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Annual Energy Outlook (AEO) Retrospective Review: Evaluation of AEO2020 and Previous Reference Case Projections

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Evaluation of AEO2020 and Previous Reference Case Projections

The U.S. Energy Information Administration (EIA) projects U.S. energy production, consumption, and prices each year in the *Annual Energy Outlook* (AEO). Every two years, 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. It also 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 publically available assumptions include projections of oil prices and gross domestic product (GDP).¹ The AEO Reference case projection generally assumes current laws and regulations, and it includes current views in economic and demographic trends and technology improvements.

Although the *AEO Retrospective* focuses on the Reference case projections, we review the projections in the context of the AEO's full range of cases, which illustrate the uncertainty inherent in long-term projections. Beyond the Reference case, each year's AEO typically includes cases that vary assumptions on economic growth, oil and natural gas supply, oil price, and renewable cost. In addition, recent AEOs have also included alternative cases that examine alternative policy developments.

Methodology overview

The AEO Retrospective summarizes the relationship between the Reference case projections and realized energy usage by comparing absolute differences and the average absolute percentage differences for many of the major measures published in AEOs from 1994 to 2020.² The average absolute percentage 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 is available through the EIA [open data API](#).³

Table 1 summarizes 25 comparisons based on 21 primary measures projected in the AEOs for each year. 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 2020.^{4,5} For price quantities, we computed the standard deviations of the log errors. The third column of Table 1 summarizes 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.

Tables 3 through 23 show the detailed results that include the Reference case projections, historical values, and percentage 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. In addition, the statistics 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.

Key findings

As reflected in the relatively lower average absolute percentage 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 AEO reviewed in this report includes alternative cases exploring differences in economic growth (Low Economic Growth case and High Economic Growth case) and in oil prices (Low Oil Price case and High Oil Price case).

In an unbiased projection, with a sufficiently large number of samples, overestimates and underestimates over time would occur in equal measure. In comparing the AEO Reference case projections with realized outcomes from 1994 to 2019, out of the 25 variables listed in Table 1, 17 more variables have historically been overestimated than underestimated.

Changes in industry-specific market conditions, significant technological breakthroughs, and new laws or regulations after the publication of an AEO can also lead to significant differences between projections and realized outcomes. For example, AEO Reference case projections from AEO1998 through AEO2017 projected the United States to continue to be a net importer of natural gas through 2017. In reality the United States became a net exporter of natural gas starting in 2017.

Notes

1. NEMS documentation is available on [the EIA website](#).
2. EIA has used the National Energy Modeling System 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](#). Further, projections in AEO1994 and AEO1995 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).
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 (for example, $H=0$ 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, 1994-2019

Variable	Average Absolute Percent Differences	Percent of Projections overestimated
Gross Domestic Product		
Real Gross Domestic Product (Average Cumulative Growth) ¹ (Table 3)	0.8	57.1
Petroleum		
Imported Refiner Acquisition Cost of Crude Oil (Constant \$) (Table 4a)	41.7	28.4
Imported Refiner Acquisition Cost of Crude Oil (Nominal \$) (Table 4b)	41.3	30.1
Total Petroleum Consumption (Table 5)	9.7	70.5
Crude Oil Production (Table 6)	17.6	34.1
Petroleum Net Imports (Table 7)	220.1	83.2
Natural Gas		
Natural Gas Price, Electric Power Sector (Constant \$) ² (Table 8a)	41.2	53.7
Natural Gas Price, Electric Power Sector (Nominal \$) ² (Table 8b)	43.2	55.7
Total Natural Gas Consumption (Table 9)	8.7	58.2
Natural Gas Production (Table 10)	10.1	42.9
Natural Gas Net Imports (Table 11) ³	302.2	65.9
Coal		
Coal Prices to Electric Generating Plants (Constant \$) ⁴ (Table 12a)	20.1	38.6
Coal Prices to Electric Generating Plants (Nominal \$) ⁴ (Table 12b)	19.4	41.2
Total Coal Consumption (Table 13)	26.3	78.7
Coal Production (Table 14)	21.4	79.0
Electricity		
Average Electricity Prices (Constant \$) (Table 15a)	10.2	29.8
Average Electricity Prices (Nominal \$) (Table 15b)	10.4	36.1
Total Electricity Sales (Table 16)	6.8	67.0
Total Energy, Carbon and Intensity		
Total Energy Consumption (Table 17)	8.5	79.8
Delivered Residential Energy Consumption (Table 18)	6.8	71.0
Delivered Commercial Energy Consumption (Table 19)	6.9	54.3
Delivered Industrial Energy Consumption (Table 20)	11.3	82.4
Delivered Transportation Energy Consumption (Table 21)	10.3	77.6
Total Energy Related Carbon Dioxide Emissions (Table 22)	12.8	78.1
Energy Intensity (Energy Consumption / Real \$ GDP) (Table 23)	12.3	97.7

AEO - Annual Energy Outlook

Source: These statistics summarize the calculations in Tables 2 through 23. The data in Tables 2 through 23 are based on the 1994 through 2020 AEO Reference case projections. Historical Data are from the U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC, September 2020), 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, August 2020, <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, the wellhead price of natural gas was no longer reported by EIA. 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 approached zero and then turned negative (indicating the change to U.S. net exporter status), the average absolute percent difference increased significantly.

