					2.8	3.7	17.5	39.0	33.7
AEO 2015																						-1.3	10.0	34.3	29.1
AEO 2016																							-2.6	16.5	10.2
AEO 2017																								1.6	-1.5
AEO 2018																									1.3
Average absolute percent difference	4.8	2.7	1.2	3.7	4.4	4.6	3.5	3.7	3.6	4.1	5.8	3.6	3.4	3.1	4.0	3.5	10.5	10.1	10.1	17.8	21.2	19.3	32.1	58.5	48.4

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.CLPRPUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 15a. Average electricity prices, projected vs. actual

Projected price in constant dollars

(constant dollars, cents per kilowatt-hour in dollar year specific to each AEO)

AEO \$ Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
AEO 1994	1992	6.80	6.80	6.90	6.90	6.90	6.90	7.00	7.00	7.10	7.10	7.20	7.20	7.30	7.30	7.40	7.50	7.60									
AEO 1995	1993		6.80	6.80	6.70	6.70	6.70	6.70	6.80	6.80	6.90	6.90	6.90	7.00	7.00	7.10	7.10	7.20									
AEO 1996	1994			7.09	6.99	6.94	6.93	6.96	6.96	6.97	6.98	6.97	6.98	6.95	6.95	6.94	6.96	6.95	6.91	6.87	6.84	6.89	6.99				
AEO 1997	1995				6.94	6.89	6.90	6.91	6.86	6.84	6.78	6.73	6.66	6.60	6.58	6.54	6.49	6.48	6.45	6.36	6.27	6.19	6.19	6.26			
AEO 1998	1996					6.80	6.60	6.57	6.46	6.36	6.29	6.26	6.18	6.12	6.05	6.01	5.97	5.94	5.91	5.81	5.71	5.69	5.65	5.58	5.55	5.52	
AEO 1999	1997						6.70	6.67	6.58	6.48	6.38	6.41	6.41	6.35	6.32	6.26	6.20	6.17	6.14	6.05	5.96	5.91	5.88	5.84	5.80	5.76	
AEO 2000	1998							6.60	6.57	6.45	6.31	6.25	6.19	6.09	6.09	6.07	6.03	5.95	5.97	5.90	5.86	5.85	5.87	5.88	5.86	5.86	
AEO 2001	1999								6.80	6.75	6.53	6.44	6.38	6.19	6.12	5.99	5.91	5.87	5.87	5.84	5.82	5.83	5.88	5.90	5.93	5.96	
AEO 2002	2000									7.06	6.71	6.52	6.50	6.43	6.35	6.32	6.32	6.32	6.34	6.37	6.33	6.34	6.32	6.32	6.36	6.39	
AEO 2003	2001										6.90	6.62	6.56	6.50	6.37	6.33	6.32	6.38	6.36	6.39	6.38	6.42	6.45	6.46	6.52	6.51	
AEO 2004	2002											7.13	6.96	6.84	6.73	6.63	6.63	6.67	6.64	6.64	6.71	6.76	6.82	6.86	6.84		
AEO 2005	2003												7.41	7.39	7.12	6.81	6.65	6.64	6.61	6.60	6.68	6.77	6.89	6.94	6.96	6.99	
AEO 2006	2004													8.34	8.21	7.82	7.56	7.42	7.31	7.19	7.14	7.21	7.19	7.12	7.13	7.14	
AEO 2007	2005														8.32	8.30	8.29	8.20	8.07	7.88	7.78	7.73	7.69	7.69	7.74	7.83	
AEO 2008	2006															8.90	9.06	9.35	9.18	8.93	8.82	8.67	8.56	8.53	8.54	8.58	
AEO 2009	2007																	9.49	9.11	8.28	8.56	8.55	8.56	8.65	8.68	8.91	
AEO 2010	2008																		9.58	9.14	8.60	8.90	8.93	8.86	8.86	8.94	8.99
AEO 2011	2009																			9.57	9.03	9.01	8.94	8.89	8.89	8.84	8.84
AEO 2012	2010																				9.73	9.59	9.63	9.60	9.68	9.70	9.65
AEO 2013	2011																					9.41	9.19	9.24	9.18	9.33	9.41
AEO 2014	2012																						9.79	9.80	9.91	9.93	9.99
AEO 2015	2013																							10.46	10.45	10.66	10.70
AEO 2016	2015																								10.27	10.16	10.10
AEO 2017	2016																									10.28	10.35
AEO 2018	2017																										10.55
Actual in Nominal\$		6.93	6.91	6.89	6.86	6.85	6.74	6.64	6.81	7.29	7.20	7.44	7.61	8.14	8.90	9.13	9.74	9.82	9.83	9.90	9.84	10.07	10.45	10.42	10.27	10.54	
Average absolute difference		0.03	0.11	0.32	0.35	0.37	0.43	0.55	0.44	0.40	0.44	0.50	0.48	0.63	0.85	0.87	1.11	1.09	1.08	1.09	1.40	1.44	2.02	2.32	2.26	2.18	

Table 15a. Average electricity prices, projected vs. actual (continued)

Projected vs. actual

(percent difference)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	0.4	2.9	6.9	9.3	11.4	14.4	19.6	19.3	15.6	18.8	18.9	19.5	15.3	10.2	10.3	6.9	8.2	10.9								
AEO 1995		0.5	2.9	3.7	5.6	8.5	11.8	11.5	8.1	11.2	11.3	11.8	7.9	3.2	3.3	0.1	0.1	2.6								
AEO 1996			5.0	5.9	7.1	9.9	13.7	13.4	8.4	11.6	10.3	10.7	6.9	0.3	0.4	-4.1	-3.9	-3.0	-2.2	-0.5	-1.6	-2.8	0.0			
AEO 1997				3.0	4.2	7.2	10.7	9.5	4.3	6.3	4.2	3.5	-1.0	-6.9	-7.5	-12.2	-12.3	-11.9	-11.9	-11.1	-12.8	-14.5	-12.3			
AEO 1998					1.0	0.7	3.3	1.3	-4.7	-3.1	-4.8	-5.6	-9.8	-16.0	-16.4	-20.7	-21.2	-20.7	-21.0	-20.3	-21.2	-23.3	-23.2	-21.4	-22.5	
AEO 1999						0.5	3.1	1.4	-4.5	-3.5	-4.3	-3.8	-8.0	-13.7	-14.4	-19.0	-19.4	-18.9	-19.1	-18.3	-19.6	-21.4	-21.0	-19.3	-20.5	
AEO 2000							0.9	0.1	-6.0	-5.5	-7.6	-8.0	-12.7	-17.7	-17.9	-22.1	-23.2	-22.0	-21.9	-20.5	-21.2	-22.5	-21.2	-19.3	-20.0	
AEO 2001								2.1	-3.2	-3.7	-6.3	-6.6	-12.6	-18.5	-20.3	-24.8	-25.3	-24.5	-23.8	-22.3	-22.7	-23.5	-22.2	-19.6	-19.9	
AEO 2002									-1.0	-3.2	-7.2	-7.0	-11.3	-17.4	-17.7	-21.3	-21.4	-20.3	-18.9	-17.3	-17.8	-19.6	-18.5	-15.7	-16.0	
AEO 2003										-2.8	-7.8	-8.3	-12.3	-18.9	-19.4	-23.1	-22.4	-21.8	-20.4	-18.5	-18.6	-19.8	-18.5	-15.5	-16.3	
AEO 2004											-2.2	-4.2	-9.1	-15.7	-16.9	-20.6	-20.1	-19.6	-18.6	-15.6	-16.2	-17.2	-15.3	-12.4	-13.4	
AEO 2005												0.1	-3.7	-12.6	-16.3	-21.8	-22.0	-21.6	-20.6	-17.7	-17.2	-17.3	-15.5	-13.0	-13.2	
AEO 2006													5.8	-1.8	-6.5	-13.6	-15.2	-15.5	-15.9	-14.3	-14.1	-16.0	-15.6	-13.3	-13.8	
AEO 2007														-3.6	-3.8	-8.2	-9.3	-9.6	-10.6	-9.6	-10.8	-12.9	-11.7	-8.7	-8.4	
AEO 2008															0.1	-2.6	0.4	-0.3	-1.7	-0.5	-3.0	-6.0	-5.0	-2.2	-2.6	
AEO 2009																-0.7	-4.7	-12.4	-8.2	-6.1	-6.6	-7.5	-5.8	-2.0	-1.5	
AEO 2010																	-1.7	-5.2	-9.6	-4.1	-4.5	-7.0	-5.8	-2.3	-2.5	
AEO 2011																		-1.5	-5.8	-3.7	-5.1	-7.4	-6.2	-4.1	-4.8	
AEO 2012																				0.3	1.3	1.0	-1.3	1.0	3.9	2.5
AEO 2013																					-2.6	-5.5	-6.9	-6.2	-2.0	-2.0
AEO 2014																						-1.2	-3.0	-0.5	2.4	2.2
AEO 2015																							1.9	3.2	8.2	7.7
AEO 2016																								-1.4	0.2	-1.2
AEO 2017																									0.1	-0.1
AEO 2018																										0.1
Average absolute percent difference		0.4	1.7	4.9	5.5	5.9	6.9	9.0	7.3	6.2	7.0	7.7	7.4	9.0	11.2	11.4	13.9	13.6	13.5	13.6	11.3	11.6	12.6	11.0	9.3	9.1

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opa/data/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL. ESTCUSA Bureau of Economic Analysis, U.S. Dept. of Commerce, June 2016. Shading indicates overestimation (blue) or underestimation (green).