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

Table 2. Standard deviations of the forecast errors

	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)	0.008	0.009	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.010	0.010	0.010	0.009	0.008	0.008
Petroleum																
Imported Refiner Acquisition Cost of Crude Oil (Constant \$) (Table 3a)	0.047	0.190	0.355	0.438	0.543	0.612	0.659	0.721	0.753	0.727	0.704	0.650	0.515	0.469	0.448	0.389
Imported Refiner Acquisition Cost of Crude Oil (Nominal \$) (Table 3b)	0.047	0.195	0.363	0.447	0.553	0.621	0.666	0.728	0.762	0.736	0.710	0.653	0.519	0.472	0.454	0.379
Total Petroleum Consumption (Table 4)	0.009	0.020	0.035	0.047	0.061	0.076	0.086	0.097	0.107	0.113	0.122	0.125	0.116	0.105	0.094	0.082
Crude Oil Production (Table 5)	0.017	0.057	0.105	0.139	0.158	0.165	0.179	0.193	0.200	0.203	0.206	0.211	0.214	0.221	0.222	0.214
Petroleum Net Imports (Table 6)	8.019	29.333	0.689	0.874	1.013	0.703	1.395	2.003	2.230	3.010	3.221	3.273	4.012	4.876	5.429	6.656
Natural Gas																
Natural Gas Price, Electric Power Sector (Constant \$) ² (Table 7a)	0.055	0.214	0.334	0.393	0.468	0.527	0.555	0.575	0.612	0.639	0.663	0.652	0.624	0.573	0.507	0.451
Natural Gas Price, Electric Power Sector (Nominal \$) ² (Table 7b)	0.057	0.218	0.339	0.397	0.469	0.528	0.552	0.568	0.604	0.628	0.646	0.632	0.599	0.545	0.485	0.427
Total Natural Gas Consumption (Table 8)	0.020	0.038	0.061	0.076	0.092	0.107	0.118	0.132	0.141	0.149	0.154	0.145	0.126	0.107	0.088	0.070
Natural Gas Production (Table 9)	0.015	0.041	0.067	0.082	0.102	0.121	0.139	0.162	0.181	0.199	0.206	0.202	0.193	0.171	0.149	0.131
Natural Gas Net Imports (Table 10) ³	0.111	0.692	0.360	0.571	0.524	1.815	2.502	5.070	5.400	4.814	8.765	12.319	11.033	16.417	16.060	14.880
Coal																
Coal Prices to Electric Generating Plants (Constant \$) ⁴ (Table 11a)	0.028	0.067	0.112	0.155	0.198	0.238	0.273	0.295	0.309	0.314	0.317	0.310	0.284	0.271	0.251	0.215
Coal Prices to Electric Generating Plants (Nominal \$) ⁴ (Table 11b)	0.029	0.071	0.121	0.167	0.212	0.253	0.289	0.314	0.330	0.340	0.345	0.337	0.310	0.296	0.280	0.245
Total Coal Consumption (Table 12)	0.021	0.050	0.082	0.116	0.142	0.183	0.203	0.233	0.267	0.313	0.358	0.387	0.416	0.430	0.431	0.426
Coal Production (Table 13)	0.040	0.044	0.080	0.104	0.122	0.147	0.156	0.178	0.198	0.226	0.255	0.275	0.295	0.310	0.315	0.324
Electricity																
Average Electricity Prices (Constant \$) (Table 14a)	0.021	0.038	0.067	0.083	0.105	0.119	0.126	0.129	0.132	0.137	0.138	0.134	0.121	0.107	0.105	0.104
Average Electricity Prices (Nominal \$) (Table 14b)	0.022	0.041	0.077	0.100	0.123	0.138	0.148	0.153	0.160	0.168	0.169	0.163	0.150	0.140	0.144	0.150
Total Electricity Sales (Table 15)	0.009	0.016	0.023	0.032	0.038	0.048	0.055	0.065	0.073	0.082	0.091	0.102	0.112	0.120	0.123	0.125
Total Energy, Carbon and Intensity																
Total Energy Consumption (Table 16)	0.009	0.019	0.029	0.035	0.042	0.052	0.059	0.066	0.072	0.077	0.082	0.086	0.085	0.083	0.083	0.080
Delivered Residential Energy Consumption (Table 17)	0.025	0.046	0.045	0.049	0.056	0.064	0.070	0.070	0.076	0.086	0.091	0.093	0.095	0.089	0.097	0.103
Delivered Commercial Energy Consumption (Table 18)	0.020	0.031	0.041	0.053	0.061	0.071	0.083	0.089	0.096	0.106	0.110	0.117	0.119	0.121	0.129	0.132
Delivered Industrial Energy Consumption (Table 19)	0.019	0.033	0.045	0.051	0.057	0.063	0.069	0.083	0.095	0.096	0.103	0.104	0.089	0.077	0.065	0.056
Delivered Transportation Energy Consumption (Table 20)	0.016	0.024	0.031	0.040	0.053	0.062	0.073	0.083	0.093	0.102	0.113	0.121	0.120	0.118	0.114	0.110
Total Energy Related Carbon Dioxide Emissions (Table 21)	0.019	0.027	0.037	0.046	0.057	0.072	0.083	0.095	0.106	0.116	0.126	0.136	0.143	0.148	0.149	0.145
Energy Intensity (Energy Consumption / Real \$ GDP) (Table 22)	0.035	0.040	0.046	0.054	0.063	0.066	0.070	0.076	0.082	0.085	0.091	0.094	0.097	0.102	0.101	0.097

Standard deviations of the percentage projection error, except for the price quantities, which are given as the log of the error. Methodology derived from Kaack et al. "Empirical Prediction Intervals Improve Energy Forecasting," Proceedings of the National Academies of Sciences 114, 33. H represents the number of years since the first projection year.

Sources: Projections: Annual Energy Outlook, Reference Case Projections, Various Editions.

Table 3. Real Gross Domestic Product Growth Trends, Projected vs. Actual

Projected Real GDP Growth Trend

(cumulative average percent growth in projected 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	2018	2019	
AEO 1994	3.09	3.15	2.86	2.78	2.73	2.65	2.62	2.60	2.56	2.53	2.52	2.49	2.45	2.41	2.40	2.36	2.32	2.29										
AEO 1995		3.66	2.77	2.53	2.71	2.67	2.61	2.55	2.48	2.46	2.45	2.45	2.43	2.39	2.35	2.31	2.27	2.24										
AEO 1996			2.61	2.20	2.46	2.48	2.46	2.46	2.45	2.41	2.37	2.36	2.35	2.33	2.28	2.24	2.20	2.16	2.13	2.10	2.07	2.04	2.01					
AEO 1997				2.14	1.87	2.02	2.19	2.28	2.27	2.23	2.24	2.23	2.21	2.22	2.22	2.17	2.12	2.09	2.05	2.02	1.99	1.97	1.93					
AEO 1998					3.40	2.87	2.63	2.52	2.44	2.37	2.31	2.30	2.30	2.30	2.28	2.27	2.25	2.23	2.20	2.17	2.14	2.10	2.06	2.03	2.00	1.97	1.94	
AEO 1999						3.39	2.49	2.51	2.41	2.37	2.36	2.34	2.37	2.39	2.40	2.41	2.40	2.40	2.35	2.32	2.27	2.24	2.22	2.19	2.16	2.13	2.11	
AEO 2000							3.79	2.86	2.74	2.63	2.62	2.63	2.63	2.57	2.52	2.48	2.44	2.41	2.35	2.32	2.32	2.32	2.32	2.28	2.25	2.23	2.21	
AEO 2001								5.21	4.52	4.18	3.90	3.70	3.58	3.47	3.41	3.36	3.32	3.29	3.25	3.23	3.21	3.20	3.18	3.14	3.11	3.07	3.04	
AEO 2002									1.03	1.61	2.13	2.30	2.47	2.53	2.61	2.73	2.84	2.93	3.01	3.01	3.01	3.01	3.01	3.01	3.02	3.01	2.99	
AEO 2003										2.44	2.83	3.02	2.98	2.97	3.02	3.10	3.15	3.22	3.24	3.24	3.22	3.21	3.18	3.15	3.14	3.12	3.12	
AEO 2004											2.30	3.02	3.29	3.34	3.35	3.34	3.29	3.25	3.21	3.18	3.18	3.16	3.14	3.11	3.10	3.09	3.06	
AEO 2005												4.36	3.96	3.64	3.58	3.44	3.40	3.36	3.31	3.27	3.25	3.26	3.24	3.21	3.21	3.20	3.18	
AEO 2006													3.64	3.46	3.36	3.39	3.33	3.27	3.21	3.16	3.13	3.12	3.12	3.13	3.15	3.15	3.12	
AEO 2007														3.32	2.89	2.94	2.97	2.97	2.98	2.94	2.91	2.90	2.89	2.90	2.92	2.93	2.93	
AEO 2008															2.14	1.87	2.11	2.41	2.58	2.60	2.57	2.55	2.55	2.53	2.52	2.51		
AEO 2009																1.28	-0.83	0.22	1.07	1.52	1.78	1.89	1.95	2.01	2.08	2.15	2.21	
AEO 2010																	-2.83	-0.90	0.55	1.32	1.61	1.75	1.90	2.02	2.11	2.20	2.28	
AEO 2011																		2.65	2.40	2.91	3.16	2.97	2.95	2.92	2.88	2.84	2.80	
AEO 2012																			1.76	1.51	1.79	2.25	2.49	2.59	2.59	2.53	2.51	
AEO 2013																					1.84	2.19	2.50	2.61	2.68	2.69	2.69	
AEO 2014																						1.84	2.32	2.63	2.75	2.78	2.74	2.70
AEO 2015																							2.20	2.65	2.61	2.54	2.57	2.57
AEO 2016																								2.18	2.11	2.45	2.71	2.67
AEO2017																									2.07	2.31	2.29	2.20
AEO2018																										2.16	2.25	2.29
AEO2019																											2.36	2.48
AEO2020																												2.44
Average Absolute Difference	0.34	0.30	0.32	1.04	1.26	1.42	1.63	1.62	1.09	0.90	0.79	0.72	0.62	0.59	0.61	0.85	1.04	0.92	0.92	0.88	0.82	0.74	0.69	0.70	0.62	0.54	0.52	