Table 15b. Average electricity prices, projected vs. actual

Projected price in nominal dollars

(nominal dollars, cents per kilowatt-hour)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	6.95	7.12	7.41	7.59	7.79	8.01	8.36	8.62	9.02	9.32	9.76	10.08	10.42	10.94	11.32	11.87	12.45	13.05							
AEO 1995		6.95	7.16	7.23	7.40	7.59	7.81	8.04	8.42	8.70	9.12	9.43	9.75	10.24	10.57	11.10	11.47	12.02							
AEO 1996			7.23	7.30	7.42	7.60	7.84	8.07	8.33	8.60	8.90	9.19	9.54	9.84	10.18	10.52	10.92	11.29	11.62	11.95	12.32	12.84	13.49		
AEO 1997				7.11	7.22	7.41	7.61	7.76	7.95	8.11	8.30	8.46	8.65	8.92	9.16	9.40	9.71	9.98	10.19	10.40	10.63	11.01	11.55		
AEO 1998					6.94	6.89	7.03	7.08	7.16	7.27	7.42	7.53	7.66	7.79	7.97	8.16	8.36	8.58	8.71	8.86	9.12	9.37	9.58	9.87	10.16
AEO 1999						6.77	6.87	6.91	6.97	7.02	7.21	7.36	7.46	7.59	7.70	7.83	7.99	8.18	8.30	8.44	8.63	8.88	9.11	9.39	9.69
AEO 2000							6.68	6.76	6.75	6.73	6.79	6.87	6.91	7.06	7.19	7.30	7.35	7.54	7.61	7.72	7.87	8.08	8.30	8.50	8.74
AEO 2001								6.95	7.05	6.94	7.00	7.09	7.03	7.09	7.07	7.11	7.19	7.32	7.42	7.53	7.69	7.92	8.13	8.38	8.67
AEO 2002									7.21	6.99	6.99	7.15	7.26	7.36	7.52	7.71	7.89	8.11	8.34	8.52	8.76	8.98	9.22	9.54	9.86
AEO 2003										6.99	6.90	7.01	7.10	7.10	7.18	7.30	7.51	7.64	7.84	8.02	8.27	8.53	8.78	9.10	9.34
AEO 2004											7.24	7.16	7.18	7.21	7.25	7.42	7.65	7.81	8.01	8.33	8.57	8.91	9.26	9.61	9.89
AEO 2005												7.57	7.70	7.54	7.35	7.32	7.46	7.59	7.77	8.06	8.36	8.71	8.99	9.22	9.50
AEO 2006													8.55	8.59	8.32	8.21	8.23	8.28	8.33	8.48	8.79	8.98	9.12	9.36	9.63
AEO 2007														8.57	8.74	8.89	8.95	8.97	8.91	8.96	9.06	9.17	9.32	9.54	9.83
AEO 2008															9.13	9.46	9.93	9.92	9.82	9.86	9.86	9.92	10.06	10.27	10.51
AEO 2009																9.69	9.40	8.60	8.99	9.09	9.27	9.55	9.81	10.16	10.53
AEO 2010																	9.72	9.41	8.97	9.43	9.62	9.71	9.87	10.14	10.39
AEO 2011																		9.65	9.23	9.31	9.40	9.52	9.70	9.84	10.05
AEO 2012																			9.93	9.92	10.03	10.16	10.43	10.63	10.76
AEO 2013																				9.58	9.52	9.70	9.78	10.10	10.34
AEO 2014																					9.94	10.13	10.41	10.58	10.80
AEO 2015																						10.63	10.82	11.25	11.49
AEO 2016																							10.38	10.46	10.61
AEO 2017																								10.43	10.72
AEO 2018																									10.74
Actual in nominal\$	6.93	6.91	6.89	6.86	6.85	6.74	6.64	6.81	7.29	7.20	7.44	7.61	8.14	8.90	9.13	9.74	9.82	9.83	9.90	9.84	10.07	10.45	10.42	10.27	10.54
Average absolute difference	0.02	0.13	0.38	0.45	0.51	0.64	0.82	0.73	0.65	0.73	0.80	0.82	1.00	1.24	1.31	1.57	1.51	1.51	1.32	1.12	1.12	1.23	1.04	0.65	0.61

Table 15b. Average electricity prices, projected vs. actual (continued)

Projected vs. actual

(percent difference)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	0.3	3.1	7.5	10.7	13.7	18.8	25.9	26.6	23.8	29.4	31.1	32.4	28.1	22.9	24.0	21.8	26.8	32.8							
AEO 1995		0.6	3.9	5.4	8.0	12.6	17.6	18.1	15.5	20.8	22.6	24.0	19.8	15.0	15.8	13.9	16.8	22.3							
AEO 1996			5.0	6.4	8.4	12.8	18.1	18.4	14.2	19.5	19.6	20.8	17.2	10.6	11.5	8.1	11.2	14.8	17.4	21.4	22.3	22.9	29.4		
AEO 1997				3.6	5.4	9.9	14.7	13.9	9.1	12.6	11.5	11.2	6.3	0.2	0.3	-3.5	-1.1	1.6	3.0	5.7	5.5	5.4	10.9		
AEO 1998					1.3	2.3	5.9	4.0	-1.8	0.9	-0.2	-1.1	-5.9	-12.5	-12.7	-16.3	-14.9	-12.7	-12.0	-9.9	-9.4	-10.3	-8.1	-3.9	-3.6
AEO 1999						0.5	3.4	1.4	-4.4	-2.6	-3.2	-3.2	-8.4	-14.7	-15.6	-19.6	-18.6	-16.8	-16.2	-14.3	-14.3	-15.1	-12.6	-8.5	-8.1
AEO 2000							0.7	-0.8	-7.3	-6.5	-8.7	-9.7	-15.2	-20.7	-21.3	-25.1	-25.1	-23.3	-23.1	-21.5	-21.8	-22.7	-20.3	-17.2	-17.1
AEO 2001								2.1	-3.3	-3.5	-5.9	-6.8	-13.6	-20.3	-22.6	-27.0	-26.7	-25.5	-25.0	-23.5	-23.6	-24.2	-21.9	-18.4	-17.7
AEO 2002									-1.0	-2.9	-6.1	-6.0	-10.9	-17.3	-17.6	-20.8	-19.6	-17.5	-15.7	-13.4	-13.0	-14.1	-11.5	-7.1	-6.4
AEO 2003										-2.9	-7.2	-7.9	-12.8	-20.3	-21.3	-25.1	-23.5	-22.3	-20.8	-18.5	-17.9	-18.4	-15.7	-11.4	-11.3
AEO 2004											-2.7	-5.9	-11.8	-19.0	-20.6	-23.9	-22.1	-20.6	-19.1	-15.3	-14.9	-14.8	-11.1	-6.4	-6.2
AEO 2005												-0.5	-5.5	-15.3	-19.5	-24.8	-24.0	-22.8	-21.5	-18.1	-17.0	-16.6	-13.7	-10.2	-9.9
AEO 2006													5.1	-3.5	-8.9	-15.8	-16.2	-15.8	-15.9	-13.8	-12.7	-14.1	-12.4	-8.9	-8.7
AEO 2007														-3.7	-4.3	-8.7	-8.8	-8.7	-10.0	-8.9	-10.0	-12.3	-10.6	-7.1	-6.7
AEO 2008															0.0	-2.8	1.1	0.9	-0.8	0.2	-2.1	-5.1	-3.4	0.0	-0.3
AEO 2009																-0.5	-4.3	-12.6	-9.2	-7.7	-8.0	-8.6	-5.8	-1.1	-0.1
AEO 2010																	-1.0	-4.3	-9.4	-4.2	-4.5	-7.1	-5.3	-1.2	-1.4
AEO 2011																		-1.8	-6.8	-5.4	-6.7	-8.9	-6.9	-4.2	-4.7
AEO 2012																			0.3	0.8	-0.4	-2.8	0.1	3.5	2.1
AEO 2013																				-2.7	-5.5	-7.2	-6.1	-1.6	-1.9
AEO 2014																					-1.3	-3.0	-0.1	3.0	2.5
AEO 2015																						1.7	3.9	9.5	9.0
AEO 2016																							-0.4	1.8	0.7
AEO 2017																								1.5	1.7
AEO 2018																									1.9
Average absolute percent difference	0.3	1.8	5.5	6.5	7.4	9.5	12.3	10.7	8.9	10.2	10.8	10.8	12.3	14.0	14.4	16.1	15.4	15.4	13.3	11.4	11.1	11.8	10.0	6.3	5.8

Sources: Projections: Annual Energy Outlook, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL. ESTCU.S.A. Shading indicates overestimation (blue) or underestimation (green).

Table 16. Total electricity sales, projected vs. actual

Projected (billion kilowatt-hours)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	2843	2891	2928	2962	3004	3039	3071	3112	3148	3185	3228	3263	3298	3332	3371	3406	3433	3469							
AEO 1995		2951	2967	2983	3026	3058	3085	3108	3134	3166	3204	3248	3285	3321	3357	3396	3433	3475							
AEO 1996			2973	2998	3039	3074	3106	3137	3173	3215	3262	3317	3363	3409	3454	3505	3553	3604	3660	3722	3775	3833	3889		
AEO 1997				3075	3115	3168	3229	3290	3328	3379	3437	3497	3545	3596	3649	3697	3736	3784	3838	3899	3948	4003	4044		
AEO 1998					3106	3204	3255	3318	3388	3438	3488	3546	3601	3658	3716	3775	3825	3877	3939	3996	4035	4075	4115	4158	4195
AEO 1999						3205	3262	3333	3402	3454	3492	3534	3585	3639	3691	3745	3793	3843	3900	3958	4005	4059	4113	4163	4208
AEO 2000							3288	3360	3402	3461	3523	3585	3647	3699	3753	3812	3861	3909	3958	4012	4059	4109	4155	4196	4230
AEO 2001								3364	3440	3530	3608	3681	3761	3838	3918	3998	4068	4147	4212	4286	4352	4417	4484	4552	4610
AEO 2002									3443	3502	3619	3711	3793	3869	3948	4022	4090	4170	4252	4332	4404	4481	4556	4630	4696
AEO 2003										3414	3527	3617	3684	3762	3848	3940	4014	4101	4183	4266	4336	4411	4481	4551	4619
AEO 2004											3495	3582	3669	3750	3830	3909	3977	4055	4133	4212	4285	4357	4429	4502	4576
AEO 2005												3547	3649	3722	3813	3912	3997	4070	4145	4220	4285	4360	4430	4501	4577
AEO 2006													3675	3700	3767	3847	3911	3978	4047	4116	4173	4234	4300	4370	4433
AEO 2007														3694	3757	3836	3891	3953	4014	4082	4138	4194	4251	4312	4358
AEO 2008															3744	3773	3807	3869	3927	3978	3979	4016	4059	4108	4146
AEO 2009																3725	3658	3737	3796	3847	3869	3894	3921	3957	3998
AEO 2010																	3589	3617	3728	3800	3809	3836	3870	3908	3944
AEO 2011																		3749	3692	3734	3770	3777	3811	3843	3872
AEO 2012																			3763	3729	3710	3735	3753	3773	3799
AEO 2013																				3712	3665	3704	3757	3797	3846
AEO 2014																					3686	3702	3772	3828	3888
AEO 2015																						3739	3750	3796	3831
AEO 2016																							3729	3740	3766
AEO 2017																								3727	3719
AEO 2018																									3681
Actual	2861	2935	3013	3101	3146	3264	3312	3421	3394	3465	3494	3547	3661	3670	3765	3734	3597	3755	3750	3695	3725	3724	3725	3762	3682
Average absolute difference	18	30	57	97	88	140	127	169	101	111	105	110	122	124	128	152	250	199	222	300	302	327	355	364	461