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	2018	2019	
AEO 1994	2.75	3.39	3.15	3.31	3.53	3.69	3.84	3.88	3.55	3.37	3.33	3.36	3.38	3.34	3.24	3.03	2.69	2.68										
AEO 1995		4.03	3.35	3.49	3.73	3.88	4.03	4.04	3.66	3.44	3.38	3.42	3.43	3.38	3.28	3.04	2.69	2.68										
AEO 1996		2.68	3.23	3.63	3.84	4.03	4.04	3.60	3.37	3.31	3.36	3.37	3.33	3.22	2.97	2.60	2.60	2.53	2.52	2.48	2.48	2.51						
AEO 1997			3.77	4.11	4.23	4.36	4.32	3.76	3.47	3.39	3.44	3.44	3.39	3.26	3.00	2.59	2.59	2.52	2.51	2.47	2.47	2.50						
AEO 1998				4.45	4.46	4.56	4.45	3.75	3.41	3.33	3.39	3.41	3.35	3.22	2.93	2.50	2.51	2.44	2.43	2.39	2.40	2.44	2.40	2.40	2.40	2.42	2.41	
AEO 1999					4.48	4.62	4.45	3.58	3.21	3.15	3.24	3.28	3.23	3.09	2.80	2.34	2.36	2.30	2.30	2.27	2.28	2.33	2.29	2.30	2.33	2.32		
AEO 2000						4.75	4.44	3.28	2.89	2.89	3.04	3.11	3.07	2.94	2.63	2.15	2.18	2.13	2.14	2.12	2.15	2.20	2.17	2.18	2.22	2.22		
AEO 2001							4.13	2.55	2.28	2.43	2.70	2.83	2.84	2.72	2.40	1.89	1.95	1.92	1.94	1.94	1.98	2.04	2.02	2.04	2.09	2.10		
AEO 2002								1.00	1.37	1.86	2.34	2.58	2.62	2.52	2.18	1.65	1.74	1.72	1.76	1.77	1.82	1.91	1.89	1.92	1.98	1.99		
AEO 2003									1.74	2.30	2.80	2.98	2.95	2.77	2.35	1.73	1.82	1.79	1.83	1.83	1.89	1.97	1.95	1.98	2.04	2.04		
AEO 2004										2.86	3.33	3.39	3.26	2.98	2.45	1.72	1.83	1.80	1.84	1.84	1.90	1.99	1.97	1.99	2.06	2.06		
AEO 2005											3.80	3.66	3.39	3.01	2.37	1.54	1.68	1.67	1.73	1.74	1.81	1.92	1.90	1.93	2.00	2.01		
AEO 2006												3.51	3.18	2.75	2.02	1.09	1.33	1.37	1.48	1.52	1.62	1.75	1.75	1.79	1.88	1.89		
AEO 2007													2.86	2.36	1.52	0.49	0.90	1.01	1.19	1.27	1.41	1.57	1.59	1.65	1.75	1.78		
AEO 2008														1.88	0.86	-0.28	0.42	0.65	0.91	1.04	1.23	1.43	1.46	1.54	1.66	1.70		
AEO 2009															-0.14	-1.34	-0.06	0.34	0.72	0.91	1.14	1.38	1.41	1.51	1.64	1.68		
AEO 2010																-2.54	-0.02	0.50	0.94	1.12	1.35	1.59	1.61	1.69	1.82	1.85		
AEO 2011																	2.56	2.06	2.12	2.05	2.15	2.30	2.22	2.23	2.32	2.30		
AEO 2012																		1.55	1.90	1.88	2.04	2.25	2.16	2.18	2.28	2.27		
AEO 2013																			2.25	2.05	2.21	2.42	2.28	2.29	2.39	2.36		
AEO 2014																				1.84	2.18	2.48	2.29	2.30	2.41	2.38		
AEO 2015																					2.53	2.80	2.44	2.41	2.53	2.47		
AEO 2016																						3.08	2.39	2.37	2.53	2.45		
AEO 2017																								1.71	2.02	2.35	2.30	
AEO 2018																									2.33	2.66	2.50	
AEO 2019																										2.66	2.50	
AEO 2020																											2.50	
Growth Rate, Real GDP*	2.75	4.03	2.68	3.77	4.45	4.48	4.75	4.13	1.00	1.74	2.86	3.80	3.51	2.86	1.88	-0.14	-2.54	2.56	1.55	2.25	1.84	2.53	3.08	1.71	2.33	3.00	2.16	

* These are historical annual growth rates in real GDP (2012 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, US Dept. of Commerce, August 2020. 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	2018	2019	
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	20.19	20.22	20.37	20.52	20.66	20.81	20.95	21.10	21.23	21.35	21.48	21.62	21.78	21.94	22.11	
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	22.35	22.53	
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	21.84	21.95	
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	22.22	22.33	
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	24.40	24.55	
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	25.18	25.33	
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	25.64	25.84	
AEO 2005	2003												35.00	33.99	30.00	27.35	26.15	25.30	25.00	25.35	25.69	26.04	26.39	26.75	27.10	27.45	27.79	28.14	
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	43.39	43.78	44.19	44.59	
AEO 2007	2005														61.75	59.49	57.23	54.21	51.20	48.48	46.22	45.01	44.41	44.61	44.81	45.22	45.64	46.05	
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	50.15	50.92	
AEO 2009	2007																96.46	38.75	48.99	61.99	72.15	80.99	88.62	96.77	101.92	106.21	110.53	112.78	
AEO 2010	2008																	56.49	67.40	66.63	72.94	79.09	83.84	86.88	90.10	92.72	95.59	96.89	
AEO 2011	2009																		74.86	80.32	82.87	85.07	86.83	88.96	91.56	94.04	96.42		
AEO 2012	2010																			99.99	99.08	106.64	110.90	113.97	111.53	113.12	113.75	114.63	
AEO 2013	2011																				101.31	96.02	93.95	92.92	94.04	96.15	98.16	100.21	
AEO 2014	2012																					101.56	98.00	88.93	85.16	83.72	84.18	85.84	
AEO 2015	2013																						100.91	57.58	73.57	78.22	78.22	79.78	
AEO 2016	2015																							52.32	36.84	48.08	58.11	70.11	
AEO 2017	2016																								38.48	45.54	56.31	63.08	
AEO 2018	2017																									46.73	46.00	47.11	
AEO 2019	2018																										64.51	64.44	
AEO 2020	2019																											56.76	
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	60.95	57.94	
Average Absolute Difference		0.92	0.94	0.33	1.87	0.53	5.91	2.58	5.85	1.77	1.70	3.46	9.13	17.91	23.14	26.46	43.50	19.10	28.34	45.70	45.57	39.84	38.00	28.20	31.29	33.15	36.03	33.02	