Table 16. Total electricity sales, projected vs. actual (continued)

Projected vs. actual (percent difference)																											
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
AEO 1994	-0.6	-1.5	-2.8	-4.5	-4.5	-6.9	-7.3	-9.0	-7.3	-8.1	-7.6	-8.0	-9.9	-9.2	-10.5	-8.8	-4.6	-7.6									
AEO 1995		0.6	-1.5	-3.8	-3.8	-6.3	-6.9	-9.2	-7.7	-8.6	-8.3	-8.4	-10.3	-9.5	-10.8	-9.1	-4.6	-7.5									
AEO 1996			-1.3	-3.3	-3.4	-5.8	-6.2	-8.3	-6.5	-7.2	-6.6	-6.5	-8.1	-7.1	-8.2	-6.1	-1.2	-4.0	-2.4	0.7	1.3	2.9	4.4				
AEO 1997				-0.8	-1.0	-2.9	-2.5	-3.8	-2.0	-2.5	-1.6	-1.4	-3.2	-2.0	-3.1	-1.0	3.9	0.8	2.4	5.5	6.0	7.5	8.6				
AEO 1998					-1.3	-1.8	-1.7	-3.0	-0.2	-0.8	-0.2	0.0	-1.6	-0.3	-1.3	1.1	6.4	3.3	5.0	8.1	8.3	9.4	10.5	10.5	13.9		
AEO 1999						-1.8	-1.5	-2.6	0.2	-0.3	-0.1	-0.4	-2.1	-0.8	-2.0	0.3	5.5	2.3	4.0	7.1	7.5	9.0	10.4	10.6	14.3		
AEO 2000							-0.7	-1.8	0.2	-0.1	0.8	1.1	-0.4	0.8	-0.3	2.1	7.3	4.1	5.5	8.6	9.0	10.3	11.6	11.5	14.9		
AEO 2001								-1.7	1.3	1.9	3.3	3.8	2.7	4.6	4.1	7.1	13.1	10.5	12.3	16.0	16.8	18.6	20.4	21.0	25.2		
AEO 2002									1.4	1.1	3.6	4.6	3.6	5.4	4.9	7.7	13.7	11.1	13.4	17.2	18.2	20.3	22.3	23.1	27.5		
AEO 2003										-1.5	1.0	2.0	0.6	2.5	2.2	5.5	11.6	9.2	11.5	15.5	16.4	18.5	20.3	21.0	25.4		
AEO 2004											0.0	1.0	0.2	1.7	4.7	10.6	8.0	10.2	14.0	15.0	17.0	18.9	19.7	24.3			
AEO 2005												0.0	-0.3	1.4	1.3	4.8	11.1	8.4	10.5	14.2	15.0	17.1	18.9	19.6	24.3		
AEO 2006													0.4	0.8	0.1	3.0	8.7	5.9	7.9	11.4	12.0	13.7	15.4	16.1	20.4		
AEO 2007														0.6	-0.2	2.7	8.2	5.3	7.1	10.5	11.1	12.6	14.1	14.6	18.4		
AEO 2008															-0.6	1.0	5.8	3.0	4.7	7.7	6.8	7.8	9.0	9.2	12.6		
AEO 2009																-0.3	1.7	-0.5	1.2	4.1	3.9	4.6	5.3	5.2	8.6		
AEO 2010																		-0.2	-3.7	-0.6	2.8	2.3	3.0	3.9	3.9	7.1	
AEO 2011																			-0.2	-1.5	1.1	1.2	1.4	2.3	2.1	5.2	
AEO 2012																				0.4	0.9	-0.4	0.3	0.8	0.3	3.2	
AEO 2013																					0.5	-1.6	-0.5	0.9	0.9	4.4	
AEO 2014																						-1.0	-0.6	1.3	1.7	5.6	
AEO 2015																								0.4	0.7	0.9	4.1
AEO 2016																									0.1	-0.6	2.3
AEO 2017																										-0.9	1.0
AEO 2018																											0.0
Average absolute percent difference	0.6	1.0	1.9	3.1	2.8	4.3	3.8	4.9	3.0	3.2	3.0	3.1	3.3	3.4	3.4	4.1	6.9	5.3	5.9	8.1	8.1	8.8	9.5				

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL ESTCPS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 17. Total energy consumption, projected vs. actual

Projected (quadrillion Btu)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	88.0	89.5	90.7	91.7	92.7	93.6	94.6	95.7	96.7	97.7	98.9	99.9	100.7	101.6	102.4	103.3	103.9	104.7							
AEO 1995		89.2	90.0	90.6	91.9	93.0	93.8	94.6	95.3	96.2	97.2	98.3	99.3	100.2	100.9	101.8	102.5	103.4							
AEO 1996			90.6	91.3	92.5	93.5	94.3	95.1	95.9	96.9	98.0	99.1	100.3	101.3	101.8	102.8	103.4	104.2	105.0	106.0	106.8	107.2	107.7		
AEO 1997				92.6	93.6	95.1	96.6	97.9	98.8	99.9	101.2	102.3	103.3	104.6	105.5	106.3	106.8	107.4	108.1	108.9	109.6	110.1	110.5		
AEO 1998					94.7	96.7	98.6	99.8	101.3	102.4	103.4	104.4	105.7	107.2	108.3	109.5	110.7	111.7	112.6	113.6	114.3	114.8	115.4	115.9	116.5
AEO 1999						94.6	97.0	99.2	100.9	102.0	102.8	103.5	104.6	105.8	106.9	108.1	109.3	110.3	111.3	112.2	113.3	114.2	115.2	116.0	116.9
AEO 2000							96.4	98.1	99.4	100.9	102.4	103.7	105.2	106.5	107.6	108.8	109.8	110.8	111.6	112.7	113.9	115.1	116.3	117.0	117.9
AEO 2001								97.6	99.9	102.2	104.1	105.6	107.0	108.4	109.8	111.1	112.3	113.6	114.8	116.1	117.6	118.9	120.4	121.6	122.9
AEO 2002									98.3	101.0	104.0	105.8	107.5	109.2	110.5	111.9	113.4	115.1	117.0	118.6	120.4	121.8	123.3	124.7	126.1
AEO 2003										97.5	99.9	101.6	103.1	105.0	107.0	108.9	110.7	112.8	114.7	116.6	118.4	120.0	121.5	123.1	124.6
AEO 2004											98.1	100.1	102.7	104.8	106.5	108.2	109.5	111.3	113.0	114.7	116.6	118.0	119.4	120.9	122.5
AEO 2005												99.8	101.8	103.5	105.3	107.5	109.3	110.8	112.3	113.8	115.2	116.7	117.9	119.3	120.9
AEO 2006													100.4	101.2	103.1	104.6	105.9	107.4	108.6	110.1	111.4	112.5	113.8	115.2	116.5
AEO 2007														100.6	102.1	103.4	104.6	106.0	107.2	108.4	109.7	110.9	111.9	113.1	114.1
AEO 2008															101.1	102.0	101.8	102.8	104.1	105.0	105.4	106.1	106.9	107.7	108.4
AEO 2009																100.2	97.6	98.6	100.0	101.1	101.8	101.8	101.7	102.0	102.4
AEO 2010																	95.2	96.1	98.0	99.5	100.2	100.9	101.2	101.8	102.4
AEO 2011																		97.3	97.8	98.9	100.4	100.7	101.7	102.2	102.7
AEO 2012																			97.8	97.4	96.3	96.8	97.1	97.5	97.7
AEO 2013																				95.5	95.9	96.2	97.4	98.0	98.8
AEO 2014																					96.1	96.3	97.4	98.1	99.0
AEO 2015																						98.5	97.8	98.7	99.0
AEO 2016																							96.7	97.6	98.7
AEO 2017																								96.5	97.3
AEO 2018																									96.8
Actual	87.4	89.1	91.0	94.0	94.6	95.0	96.7	98.8	96.2	97.6	97.9	100.1	100.2	99.5	101.0	98.9	94.1	97.5	96.9	94.5	97.2	98.5	97.5	97.6	97.7
Average absolute difference	0.7	0.3	0.6	2.5	1.5	1.2	1.4	1.9	2.6	2.5	3.1	2.5	3.1	4.8	4.3	7.2	12.1	9.6	11.0	13.8	11.7	11.0	11.7	11.9	12.0

Table 17. Total energy consumption, projected vs. actual (continued)