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	2018	2019	
AEO 1994		5.9	10.8	5.8	-7.0	9.1	77.0	30.7	-13.3	16.6	14.8	4.0	-14.8	-33.8	-42.0	-46.1	-59.2	-34.1	-47.0									
AEO 1995			-1.9	-0.2	-13.1	1.7	63.3	19.0	-21.8	3.4	0.0	-10.8	-27.8	-44.2	-51.3	-55.1	-66.2	-45.3	-55.7									
AEO 1996				0.2	-14.5	-0.8	59.7	17.0	-22.8	2.6	-0.6	-11.3	-28.2	-44.4	-51.8	-55.7	-66.8	-46.8	-57.3	-67.3	-65.6	-63.5	-58.7	-18.5				
AEO 1997					-3.7	3.6	58.4	12.2	-28.6	-5.9	-9.7	-20.1	-35.9	-50.9	-57.8	-61.5	-71.5	-54.7	-64.0	-72.7	-71.5	-70.0	-66.4	-34.2				
AEO 1998						-0.3	53.7	12.3	-26.4	-4.0	-8.9	-19.4	-35.5	-50.6	-57.8	-61.6	-71.5	-54.7	-64.0	-72.6	-71.5	-69.9	-66.2	-33.8	-19.4	-34.7	-45.7	-41.5
AEO 1999							3.9	-21.2	-47.1	-25.9	-25.4	-30.1	-41.6	-53.7	-58.7	-61.3	-71.3	-54.3	-63.7	-72.5	-71.3	-69.8	-66.1	-33.6	-19.3	-34.6	-45.7	-41.4
AEO 2000								0.7	-20.7	-3.4	-8.4	-19.7	-36.0	-51.3	-58.3	-62.1	-71.9	-55.4	-64.7	-73.2	-72.1	-70.6	-67.1	-35.5	-21.6	-36.7	-47.5	-43.5
AEO 2001									1.8	13.1	-4.0	-19.8	-35.9	-51.2	-58.2	-62.0	-71.9	-55.3	-64.6	-73.1	-72.1	-70.6	-67.0	-35.4	-21.4	-36.5	-47.4	-43.4
AEO 2002										4.4	-7.6	-14.5	-31.7	-47.9	-55.3	-59.4	-69.9	-52.2	-62.1	-71.2	-70.1	-68.5	-64.6	-30.7	-15.7	-31.8	-43.4	-39.1
AEO 2003											-0.1	-3.6	-28.8	-47.8	-55.2	-59.2	-69.8	-52.0	-61.9	-71.1	-69.9	-68.3	-64.4	-30.1	-15.0	-31.2	-42.9	-38.5
AEO 2004												0.2	-30.5	-48.6	-55.8	-59.7	-70.1	-52.5	-62.2	-71.3	-70.1	-68.4	-64.5	-30.3	-15.0	-31.2	-42.8	-38.2
AEO 2005													0.1	-26.3	-44.5	-54.3	-67.8	-50.8	-61.6	-70.6	-69.2	-67.3	-63.0	-26.9	-10.4	-27.1	-39.1	-34.0
AEO 2006														4.9	-2.9	-16.3	-41.3	-12.0	-34.3	-50.6	-49.1	-46.9	-41.0	14.4	39.6	13.2	-5.7	1.9
AEO 2007															7.8	-6.1	-33.5	-0.4	-25.8	-47.0	-47.7	-46.6	-41.2	15.1	39.9	13.4	-5.5	2.1
AEO 2008																-4.9	-17.9	21.8	-8.3	-33.5	-34.0	-33.9	-29.8	30.3	49.6	20.5	0.8	9.5
AEO 2009																	6.0	-32.7	-32.9	-35.9	-22.8	-9.2	10.9	135.9	200.7	151.8	116.3	136.3
AEO 2010																		-3.8	-9.4	-32.4	-23.5	-13.0	2.9	107.8	160.7	115.6	83.5	99.1
AEO 2011																			-0.2	-19.2	-16.0	-9.5	3.6	106.1	155.5	111.3	79.1	96.7
AEO 2012																				-0.5	2.0	15.1	33.5	167.4	216.6	158.1	114.2	131.1
AEO 2013																					2.1	1.5	10.8	113.5	161.5	114.9	81.0	97.9
AEO 2014																						5.3	13.4	100.5	132.3	83.6	52.3	66.3
AEO 2015																							14.8	27.6	97.3	68.6	39.1	51.9
AEO 2016																								12.8	-3.9	0.8	0.5	29.8
AEO 2017																									-0.7	-5.5	-3.6	15.6
AEO 2018																										-4.9	-22.7	-15.3
AEO 2019																											5.8	11.3
AEO 2020																												-2.0
Average Absolute Percent Difference		5.9	6.3	2.0	9.6	3.1	52.7	16.1	22.8	8.8	7.9	14.0	28.9	42.7	47.0	48.4	57.9	39.9	46.6	55.0	50.0	45.7	42.5	54.3	63.5	49.0	40.2	43.4