Projected vs. actual (percent difference)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	0.7	0.5	-0.3	-2.4	-2.0	-1.5	-2.2	-3.1	0.5	0.0	1.0	-0.1	0.5	2.1	1.4	4.4	10.3	7.4							
AEO 1995		0.1	-1.2	-3.7	-2.8	-2.1	-2.9	-4.3	-0.9	-1.5	-0.8	-1.8	-0.9	0.7	-0.1	2.9	8.9	6.1							
AEO 1996			-0.5	-2.9	-2.2	-1.6	-2.5	-3.8	-0.2	-0.7	0.0	-0.9	0.1	1.8	0.8	3.9	9.8	6.9	8.3	12.1	9.9	8.9	10.4		
AEO 1997				-1.5	-1.1	0.1	-0.1	-1.0	2.7	2.3	3.3	2.3	3.1	5.1	4.5	7.4	13.4	10.2	11.5	15.2	12.7	11.9	13.3		
AEO 1998					0.1	1.8	2.0	1.0	5.3	4.9	5.6	4.3	5.5	7.7	7.2	10.7	17.5	14.6	16.2	20.2	17.6	16.6	18.3	18.8	19.2
AEO 1999						-0.4	0.3	0.4	4.9	4.5	5.0	3.4	4.4	6.4	5.8	9.3	16.1	13.2	14.8	18.8	16.5	16.0	18.1	18.9	19.6
AEO 2000							-0.3	-0.7	3.3	3.3	4.6	3.6	5.0	7.1	6.6	10.0	16.6	13.6	15.2	19.3	17.2	16.9	19.2	19.9	20.6
AEO 2001								-1.2	3.9	4.7	6.3	5.5	6.7	8.9	8.7	12.3	19.3	16.6	18.5	22.8	20.9	20.8	23.4	24.7	25.8
AEO 2002									2.2	3.5	6.2	5.7	7.3	9.7	9.4	13.1	20.5	18.1	20.8	25.6	23.8	23.7	26.4	27.9	29.1
AEO 2003										-0.1	2.0	1.5	2.9	5.5	5.9	10.1	17.6	15.7	18.4	23.4	21.7	21.9	24.6	26.1	27.5
AEO 2004											0.1	0.1	2.5	5.3	5.4	9.4	16.3	14.2	16.6	21.4	19.9	19.8	22.4	23.9	25.4
AEO 2005												-0.3	1.6	4.0	4.2	8.7	16.1	13.6	15.9	20.4	18.5	18.6	20.9	22.3	23.7
AEO 2006													0.2	1.7	2.0	5.7	12.5	10.1	12.1	16.5	14.5	14.3	16.7	18.1	19.2
AEO 2007														1.1	1.1	4.5	11.2	8.7	10.6	14.8	12.8	12.6	14.8	16.0	16.8
AEO 2008															0.1	3.1	8.1	5.5	7.4	11.1	8.4	7.8	9.6	10.4	10.9
AEO 2009																1.3	3.7	1.1	3.2	7.0	4.7	3.4	4.3	4.6	4.8
AEO 2010																	1.1	-1.4	1.2	5.4	3.1	2.5	3.8	4.3	4.8
AEO 2011																		-0.2	0.9	4.7	3.3	2.3	4.2	4.8	5.1
AEO 2012																			1.0	3.1	-1.0	-1.6	-0.5	-0.1	-0.1
AEO 2013																				1.1	-1.4	-2.3	-0.2	0.4	1.1
AEO 2014																					-1.1	-2.2	-0.2	0.6	1.3
AEO 2015																						0.0	0.3	1.2	1.3
AEO 2016																							-0.8	0.0	1.0
AEO 2017																								-1.1	-0.4
AEO 2018																									-0.9
Average absolute percent difference	0.7	0.3	0.7	2.6	1.6	1.3	1.5	1.9	2.7	2.5	3.2	2.5	3.1	4.8	4.2	7.3	12.9	9.8	11.3	14.6	12.1	11.2	12.0	12.2	12.3

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.TETCBUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 18. Total delivered residential energy consumption, projected vs. actual

Projected (quadrillion Btu)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	10.3	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.5	10.5	10.5	10.5	10.5	10.6	10.6							
AEO 1995		11.0	10.8	10.8	10.8	10.8	10.8	10.8	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.8	10.8	10.9							
AEO 1996			10.4	10.7	10.7	10.7	10.8	10.8	10.9	10.9	11.0	11.2	11.2	11.3	11.4	11.5	11.6	11.7	11.8	12.0	12.1	12.2	12.3		
AEO 1997				11.1	10.9	11.1	11.1	11.2	11.2	11.2	11.3	11.4	11.5	11.5	11.6	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.4		
AEO 1998					10.7	11.1	11.2	11.4	11.5	11.5	11.6	11.7	11.8	11.9	11.9	12.1	12.1	12.2	12.3	12.5	12.6	12.7	12.8	12.9	12.9
AEO 1999						10.5	11.1	11.3	11.3	11.4	11.5	11.5	11.6	11.6	11.7	11.8	11.9	12.0	12.1	12.3	12.4	12.5	12.6	12.7	12.8
AEO 2000							10.7	10.9	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.3	12.5	12.5
AEO 2001								10.8	11.2	11.4	11.6	11.8	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.7	12.8	13.0	13.1	13.2	13.3
AEO 2002									11.3	11.5	11.8	12.0	12.0	12.1	12.1	12.3	12.3	12.4	12.5	12.6	12.7	12.8	12.9	13.1	13.1
AEO 2003										11.1	11.6	11.8	11.9	12.0	12.2	12.3	12.4	12.5	12.6	12.7	12.7	12.8	12.9	13.1	13.1
AEO 2004											11.5	11.8	11.9	12.0	12.2	12.3	12.4	12.6	12.7	12.8	12.9	13.0	13.1	13.2	13.3
AEO 2005												11.5	11.7	11.8	12.0	12.3	12.5	12.7	12.8	13.0	13.1	13.2	13.3	13.4	13.5
AEO 2006													11.7	11.7	11.8	12.0	12.1	12.2	12.4	12.5	12.6	12.7	12.8	13.0	13.0
AEO 2007														11.3	11.8	12.0	12.1	12.2	12.3	12.5	12.6	12.7	12.7	12.9	12.9
AEO 2008															11.5	11.7	11.7	11.7	11.8	11.9	11.8	11.9	11.9	12.1	12.1
AEO 2009																11.6	11.6	11.6	11.4	11.4	11.3	11.4	11.4	11.5	11.5
AEO 2010																	11.2	11.3	11.1	11.1	11.0	11.0	11.1	11.1	11.2
AEO 2011																		11.4	11.1	11.1	11.0	11.0	11.0	11.1	11.1
AEO 2012																			11.6	11.6	11.3	11.3	11.2	11.2	11.3
AEO 2013																				10.7	11.2	11.0	11.0	11.0	11.0
AEO 2014																					11.3	11.0	10.8	10.8	10.8
AEO 2015																						11.7	10.9	10.8	10.8
AEO 2016																							10.9	10.9	11.1
AEO 2017																								10.6	10.9
AEO 2018																									10.5
Actual	10.5	10.4	10.5	11.2	10.7	10.3	10.7	11.2	11.0	11.2	11.6	11.4	11.5	10.8	11.4	11.6	11.3	11.5	11.3	10.5	11.6	11.9	11.3	10.7	10.7
Average absolute difference	0.2	0.3	0.2	0.4	0.1	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.8	0.5	0.4	0.7	0.6	0.8	1.6	0.7	0.7	1.0	1.3	1.3

Table 18. Total delivered residential energy consumption, projected vs. actual (continued)

Projected vs. actual (percent difference)																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	-2.2	-0.6	-1.3	-7.1	-3.0	1.3	-2.6	-7.3	-4.9	-7.1	-9.9	-8.3	-9.4	-2.7	-7.4	-9.4	-6.7	-8.0							
AEO 1995		5.2	2.9	-3.1	1.0	5.1	0.8	-4.2	-2.2	-4.5	-7.7	-6.1	-7.4	-0.7	-5.6	-7.5	-4.6	-5.8							
AEO 1996			-0.9	-4.5	-0.1	4.3	0.8	-3.4	-0.9	-2.5	-4.8	-2.2	-3.0	4.8	0.3	-0.8	2.5	1.6	4.2	14.4	4.1	2.4	8.9		
AEO 1997				-0.9	2.3	7.7	3.8	-0.6	1.9	0.1	-2.4	0.1	-0.7	7.1	2.4	1.0	4.2	3.2	5.6	15.9	5.3	3.6	10.0		
AEO 1998					0.1	8.1	4.8	1.2	4.5	2.7	0.2	2.8	1.9	10.1	5.2	3.9	7.3	6.3	8.8	19.5	8.5	6.7	13.2	20.1	20.7
AEO 1999						2.6	4.2	0.3	3.5	1.7	-1.1	1.3	0.2	8.0	3.2	1.9	5.2	4.1	6.8	17.3	6.6	5.0	11.4	18.3	18.9
AEO 2000							0.3	-2.5	0.5	-1.0	-3.3	-0.6	-1.3	6.6	2.0	0.9	4.3	3.3	5.6	15.6	4.9	3.1	9.4	16.0	16.6
AEO 2001								-3.9	1.8	1.5	-0.1	3.1	2.7	11.0	6.4	5.2	8.7	7.9	10.6	21.5	10.6	9.0	16.0	23.4	24.4
AEO 2002									2.6	2.7	1.8	4.8	3.9	12.0	7.0	5.5	8.8	7.6	10.1	20.7	9.6	7.8	14.6	21.6	22.4
AEO 2003										-0.9		3.6	3.1	11.8	7.2	5.9	9.3	8.3	10.7	21.2	9.9	8.0	14.7	21.7	22.4
AEO 2004											-0.6	3.2	2.7	11.5	7.1	6.1	9.8	9.2	11.9	22.5	11.1	9.1	15.8	22.9	23.7
AEO 2005												0.5	0.9	9.5	5.9	5.8	10.3	10.0	13.2	24.3	13.0	11.0	17.8	25.0	25.9
AEO 2006													1.2	8.9	3.9	3.2	7.0	6.3	9.0	19.6	8.6	6.7	13.6	20.6	21.4
AEO 2007														4.7	3.7	3.0	6.7	6.0	8.7	19.3	8.4	6.5	13.0	19.7	20.2
AEO 2008															0.9	0.4	3.6	1.2	3.6	13.6	1.9	-0.1	5.9	12.3	12.8
AEO 2009																0.2	2.7	0.8	0.5	9.1	-2.1	-4.4	1.0	6.7	7.0
AEO 2010																	-0.9	-2.2	-2.2	6.2	-4.8	-7.1	-1.8	3.7	4.0
AEO 2011																		-0.7	-2.2	6.1	-4.8	-7.2	-2.3	3.0	3.1
AEO 2012																			2.2	11.0	-2.5	-5.2	-0.4	4.7	5.0
AEO 2013																				2.7	-3.0	-7.3	-2.6	2.1	2.1
AEO 2014																					-2.9	-7.2	-4.1	0.6	0.8
AEO 2015																						-1.4	-3.3	0.3	0.3
AEO 2016																							-3.2	1.9	3.4
AEO 2017																								-1.1	1.7
AEO 2018																									-1.8
Average absolute percent difference	2.2	2.9	1.7	3.9	1.3	4.8	2.5	2.9	2.5	2.5	2.9	3.1	3.0	7.8	4.6	3.8	6.0	5.1	6.8	15.6	6.5	5.9	8.7	12.3	12.3