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/>) (Washington, DC). Retrieved September 24, 2020. Series: TOTAL.RACPUUS.A Bureau of Economic Analysis, US Dept. of Commerce, August 2020. 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	2018	2019
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	41.86	43.74
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	39.09	41.05
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	33.58	34.89
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	33.31	34.62
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	38.84	40.41
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	37.15	38.43
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	38.32	39.97
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	38.78	40.36
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	61.25	63.51
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	58.32	59.94
AEO 2008															63.72	75.98	72.58	70.43	68.90	67.16	65.24	63.33	61.38	59.33	60.64	62.69	65.00
AEO 2009																98.58	39.99	50.84	65.08	76.70	87.64	97.94	109.32	117.78	125.56	133.76	139.73
AEO 2010																	57.35	69.43	69.54	77.21	85.19	91.87	96.82	102.20	107.12	112.49	116.13
AEO 2011																		75.52	82.10	83.37	87.10	91.03	94.78	99.05	104.05	109.12	114.16
AEO 2012																			102.10	102.50	111.15	117.41	122.81	122.33	126.23	129.18	132.42
AEO 2013																				103.10	99.38	98.61	99.02	101.79	105.65	109.60	113.66
AEO 2014																					103.07	101.27	93.33	90.75	90.53	92.41	95.70
AEO 2015																						102.51	59.61	77.64	83.99	85.57	88.91
AEO 2016																							52.86	37.91	50.52	62.26	76.62
AEO 2017																								38.48	46.53	58.65	67.09
AEO 2018																									46.73	47.03	49.28
AEO 2019																										64.51	66.02
AEO 2020																											56.76
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	60.95	57.94
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	36.21	23.87	26.40	25.63	25.36	26.33

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	2018	2019	
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	-31.3	-24.5	
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	-35.9	-29.1	
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	-44.9	-39.8	
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	-45.3	-40.2	
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	-36.3	-30.3	
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	-39.1	-33.7	
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	-37.1	-31.0	
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	-36.4	-30.3	
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	0.5	9.6	
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	-4.3	3.5	
AEO 2008															-5.0	-18.1	22.7	-7.2	-32.9	-33.6	-33.5	-29.3	32.3	53.1	23.4	2.9	12.2	
AEO 2009																6.3	-32.4	-33.0	-36.6	-24.1	-10.7	9.4	135.6	203.9	155.6	119.5	141.2	
AEO 2010																	-3.1	-8.5	-32.2	-23.6	-13.2	2.6	108.7	163.7	118.1	84.6	100.4	
AEO 2011																		-0.5	-20.0	-17.5	-11.2	1.6	104.3	155.6	111.8	79.0	97.0	
AEO 2012																			-0.5	1.4	13.3	31.1	164.7	215.7	157.0	111.9	128.6	
AEO 2013																					2.0	1.3	10.1	113.4	162.7	115.1	79.8	96.2
AEO 2014																						5.1	13.1	101.1	134.2	84.3	51.6	65.2
AEO 2015																							14.5	28.5	100.4	71.0	40.4	53.5
AEO 2016																								13.9	-2.2	2.9	2.2	32.2
AEO 2017																									-0.7	-5.3	-3.8	15.8
AEO 2018																										-4.9	-22.8	-14.9
AEO 2019																											5.8	14.0
AEO 2020																												-2.0
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	40.4	51.4	68.1	52.2	41.6	45.4	

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 September 24, 2020. Series: TOTAL.RACPUUS.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	2018	2019	
AEO 1994		6,450	6,566	6,643	6,723	6,811	6,880	6,957	7,059	7,125	7,205	7,296	7,377	7,446	7,523	7,596	7,665	7,712	7,775										
AEO 1995			6,398	6,544	6,555	6,676	6,745	6,822	6,888	6,964	7,048	7,147	7,245	7,337	7,406	7,472	7,537	7,581	7,621										
AEO 1996				6,490	6,526	6,607	6,709	6,782	6,855	6,942	7,008	7,085	7,176	7,260	7,329	7,384	7,450	7,501	7,545	7,581	7,632	7,676	7,705	7,731					
AEO 1997					6,636	6,694	6,826	6,953	7,074	7,183	7,267	7,369	7,461	7,548	7,643	7,731	7,793	7,833	7,884	7,924	7,961	8,004	8,034	8,074					
AEO 1998						6,895	6,906	7,066	7,161	7,278	7,400	7,488	7,597	7,719	7,859	7,959	8,074	8,190	8,286	8,361	8,455	8,503	8,564	8,634	8,689	8,741	8,801	8,859	
AEO 1999							6,884	7,007	7,269	7,383	7,472	7,539	7,620	7,725	7,841	7,949	8,069	8,174	8,283	8,351	8,422	8,485	8,564	8,652	8,715	8,786	8,865	8,932	
AEO 2000								7,056	7,141	7,266	7,363	7,452	7,578	7,694	7,815	7,926	8,028	8,113	8,217	8,288	8,381	8,482	8,600	8,713	8,795	8,880	8,968	9,060	
AEO 2001									7,119	7,314	7,431	7,528	7,634	7,740	7,853	7,963	8,074	8,179	8,285	8,385	8,482	8,603	8,730	8,856	8,976	9,089	9,200	9,311	
AEO 2002										7,170	7,243	7,485	7,628	7,765	7,879	8,013	8,155	8,311	8,472	8,646	8,779	8,919	9,042	9,150	9,264	9,370	9,490	9,622	
AEO 2003											7,143	7,237	7,364	7,477	7,634	7,812	7,998	8,186	8,390	8,575	8,755	8,920	9,076	9,207	9,343	9,479	9,615	9,768	
AEO 2004												7,259	7,359	7,608	7,772	7,916	8,063	8,168	8,290	8,433	8,602	8,773	8,920	9,052	9,170	9,292	9,408	9,521	
AEO 2005													7,484	7,630	7,775	7,928	8,097	8,268	8,389	8,510	8,625	8,738	8,881	9,003	9,104	9,226	9,360	9,491	
AEO 2006														7,601	7,723	7,742	7,842	7,956	8,094	8,220	8,329	8,420	8,511	8,589	8,684	8,782	8,885	8,976	
AEO 2007															7,546	7,644	7,721	7,805	7,880	7,991	8,077	8,177	8,250	8,342	8,438	8,502	8,591	8,686	
AEO 2008																7,540	7,628	7,558	7,660	7,737	7,796	7,833	7,868	7,914	7,955	7,975	7,989	8,006	
AEO 2009																	7,071	6,851	7,229	7,333	7,380	7,400	7,362	7,308	7,278	7,257	7,257	7,281	
AEO 2010																		6,830	7,026	7,214	7,312	7,336	7,349	7,366	7,386	7,414	7,425	7,470	
AEO 2011																			6,926	6,973	7,293	7,402	7,427	7,461	7,493	7,512	7,517	7,524	
AEO 2012																				6,909	6,951	6,881	6,948	6,971	6,978	6,967	6,950	6,944	
AEO 2013																					6,806	6,850	6,988	7,104	7,158	7,191	7,218	7,243	
AEO 2014																						6,803	6,826	6,996	7,069	7,113	7,131	7,134	
AEO 2015																							6,935	7,031	7,068	7,050	7,114	7,148	
AEO 2016																								7,088	7,114	7,210	7,254	7,321	
AEO 2017																									7,151	7,231	7,323	7,370	
AEO 2018																										7,260	7,419	7,440	
AEO 2019																											7,445	7,535	
AEO 2020																												7,425	
Actual		6,291	6,467	6,469	6,701	6,796	6,905	7,125	7,211	7,172	7,213	7,312	7,588	7,593	7,551	7,548	7,136	6,852	7,001	6,892	6,767	6,921	6,974	7,079	7,206	7,255	7,487	7,498	
Average Absolute Difference		158	84	90	102	105	80	176	154	117	135	139	149	126	192	257	701	987	910	1,075	1,235	1,114	1,077	1,003	955	929	872	870	