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.TERCUS.A & TOTAL.LORCUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 19. Total delivered commercial energy consumption, projected vs. actual

Projected (quadrillion Btu)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	6.8	6.9	6.9	7.0	7.1	7.1	7.2	7.2	7.3	7.3	7.4	7.4	7.4	7.5	7.5	7.5	7.5	7.6							
AEO 1995		6.9	6.9	7.0	7.0	7.0	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	7.3	7.3	7.3							
AEO 1996			7.1	7.2	7.2	7.3	7.3	7.4	7.4	7.5	7.6	7.6	7.7	7.7	7.8	7.9	8.0	8.0	8.1	8.1	8.2	8.2	8.3	8.4	
AEO 1997				7.4	7.4	7.4	7.5	7.5	7.6	7.7	7.7	7.8	7.8	7.9	7.9	8.0	8.1	8.1	8.1	8.2	8.3	8.4	8.4	8.5	
AEO 1998					7.5	7.6	7.7	7.8	7.9	8.0	8.0	8.1	8.2	8.3	8.4	8.4	8.5	8.6	8.7	8.8	8.8	8.8	8.9	8.9	9.0
AEO 1999						7.4	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.0	9.1	9.2	9.2	9.3	
AEO 2000							7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.5	8.7	8.7	8.8	8.9	9.0	9.1	9.1	9.1	9.2
AEO 2001								7.8	8.1	8.3	8.6	8.7	8.9	9.0	9.2	9.3	9.5	9.6	9.7	9.9	10.0	10.1	10.2	10.3	10.4
AEO 2002									8.2	8.4	8.7	8.9	9.0	9.2	9.4	9.6	9.7	9.9	10.1	10.3	10.4	10.6	10.8	11.0	11.1
AEO 2003										8.4	8.6	8.8	9.0	9.1	9.3	9.4	9.5	9.7	9.8	10.0	10.2	10.3	10.5	10.7	10.8
AEO 2004											8.4	8.5	8.8	9.0	9.2	9.4	9.5	9.7	9.9	10.1	10.2	10.4	10.5	10.7	10.8
AEO 2005												8.3	8.4	8.6	8.9	9.1	9.3	9.5	9.7	9.9	10.1	10.2	10.4	10.6	10.8
AEO 2006													8.4	8.3	8.5	8.7	8.8	9.0	9.2	9.4	9.5	9.7	9.9	10.0	10.2
AEO 2007														8.3	8.5	8.7	8.9	9.1	9.2	9.4	9.6	9.8	9.9	10.1	10.2
AEO 2008															8.6	8.7	8.5	8.6	8.8	8.9	9.1	9.2	9.4	9.5	9.6
AEO 2009																8.6	8.9	8.9	9.0	9.1	9.2	9.3	9.4	9.5	
AEO 2010																	8.4	8.6	8.8	8.9	8.9	9.0	9.0	9.1	9.2
AEO 2011																		8.5	8.7	8.7	8.8	8.9	9.0	9.1	9.2
AEO 2012																			8.7	8.7	8.7	8.7	8.8	8.9	8.9
AEO 2013																				8.3	8.6	8.7	8.8	8.8	8.8
AEO 2014																					8.6	8.5	8.5	8.6	8.6
AEO 2015																						8.9	8.8	8.8	8.8
AEO 2016																							8.8	9.0	9.1
AEO 2017																								8.8	8.8
AEO 2018																									8.9
Actual	7.0	7.1	7.4	7.6	7.8	7.7	7.8	8.2	8.1	8.2	8.4	8.4	8.4	8.2	8.5	8.7	8.5	8.6	8.6	8.2	8.7	9.0	8.7	9.0	9.0
Average absolute difference	0.2	0.2	0.4	0.5	0.6	0.4	0.4	0.7	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.9	0.6	0.6	0.7	0.7	0.7

Table 19. Total delivered commercial energy consumption, projected vs. actual (continued)

Projected vs. actual (percent difference)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
AEO 1994	-2.5	-3.7	-5.6	-8.1	-9.5	-7.2	-8.4	-12.3	-10.8	-11.2	-12.2	-12.4	-11.8	-8.9	-11.9	-13.3	-11.7	-11.7									
AEO 1995		-2.7	-6.1	-8.8	-10.4	-8.6	-9.8	-14.0	-13.0	-13.7	-15.0	-15.2	-14.7	-12.1	-14.8	-16.1	-14.2	-14.2									
AEO 1996			-4.0	-5.8	-7.3	-5.2	-6.2	-10.3	-8.6	-9.0	-9.8	-9.6	-8.5	-5.3	-7.8	-8.9	-6.5	-6.2	-5.8	-0.7	-5.1	-7.1	-3.5				
AEO 1997				-2.8	-5.7	-3.4	-4.3	-8.4	-6.7	-7.0	-7.9	-7.7	-6.7	-3.5	-6.3	-7.4	-5.2	-4.9	-4.5	0.6	-3.9	-6.0	-2.4				
AEO 1998					-4.2	-0.6	-1.2	-5.2	-3.3	-3.4	-4.2	-3.6	-2.3	1.3	-1.4	-2.4	0.2	0.5	1.1	6.4	1.5	-1.0	2.6	-0.1	0.0		
AEO 1999						-3.1	0.0	-3.8	-1.7	-1.8	-2.6	-2.2	-0.9	2.7	0.1	-0.8	2.0	2.5	3.4	9.0	4.1	1.8	5.5	2.8	3.0		
AEO 2000							-1.4	-5.1	-2.7	-2.6	-3.4	-2.9	-1.4	2.3	-0.3	-1.2	1.7	2.2	3.0	8.5	3.5	1.0	4.6	1.8	1.9		
AEO 2001								-5.4	-1.0	1.2	2.0	3.4	5.6	10.2	8.1	7.6	11.2	12.2	13.4	20.0	15.0	12.7	17.1	14.6	15.1		
AEO 2002									0.4	1.8	3.3	5.4	7.7	12.7	10.8	10.5	14.4	15.9	17.6	24.8	20.2	18.5	24.0	22.2	23.7		
AEO 2003										1.5	2.0	4.2	6.6	11.5	9.4	8.8	12.2	13.3	14.7	21.6	17.0	15.2	20.5	18.7	20.3		
AEO 2004											0.6	1.1	4.2	9.8	8.2	8.1	12.1	13.9	15.6	22.5	17.7	15.7	20.8	18.7	20.1		
AEO 2005												-1.2	-0.1	5.2	4.4	5.1	9.6	11.4	13.3	20.4	15.9	14.2	19.6	18.1	20.1		
AEO 2006													0.4	1.6	-0.1	0.0	3.8	5.3	7.0	13.8	9.6	8.0	13.2	11.7	13.3		
AEO 2007														1.9	0.3	1.0	4.7	5.9	7.8	14.7	10.8	9.1	14.1	12.3	13.4		
AEO 2008															1.0	0.1	0.4	0.8	2.1	8.3	4.2	2.8	7.6	6.0	7.2		
AEO 2009																-1.2	4.2	3.9	4.2	9.6	4.8	2.7	6.8	4.5	5.1		
AEO 2010																	-1.1	0.6	2.2	7.9	2.3	-0.1	3.9	1.7	2.4		
AEO 2011																		-0.5	0.8	6.0	1.3	-0.6	3.7	1.6	2.4		
AEO 2012																				1.5	6.1	0.0	-2.4	1.1	-1.2	-0.6	
AEO 2013																					1.5	-1.1	-3.4	0.6	-2.0	-2.0	
AEO 2014																						-1.1	-4.9	-2.0	-4.4	-4.0	
AEO 2015																							-0.2	0.8	-2.2	-2.0	
AEO 2016																								1.2	-0.3	0.6	
AEO 2017																										-1.7	-2.0
AEO 2018																											-0.7
Average absolute percent difference	2.5	3.2	5.2	6.4	7.4	4.7	4.5	8.1	5.3	5.3	5.7	5.7	5.4	6.4	5.7	5.8	6.8	7.0	6.9	11.3	7.3	6.4	8.4	7.3	7.6		

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.TECBUS.A & TOTAL.LOCCBUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 20. Total delivered industrial energy consumption, projected vs. actual

Projected (quadrillion Btu)	Projected vs. actual																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	25.4	25.9	26.3	26.7	27.0	27.1	26.8	26.6	26.9	27.2	27.7	28.1	28.3	28.7	29.1	29.4	29.7	30.0								
AEO 1995		26.2	26.3	26.5	27.0	27.3	26.9	26.6	26.8	27.1	27.5	27.9	28.2	28.4	28.7	29.0	29.3	29.6								
AEO 1996			26.5	26.6	27.3	27.5	26.9	26.5	26.7	26.9	27.2	27.6	27.9	28.2	28.3	28.5	28.7	28.9	29.2	29.4	29.6	29.9	30.0			
AEO 1997				26.2	26.5	26.9	26.7	26.6	26.8	27.1	27.4	27.8	28.0	28.4	28.7	28.9	29.0	29.2	29.4	29.5	29.7	29.9	30.1			
AEO 1998					27.2	27.5	27.2	26.9	27.1	27.5	27.7	27.9	28.3	28.7	29.0	29.3	29.7	29.9	30.1	30.4	30.5	30.6	30.7	30.8		
AEO 1999						26.7	26.4	26.4	26.8	27.1	27.3	27.5	27.9	28.3	28.6	28.9	29.2	29.5	29.7	30.0	30.2	30.5	30.6	31.1	31.4	
AEO 2000							25.8	25.5	25.7	26.0	26.5	26.9	27.4	27.8	28.1	28.3	28.5	28.8	29.0	29.2	29.6	29.9	30.3	30.5	30.7	
AEO 2001								25.8	26.2	26.6	27.0	27.3	27.7	28.1	28.5	28.8	29.1	29.4	29.7	30.0	30.4	30.7	31.2	31.5	31.9	
AEO 2002									24.5	25.8	26.6	27.0	27.5	28.0	28.5	28.8	29.2	29.7	30.2	30.6	30.9	31.2	31.5	31.8	32.1	
AEO 2003										25.5	25.9	26.2	26.4	26.7	27.2	27.6	28.1	28.8	29.3	29.8	30.2	30.5	30.8	31.1	31.4	
AEO 2004											24.5	24.9	25.7	26.1	26.5	26.9	27.1	27.5	27.9	28.3	28.7	29.0	29.3	29.7	30.1	
AEO 2005												25.5	25.9	26.2	26.4	26.9	27.2	27.3	27.6	27.8	27.9	28.2	28.3	28.5	28.8	
AEO 2006													25.2	25.4	26.1	26.3	26.5	26.7	27.0	27.2	27.3	27.5	27.7	28.0	28.2	
AEO 2007														25.3	25.5	25.8	26.1	26.3	26.5	26.6	26.7	26.9	27.0	27.1	27.2	
AEO 2008																25.2	25.8	25.3	25.8	26.2	26.2	26.2	26.2	26.3	26.4	26.4
AEO 2009																	25.1	23.3	22.8	23.5	23.9	24.3	24.2	23.9	23.9	23.9
AEO 2010																		22.2	22.3	23.0	23.8	24.2	24.6	24.8	24.9	25.0
AEO 2011																			23.1	24.2	25.0	26.0	26.2	26.7	26.8	26.9
AEO 2012																				23.8	23.8	23.1	23.7	24.0	24.2	24.2
AEO 2013																					24.3	23.8	24.0	24.9	25.5	26.0
AEO 2014																						23.8	24.2	25.3	26.0	26.5
AEO 2015																							24.7	25.2	25.9	26.2
AEO 2016																								24.5	24.3	24.7
AEO 2017																									24.6	25.0
AEO 2018																										24.8
Actual	25.1	25.8	26.2	26.9	27.2	26.8	26.6	26.5	25.2	25.2	25.0	25.9	24.9	25.0	24.9	24.0	21.9	23.6	23.8	24.1	24.6	24.6	24.5	25.0	25.2	
Average absolute difference	0.3	0.2	0.2	0.4	0.3	0.4	0.4	0.3	1.3	1.5	2.0	1.4	2.4	2.5	2.8	3.8	5.7	4.2	3.8	3.5	3.3	3.2	3.4	2.9	2.9	

Table 20. Total delivered industrial energy consumption, projected vs. actual (continued)

Projected vs. actual (percent difference)	Projected vs. actual																									
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	1.4	0.3	0.5	-1.0	-0.9	1.1	0.7	0.5	6.8	8.1	10.7	8.4	13.9	14.8	16.9	22.6	35.7	27.2								
AEO 1995		1.3	0.5	-1.6	-0.7	1.8	1.1	0.5	6.4	7.6	9.9	7.7	13.1	13.9	15.5	21.1	33.9	25.5								
AEO 1996			1.4	-1.2	0.3	2.7	1.3	0.1	5.9	7.0	9.0	6.6	12.1	12.7	13.8	19.0	31.3	22.6	22.5	22.1	20.4	21.2	22.5			
AEO 1997				-2.7	-2.8	0.5	0.4	0.4	6.3	7.5	9.8	7.2	12.6	13.7	15.4	20.4	32.6	23.8	23.4	22.6	20.8	21.6	22.7			
AEO 1998					0.1	2.6	2.6	1.7	7.7	9.1	10.7	7.9	13.7	14.9	16.7	22.4	35.5	26.8	26.6	26.0	23.7	23.8	24.9	22.6	22.3	
AEO 1999						-0.1	-0.6	0.0	6.5	7.8	9.3	6.3	12.0	13.1	15.0	20.5	33.4	25.1	24.8	24.5	22.8	24.0	26.1	24.4	24.7	
AEO 2000							-2.8	-3.5	2.0	3.3	6.0	4.0	10.1	11.2	12.9	18.2	30.3	22.1	21.6	21.3	20.1	21.5	23.7	21.8	22.1	
AEO 2001								-2.5	3.9	5.6	8.2	5.5	11.1	12.4	14.5	20.1	32.9	24.8	24.7	24.4	23.4	24.8	27.2	26.1	26.7	
AEO 2002									-2.6	2.6	6.5	4.4	10.5	11.9	14.4	20.0	33.4	25.8	27.0	26.9	25.5	26.7	28.7	27.3	27.7	
AEO 2003										1.1	3.8	1.4	5.9	7.0	9.4	15.3	28.6	21.9	23.2	23.7	22.5	24.0	25.9	24.3	24.9	
AEO 2004											-1.9	-3.7	3.3	4.7	6.7	12.1	23.9	16.7	17.3	17.3	17.3	16.6	17.8	19.7	18.6	19.6
AEO 2005												-1.5	4.1	5.1	6.3	12.0	24.2	15.9	15.9	15.3	13.4	14.3	15.4	13.8	14.6	
AEO 2006													1.1	1.5	4.9	9.7	21.0	13.1	13.2	12.7	11.0	11.6	13.2	11.8	11.9	
AEO 2007														1.4	2.7	7.7	19.2	11.6	11.3	10.5	8.6	9.2	10.1	8.4	8.1	
AEO 2008															1.4	7.7	15.7	9.4	10.0	8.8	6.3	6.3	7.4	5.4	5.1	
AEO 2009																4.7	6.6	-3.4	-1.4	-0.8	-1.5	-1.9	-2.3	-4.6	-5.1	
AEO 2010																	1.7	-5.5	-3.4	-1.2	-1.6	-0.2	1.1	-0.6	-0.7	
AEO 2011																		-2.1	1.6	3.9	5.8	6.4	9.2	7.3	7.1	
AEO 2012																			-0.2	-1.3	-6.0	-3.7	-2.2	-3.2	-3.8	
AEO 2013																				0.7	-3.4	-2.6	1.7	1.9	3.2	
AEO 2014																					-3.1	-1.7	3.2	3.8	5.5	
AEO 2015																						0.4	3.0	3.5	4.0	
AEO 2016																							0.0	-2.7	-1.8	
AEO 2017																								-1.8	-0.8	
AEO 2018																									-1.5	
Average absolute percent difference	1.4	0.8	0.8	1.6	1.0	1.5	1.4	1.2	5.3	6.0	7.8	5.4	9.5	9.9	11.1	15.9	25.9	18.0	15.8	14.7	13.5	13.2	13.8	11.7	11.5	

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opa/data/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.TEICBUS.A & TOTAL.LOICBUS.A. Shading indicates overestimation (blue) or underestimation (green). Comparisons through AEO 2002 have been adjusted for the AER 2001 revision to

Table 21. Total delivered transportation energy consumption, projected vs. actual

Projected (quadrillion Btu)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	23.6	24.1	24.5	24.7	25.1	25.4	25.7	26.2	26.5	26.9	27.2	27.5	27.8	28.1	28.4	28.6	28.8	29.0							
AEO 1995		23.3	24.0	24.2	24.7	25.1	25.5	25.9	26.2	26.5	26.9	27.2	27.6	27.9	28.0	28.2	28.3	28.4							
AEO 1996			23.9	24.1	24.5	24.8	25.3	25.7	26.0	26.4	26.7	27.0	27.4	27.7	27.9	28.1	28.2	28.4	28.6	28.8	29.1	29.3	29.5		
AEO 1997				24.7	25.3	25.9	26.4	27.0	27.5	28.0	28.4	28.9	29.3	29.7	30.0	30.3	30.4	30.6	30.8	31.0	31.3	31.5	31.6		
AEO 1998					25.3	25.9	26.7	27.1	27.7	28.3	28.8	29.3	29.9	30.5	30.9	31.4	31.8	32.3	32.6	33.0	33.5	33.8	34.2	34.5	34.8
AEO 1999						25.4	26.0	27.0	27.6	28.2	28.8	29.3	29.9	30.5	30.9	31.4	31.8	32.3	32.6	33.0	33.5	33.9	34.3	34.6	35.0
AEO 2000							26.2	26.8	27.4	28.0	28.5	29.1	29.6	30.2	30.6	31.1	31.5	32.0	32.4	32.8	33.5	34.1	34.6	35.1	35.5
AEO 2001								26.8	27.5	28.3	28.8	29.3	29.9	30.5	30.9	31.4	31.9	32.4	32.9	33.3	34.1	34.6	35.2	35.8	36.3
AEO 2002									27.5	28.0	28.9	29.5	30.1	30.6	31.1	31.7	32.4	33.0	33.7	34.4	35.2	35.8	36.3	36.9	37.5
AEO 2003										27.2	27.7	28.2	28.9	29.6	30.3	31.0	31.8	32.7	33.5	34.3	35.2	35.9	36.6	37.2	37.9
AEO 2004											27.2	28.0	28.8	29.5	30.0	30.5	31.1	31.7	32.3	32.9	33.8	34.4	34.9	35.4	36.0
AEO 2005												27.7	28.4	28.9	29.5	30.1	30.8	31.3	32.0	32.5	33.2	33.8	34.4	34.9	35.5
AEO 2006													28.0	28.3	28.8	29.2	29.7	30.2	30.8	31.2	31.8	32.3	32.7	33.2	33.7
AEO 2007														28.2	28.4	28.6	28.9	29.4	29.8	30.2	30.8	31.3	31.7	32.2	32.6
AEO 2008															28.3	28.1	28.2	28.5	28.8	29.1	29.6	29.8	30.0	30.3	30.4
AEO 2009																27.6	27.1	27.5	28.0	28.1	28.4	28.3	28.2	28.2	28.2
AEO 2010																	26.5	26.8	27.3	27.6	27.9	28.0	28.1	28.1	28.3
AEO 2011																		26.9	27.1	27.4	27.9	28.0	28.1	28.3	28.4
AEO 2012																			26.6	26.8	27.0	27.2	27.2	27.2	27.2
AEO 2013																				26.2	26.4	26.6	26.8	26.9	26.9
AEO 2014																					26.4	26.3	26.4	26.4	26.4
AEO 2015																						26.8	27.1	27.3	27.3
AEO 2016																							27.3	26.6	26.9
AEO 2017																								28.2	28.4
AEO 2018																									27.7
Actual	22.7	23.3	23.8	24.4	24.7	25.2	25.9	26.5	26.2	26.8	26.8	27.8	28.2	28.7	28.8	27.4	26.6	27.0	26.7	26.2	26.7	27.1	27.7	27.9	28.1
Average absolute difference	0.9	0.4	0.3	0.3	0.4	0.4	0.4	0.5	0.9	0.9	1.2	0.9	1.0	1.1	1.2	2.4	3.3	3.2	3.9	4.5	4.4	4.2	3.9	4.0	3.9