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	2018	2019	
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	17.6	18.1
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	18.4	19.1
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	19.8	20.8
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	22.9	24.2
AEO 2002										0.0	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	26.8	28.3
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	28.4	30.3
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	25.7	27.0
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	25.0	26.6
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	18.7	19.7
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	14.7	15.8
AEO 2008																-0.1	6.9	10.3	9.4	12.3	15.2	13.2	12.8	11.8	10.4	9.9	6.7	6.8
AEO 2009																	-0.9	0.0	3.3	6.4	9.0	6.9	5.6	3.2	1.0	0.0	-3.1	-2.9
AEO 2010																		-0.3	0.4	4.7	8.0	6.0	5.4	4.1	2.5	2.2	-0.8	-0.4
AEO 2011																			-1.1	1.2	7.8	6.9	6.5	5.4	4.0	3.5	0.4	0.3
AEO 2012																				0.3	2.7	-0.6	-0.4	-1.5	-3.2	-4.0	-7.2	-7.4
AEO 2013																					0.6	-1.0	0.2	0.3	-0.7	-0.9	-3.6	-3.4
AEO 2014																						-1.7	-2.1	-1.2	-1.9	-2.0	-4.8	-4.9
AEO 2015																							-0.5	-0.7	-1.9	-2.8	-5.0	-4.7
AEO 2016																								0.1	-1.3	-0.6	-3.1	-2.4
AEO 2017																									-0.8	-0.3	-2.2	-1.7
AEO 2018																										0.1	-0.9	-0.8
AEO 2019																											-0.6	0.5
AEO 2020																												-1.0
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	11.6	11.6