Table 21. Total delivered transportation energy consumption, projected vs. actual (continued)

Projected vs. actual (percent difference)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	4.2	3.2	2.7	1.3	1.4	0.6	-0.7	-1.3	1.0	0.2	1.3	-1.0	-1.4	-1.8	-1.6	4.2	8.0	7.4							
AEO 1995		-0.3	0.8	-0.9	-0.1	-0.4	-1.6	-2.5	-0.3	-1.1	0.0	-2.0	-2.3	-2.7	-2.8	2.7	6.3	5.3							
AEO 1996			0.4	-1.3	-1.0	-1.5	-2.5	-3.2	-0.8	-1.5	-0.5	-2.8	-2.9	-3.4	-3.3	2.3	5.9	5.0	7.2	9.9	9.2	8.4	6.8		
AEO 1997				1.2	2.6	2.6	2.0	2.0	4.9	4.3	5.9	3.9	3.8	3.7	4.2	10.3	14.3	13.4	15.5	18.4	17.4	16.4	14.4		
AEO 1998					2.6	2.5	2.9	2.4	5.7	5.6	7.4	5.6	5.9	6.4	7.3	14.3	19.6	19.5	22.3	26.1	25.5	25.1	23.6	23.3	23.7
AEO 1999						0.8	0.2	1.9	5.3	5.3	7.2	5.5	6.0	6.3	7.3	14.3	19.5	19.5	22.3	26.0	25.4	25.3	24.0	24.0	24.5
AEO 2000							1.3	1.2	4.4	4.3	6.1	4.6	5.0	5.4	6.3	13.3	18.3	18.4	21.5	25.4	25.5	26.0	25.2	25.5	26.2
AEO 2001								1.2	5.0	5.4	7.3	5.6	6.0	6.5	7.5	14.6	19.8	19.9	23.3	27.4	27.6	28.1	27.4	28.1	29.2
AEO 2002									4.8	4.6	7.6	6.1	6.7	6.9	8.0	15.6	21.5	22.2	26.5	31.4	31.8	32.2	31.4	32.1	33.2
AEO 2003										1.3	3.3	1.6	2.2	3.3	5.1	13.2	19.6	21.0	25.6	31.0	31.9	32.8	32.3	33.2	34.6
AEO 2004											1.2	0.8	2.2	3.0	4.1	11.3	16.7	17.3	21.1	25.9	26.6	27.1	26.2	26.8	27.9
AEO 2005												-0.2	0.5	0.9	2.3	9.7	15.5	16.1	19.9	24.3	24.5	25.1	24.3	24.9	26.1
AEO 2006													-0.8	-1.2	-0.1	6.4	11.4	11.9	15.4	19.3	19.2	19.3	18.3	18.8	19.6
AEO 2007														-1.5	-1.4	4.3	8.7	8.7	11.7	15.4	15.4	15.6	14.7	15.1	15.9
AEO 2008															-1.8	2.6	6.0	5.5	8.0	11.3	10.7	10.1	8.5	8.3	8.1
AEO 2009																0.6	1.6	1.8	5.0	7.6	6.3	4.8	2.2	1.0	0.3
AEO 2010																	-0.4	-0.8	2.6	5.5	4.5	3.5	1.5	0.7	0.5
AEO 2011																		-0.3	1.7	4.6	4.5	3.5	1.7	1.2	0.9
AEO 2012																			-0.2	2.3	1.3	0.5	-1.5	-2.5	-3.4
AEO 2013																				0.1	-1.0	-1.6	-3.2	-3.9	-4.3
AEO 2014																					-1.1	-2.6	-4.8	-5.5	-6.1
AEO 2015																						-1.0	-1.9	-2.2	-2.9
AEO 2016																							-1.4	-4.9	-4.3
AEO 2017																								0.9	1.0
AEO 2018																									-1.5
Average absolute percent difference	4.2	1.8	1.3	1.2	1.5	1.4	1.6	2.0	3.6	3.4	4.3	3.3	3.5	3.8	4.2	8.7	12.5	11.9	14.7	17.3	16.3	15.4	14.1	14.1	14.0

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTAL.TEACBUS.A & TOTAL.LOACBUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 22. Total energy related carbon dioxide emissions, projected vs. actual

Projected (million metric tons)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994	5060	5130	5185	5240	5287	5335	5379	5438	5482	5529	5599	5658	5694	5738	5797	5874	5925	5984							
AEO 1995		5137	5174	5188	5262	5309	5361	5394	5441	5489	5551	5621	5680	5727	5775	5841	5889	5944							
AEO 1996			5182	5224	5295	5355	5417	5464	5525	5589	5660	5735	5812	5879	5925	5981	6030	6087	6142	6203	6258	6322	6362		
AEO 1997				5295	5381	5491	5586	5658	5715	5781	5863	5934	6009	6106	6184	6236	6268	6316	6365	6417	6467	6542	6597		
AEO 1998					5474	5621	5711	5784	5893	5957	6026	6098	6192	6292	6379	6465	6542	6612	6683	6752	6801	6862	6924	6973	7034
AEO 1999						5522	5689	5810	5913	5976	6036	6084	6152	6244	6325	6418	6493	6563	6641	6703	6771	6846	6930	6991	7066
AEO 2000							5573	5692	5777	5865	5971	6078	6172	6262	6345	6420	6480	6551	6610	6678	6755	6841	6942	6999	7068
AEO 2001								5630	5781	5909	6023	6114	6197	6281	6387	6470	6541	6633	6709	6788	6881	6970	7070	7152	7244
AEO 2002									5723	5808	5981	6095	6210	6323	6438	6530	6624	6727	6839	6937	7032	7117	7206	7299	7390
AEO 2003										5633	5749	5856	5954	6095	6232	6360	6475	6602	6719	6828	6927	7024	7129	7224	7322
AEO 2004											5743.27	5826	5986	6124	6251	6357	6453	6559	6657	6763	6857	6944	7028	7123	7219
AEO 2005												5905	6023	6138	6274	6415	6533	6627	6721	6812	6889	6979	7052	7135	7236
AEO 2006													5967	5978	6080	6182	6281	6365	6440	6536	6595	6654	6718	6794	6869
AEO 2007														5940	5999	6059	6124	6214	6296	6369	6442	6527	6589	6662	6716
AEO 2008															5977	5983	5978	6011	6087	6144	6154	6187	6226	6272	6308
AEO 2009																5849	5699	5746	5803	5842	5858	5852	5830	5844	5857
AEO 2010																	5507	5521	5643	5706	5707	5741	5731	5749	5761
AEO 2011																		5643	5601	5622	5659	5651	5680	5700	5707
AEO 2012																			5632	5570	5453	5438	5407	5408	5402
AEO 2013																				5361	5368	5361	5336	5370	5370
AEO 2014																					5421	5426	5418	5382	5418
AEO 2015																						5488	5428	5436	5405
AEO 2016																							5273	5292	5321
AEO 2017																								5157	5183
AEO 2018																									5151
Actual	5185	5261	5323	5510	5584	5635	5688	5868	5761	5804	5853	5970	5993	5910	6001	5809	5386	5576	5439	5227	5355	5406	5257	5188	5140
Average absolute difference	125	128	143	273	244	197	164	259	138	149	159	156	144	226	228	406	840	691	889	1108	976	937	1072	1112	1148

Table 22. Total energy related carbon dioxide emissions, projected vs. actual (continued)

Projected vs. actual (percent difference)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AEO 1994	-2.4	-2.5	-2.6	-4.9	-5.3	-5.3	-5.4	-7.3	-4.9	-4.7	-4.3	-5.2	-5.0	-2.9	-3.4	1.1	10.0	7.3								
AEO 1995		-2.4	-2.8	-5.8	-5.8	-5.8	-8.1	-5.6	-5.4	-5.2	-5.8	-5.2	-3.1	-3.8	0.6	9.3	6.6									
AEO 1996			-2.6	-5.2	-5.2	-5.0	-4.8	-6.9	-4.1	-3.7	-3.3	-3.9	-3.0	-0.5	-1.3	3.0	12.0	9.2	12.9	18.7	16.9	17.0	21.0			
AEO 1997				-3.9	-3.6	-2.6	-1.8	-3.6	-0.8	-0.4	0.2	-0.6	0.3	3.3	3.1	7.3	16.4	13.3	17.0	22.8	20.8	21.0	25.5			
AEO 1998					-2.0	-0.3	0.4	-1.4	2.3	2.6	3.0	2.1	3.3	6.5	6.3	11.3	21.5	18.6	22.9	29.2	27.0	26.9	31.7	34.4	36.8	
AEO 1999						-2.0	0.0	-1.0	2.6	3.0	3.1	1.9	2.6	5.7	5.4	10.5	20.6	17.7	22.1	28.2	26.4	26.7	31.8	34.8	37.5	
AEO 2000							-2.0	-3.0	0.3	1.0	2.0	1.8	3.0	6.0	5.7	10.5	20.3	17.5	21.5	27.8	26.1	26.6	32.0	34.9	37.5	
AEO 2001								-4.1	0.3	1.8	2.9	2.4	3.4	6.3	6.4	11.4	21.5	19.0	23.3	29.9	28.5	28.9	34.5	37.9	40.9	
AEO 2002									-0.7	0.1	2.2	2.1	3.6	7.0	7.3	12.4	23.0	20.6	25.7	32.7	31.3	31.7	37.1	40.7	43.8	
AEO 2003										-3.0	-1.8	-1.9	-0.7	3.1	3.9	9.5	20.2	18.4	23.5	30.6	29.3	29.9	35.6	39.3	42.4	
AEO 2004											-1.9	-2.4	-0.1	3.6	4.2	9.4	19.8	17.6	22.4	29.4	28.0	28.5	33.7	37.3	40.4	
AEO 2005												-1.1	0.5	3.9	4.6	10.4	21.3	18.8	23.6	30.3	28.6	29.1	34.1	37.5	40.8	
AEO 2006													-0.4	1.1	1.3	6.4	16.6	14.1	18.4	25.0	23.1	23.1	27.8	31.0	33.6	
AEO 2007														0.5	0.0	4.3	13.7	11.4	15.7	21.9	20.3	20.7	25.3	28.4	30.7	
AEO 2008															-0.4	3.0	11.0	7.8	11.9	17.6	14.9	14.5	18.4	20.9	22.7	
AEO 2009																0.7	5.8	3.0	6.7	11.8	9.4	8.3	10.9	12.6	13.9	
AEO 2010																		2.3	-1.0	3.7	9.2	6.6	6.2	9.0	10.8	12.1
AEO 2011																			1.2	3.0	7.6	5.7	4.5	8.0	9.9	11.0
AEO 2012																				3.5	6.6	1.8	0.6	2.9	4.2	5.1
AEO 2013																					2.6	0.2	-0.8	2.3	2.9	4.5
AEO 2014																					1.2	0.4	3.1	3.7	5.4	
AEO 2015																						1.5	3.2	4.8	5.1	
AEO 2016																							0.3	2.0	3.5	
AEO 2017																								-0.6	0.8	
AEO 2018																									0.2	
Average absolute percent difference	2.4	2.4	2.7	5.0	4.4	3.5	2.9	4.4	2.4	2.6	2.7	2.6	2.4	3.8	3.8	7.0	15.6	12.4	16.3	21.2	18.2	17.3	20.4	19.5	20.4	

Sources: Projections: Annual Energy Outlook, Reference case projections, various editions.

Historical data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved July 18, 2018. Series: TOTALTETCEUSA. Shading indicates overestimation (blue) or underestimation (green).

Table 23. Energy intensity, projected vs. actual

Projected (quadrillion Btu / \$Billion 2009 Chained GDP)		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994		10.0	9.9	9.8	9.6	9.5	9.4	9.3	9.1	9.0	8.9	8.8	8.7	8.6	8.5	8.4	8.3	8.3	8.2							
AEO 1995			9.7	9.6	9.4	9.3	9.2	9.0	8.9	8.8	8.7	8.6	8.5	8.4	8.3	8.2	8.1	8.0	8.0							
AEO 1996				9.5	9.4	9.3	9.2	9.0	8.9	8.7	8.7	8.6	8.5	8.4	8.3	8.2	8.1	8.1	8.0	7.9	7.9	7.8	7.7	7.7		
AEO 1997					9.2	9.1	9.0	8.9	8.8	8.7	8.6	8.6	8.5	8.4	8.3	8.2	8.1	8.0	8.0	7.9	7.8	7.8	7.7	7.6		
AEO 1998						9.0	9.0	8.9	8.8	8.7	8.6	8.6	8.5	8.5	8.4	8.3	8.2	8.1	8.1	8.0	7.9	7.8	7.7	7.6	7.6	7.6
AEO 1999							8.6	8.6	8.6	8.6	8.5	8.4	8.2	8.1	8.0	7.9	7.8	7.7	7.6	7.5	7.4	7.4	7.3	7.3	7.2	7.1
AEO 2000								8.4	8.4	8.3	8.2	8.1	8.0	7.9	7.8	7.8	7.7	7.6	7.5	7.4	7.4	7.3	7.2	7.1	7.0	7.0
AEO 2001									7.7	7.6	7.5	7.4	7.3	7.2	7.1	7.0	6.9	6.8	6.6	6.5	6.4	6.3	6.2	6.1	6.0	5.9
AEO 2002										7.8	7.8	7.8	7.7	7.6	7.5	7.4	7.2	7.1	6.9	6.8	6.7	6.6	6.4	6.3	6.2	6.1
AEO 2003											7.6	7.6	7.5	7.4	7.3	7.2	7.1	6.9	6.8	6.7	6.6	6.5	6.4	6.3	6.2	6.1
AEO 2004												7.5	7.4	7.3	7.2	7.1	7.0	6.8	6.7	6.7	6.6	6.5	6.4	6.3	6.2	6.1
AEO 2005													7.3	7.2	7.1	7.0	6.9	6.8	6.7	6.6	6.5	6.4	6.2	6.1	6.0	5.9
AEO 2006														7.1	6.9	6.9	6.7	6.6	6.5	6.4	6.3	6.2	6.1	6.0	5.8	5.7
AEO 2007															7.0	6.9	6.8	6.7	6.5	6.4	6.3	6.2	6.1	6.0	5.9	5.8
AEO 2008																6.9	6.9	6.7	6.5	6.4	6.3	6.2	6.0	5.9	5.8	5.7
AEO 2009																	6.8	6.8	6.7	6.6	6.4	6.3	6.1	6.0	5.8	5.7
AEO 2010																		6.6	6.6	6.5	6.4	6.3	6.2	6.0	5.9	5.7
AEO 2011																			6.5	6.4	6.2	6.1	6.0	5.9	5.8	5.6
AEO 2012																				6.5	6.4	6.2	6.0	5.8	5.7	5.5
AEO 2013																					6.2	6.2	6.0	5.9	5.7	5.6
AEO 2014																						6.2	6.0	5.9	5.7	5.6
AEO 2015																							5.9	5.7	5.6	5.5
AEO 2016																								5.7	5.6	5.5
AEO 2017																									5.8	5.7
AEO 2018																										5.7
Actual*		9.2	9.0	8.9	8.9	8.6	8.2	8.0	7.9	7.6	7.6	7.4	7.3	7.0	6.8	6.8	6.7	6.5	6.6	6.5	6.2	6.2	6.1	5.9	5.8	5.7
Average absolute difference		0.8	0.8	0.7	0.5	0.7	0.8	0.9	0.8	0.9	0.8	0.8	0.7	0.8	0.9	0.8	0.7	0.7	0.6	0.5	0.6	0.4	0.4	0.5	0.3	0.3

Table 23. Energy intensity, projected vs. actual (continued)

Projected vs. actual (percent difference)		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AEO 1994		9.2	9.8	9.3	8.3	10.9	13.9	15.6	16.3	19.1	18.1	19.6	20.2	22.6	25.4	24.1	25.0	26.4	24.0							
AEO 1995			7.6	7.0	6.1	8.3	11.1	12.8	13.3	16.1	14.9	16.2	16.5	18.9	21.7	20.7	21.8	23.2	20.9							
AEO 1996				6.6	6.0	8.4	11.0	12.6	12.9	15.4	14.4	16.1	16.8	19.2	21.9	20.8	22.1	23.5	21.3	22.9	28.1	25.6	25.8	29.4		
AEO 1997					2.8	6.2	9.7	11.6	12.2	15.0	14.2	16.0	16.6	19.0	21.8	20.6	21.6	23.0	20.6	22.2	27.2	24.6	24.9	28.5		
AEO 1998						4.9	8.8	11.8	12.8	16.2	15.5	17.2	17.6	20.2	23.2	22.2	23.2	24.6	22.2	23.7	28.5	25.7	26.1	29.8	30.6	32.1
AEO 1999							3.9	7.9	9.6	13.2	12.2	13.4	13.4	15.3	17.6	16.2	16.8	17.8	15.0	16.5	21.1	18.8	19.2	22.5	23.2	24.8
AEO 2000								4.4	6.2	8.8	8.3	9.9	10.1	12.3	15.1	14.1	15.0	16.2	13.7	15.2	19.6	16.9	16.8	19.9	20.4	21.6
AEO 2001									-1.8	0.5	-0.5	0.8	0.9	2.5	4.4	3.0	3.1	3.4	0.6	1.0	3.9	1.0	0.5	2.7	2.6	3.2
AEO 2002										2.9	3.7	6.1	6.5	8.4	10.6	8.9	8.4	8.2	4.8	5.0	8.3	5.4	4.9	6.9	6.5	6.7
AEO 2003											1.0	2.7	2.7	4.5	6.9	5.7	5.8	6.2	3.2	3.8	7.1	4.3	3.9	6.2	6.2	6.7
AEO 2004												1.8	1.7	3.7	5.7	4.2	4.4	4.7	2.4	3.3	6.8	3.9	3.5	5.7	5.7	6.2
AEO 2005													0.0	1.7	3.8	2.4	3.5	4.1	1.4	2.0	5.3	2.1	1.4	3.3	3.0	3.4
AEO 2006														1.0	1.9	0.9	0.7	1.1	-1.4	-0.9	2.4	-0.5	-1.2	0.6	0.1	0.0
AEO 2007															2.2	1.5	1.5	1.9	-0.8	-0.4	2.8	0.0	-0.4	1.5	1.1	1.0
AEO 2008																1.7	2.8	2.1	-1.1	-0.9	2.0	-1.2	-1.6	0.4	0.1	0.4
AEO 2009																	1.6	4.2	1.7	1.8	4.4	0.7	-0.5	0.8	0.1	-0.1
AEO 2010																		1.7	0.6	1.3	4.0	0.7	0.2	1.6	0.7	0.5
AEO 2011																			-1.1	-0.5	1.5	-2.0	-2.6	-0.7	-1.4	-1.4
AEO 2012																				1.0	4.1	-0.7	-2.4	-1.8	-3.0	-3.2
AEO 2013																					1.4	-1.0	-2.3	-0.7	-1.6	-1.7
AEO 2014																						-1.1	-2.4	-0.7	-1.6	-1.5
AEO 2015																							-3.8	-3.8	-3.9	-3.9
AEO 2016																								-3.7	-4.3	-4.0
AEO 2017																									-0.7	-0.5
AEO 2018																										-0.8
Average absolute percent difference		9.2	8.7	7.7	5.8	7.7	9.8	11.0	10.6	11.9	10.3	10.9	10.2	11.5	13.0	11.1	11.1	11.3	8.7	7.2	9.9	7.2	7.2	8.2	5.8	5.9

Sources: Projections: *Annual Energy Outlook*, Reference case projections, various editions.

Historical Data: Bureau of Economic Analysis, US Dept. of Commerce, June 2016. Shading indicates overestimation (blue) or underestimation (green).

* Actual energy intensity is based on BEA data using 2009 chained dollars.