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 September 24, 2020. 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	2018	2019	
AEO 1994	2,508	2,373	2,256	2,161	2,088	2,022	1,953	1,891	1,851	1,825	1,799	1,781	1,767	1,759	1,778	1,789	1,807	1,862										
AEO 1995		2,402	2,307	2,205	2,095	2,037	1,967	1,953	1,924	1,916	1,905	1,894	1,883	1,887	1,887	1,920	1,945	1,967										
AEO 1996			2,387	2,310	2,248	2,172	2,113	2,062	2,011	1,978	1,953	1,938	1,916	1,920	1,927	1,949	1,971	1,986	2,000	2,018	2,055	2,095	2,121					
AEO 1997				2,362	2,307	2,245	2,197	2,143	2,091	2,055	2,033	2,015	2,004	1,997	1,989	1,982	1,975	1,967	1,949	1,942	1,935	1,924	1,909					
AEO 1998					2,340	2,332	2,291	2,252	2,220	2,192	2,169	2,145	2,125	2,104	2,087	2,068	2,050	2,033	2,016	1,995	1,974	1,940	1,913	1,886	1,860	1,837	1,818	
AEO 1999						2,340	2,309	2,296	2,265	2,207	2,171	2,141	2,122	2,114	2,092	2,074	2,057	2,040	2,025	2,010	1,992	1,971	1,947	1,924	1,901	1,879	1,847	
AEO 2000							2,193	2,181	2,122	2,063	2,016	1,980	1,957	1,939	1,920	1,904	1,894	1,889	1,889	1,890	1,897	1,897	1,898	1,916	1,921	1,925	1,926	
AEO 2001								2,152	2,161	2,204	2,193	2,111	2,062	1,995	1,957	1,934	1,901	1,879	1,848	1,850	1,852	1,844	1,854	1,876	1,885	1,888	1,861	
AEO 2002									2,133	2,135	2,074	2,008	1,962	1,944	1,943	1,913	1,880	1,855	1,842	1,848	1,912	1,974	2,028	2,084	2,109	2,104	2,064	
AEO 2003										2,149	2,121	2,065	2,038	2,193	2,210	2,170	2,119	2,054	2,020	1,990	1,949	1,922	1,915	1,921	1,926	1,941	1,985	
AEO 2004											2,076	2,116	2,139	2,166	2,222	2,231	2,209	2,166	2,124	2,085	2,065	2,031	2,018	1,977	1,923	1,921	1,875	
AEO 2005												2,059	2,124	2,200	2,221	2,243	2,257	2,198	2,152	2,123	2,081	2,044	2,006	1,954	1,936	1,925	1,916	
AEO 2006													1,944	2,008	2,023	2,061	2,133	2,146	2,132	2,140	2,144	2,145	2,133	2,140	2,106	2,076	2,051	
AEO 2007														1,861	2,001	2,058	2,074	2,068	2,086	2,104	2,079	2,123	2,158	2,168	2,168	2,165	2,166	
AEO 2008															1,862	1,876	2,064	2,165	2,166	2,168	2,192	2,206	2,247	2,273	2,287	2,293	2,285	
AEO 2009																1,809	1,955	2,015	2,024	2,039	2,033	2,004	1,978	1,966	1,978	2,028	2,075	
AEO 2010																	1,913	1,936	1,980	1,999	2,079	2,098	2,108	2,097	2,126	2,161	2,211	
AEO 2011																		2,011	1,993	1,962	2,037	2,102	2,122	2,175	2,218	2,228	2,235	
AEO 2012																			2,033	2,094	2,154	2,191	2,244	2,344	2,360	2,390	2,425	
AEO 2013																				2,312	2,492	2,618	2,660	2,744	2,737	2,735	2,750	
AEO 2014																					2,819	3,113	3,299	3,483	3,488	3,495	3,507	
AEO 2015																						3,151	3,404	3,486	3,651	3,786	3,861	
AEO 2016																							3,440	3,225	3,122	3,289	3,352	
AEO 2017																								3,191	3,174	3,400	3,536	
AEO 2018																									3,374	3,630	3,809	
AEO 2019																										3,920	4,369	
AEO 2020																											4,476	
Actual	2,499	2,431	2,394	2,366	2,355	2,282	2,147	2,131	2,118	2,097	2,062	1,991	1,892	1,857	1,853	1,830	1,954	1,999	2,058	2,370	2,721	3,179	3,442	3,242	3,415	4,002	4,471	
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	1501	1845	

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	2018	2019	
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	-54.1	-59.3	
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	-53.1	-58.7	
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	-51.9	-56.9	
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	-52.8	-58.4	
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	-47.4	-53.8	
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	-51.5	-55.6	
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	-52.0	-58.0	
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	-51.9	-57.1	
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	-48.1	-54.1	
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	-45.9	-51.5	
AEO 2008															0.5	2.5	5.6	8.3	5.2	-8.5	-19.4	-30.6	-34.7	-29.9	-33.0	-42.7	-48.9	
AEO 2009																	-1.2	0.0	0.8	-1.6	-14.0	-25.3	-37.0	-42.5	-39.4	-42.1	-49.3	-53.6
AEO 2010																		-2.1	-3.1	-3.8	-15.7	-23.6	-34.0	-38.8	-35.3	-37.7	-46.0	-50.5
AEO 2011																			0.6	-3.1	-17.2	-25.1	-33.9	-38.4	-32.9	-35.1	-44.3	-50.0
AEO 2012																				-1.2	-11.6	-20.8	-31.1	-34.8	-27.7	-30.9	-40.3	-45.8
AEO 2013																					-2.4	-8.4	-17.6	-22.7	-15.3	-19.8	-31.6	-38.5
AEO 2014																						3.6	-2.1	-4.2	7.4	2.2	-12.7	-21.6
AEO 2015																							-0.9	-1.1	7.6	6.9	-5.4	-13.6
AEO 2016																								-0.1	-0.5	-8.6	-17.8	-25.0
AEO 2017																									-1.6	-7.0	-15.0	-20.9
AEO 2018																										-1.2	-9.3	-14.8
AEO 2019																											-2.1	-2.3
AEO 2020																												0.1
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	37.5	41.3	

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 September 24, 2020. Series: TOTAL.PATCPUS.A. 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	2018	2019
AEO 1994	2,935	3,201	3,362	3,504	3,657	3,738	3,880	3,993	4,099	4,212	4,303	4,398	4,475	4,541	4,584	4,639	4,668	4,672									
AEO 1995	2,953	3,157	3,281	3,489	3,610	3,741	3,818	3,920	4,000	4,103	4,208	4,303	4,362	4,420	4,442	4,460	4,460										
AEO 1996		3,011	3,106	3,219	3,398	3,519	3,679	3,807	3,891	3,979	4,070	4,165	4,212	4,260	4,289	4,303	4,322	4,325	4,347	4,344	4,318	4,303					
AEO 1997			3,099	3,245	3,497	3,665	3,825	3,975	4,084	4,190	4,285	4,380	4,464	4,552	4,617	4,654	4,709	4,760	4,803	4,844	4,865	4,913					
AEO 1998				3,303	3,391	3,654	3,713	3,876	4,053	4,137	4,298	4,415	4,556	4,639	4,750	4,910	4,992	5,087	5,221	5,240	5,347	5,445	5,508	5,588	5,677	5,756	
AEO 1999					3,380	3,442	3,888	4,022	4,153	4,238	4,336	4,441	4,545	4,652	4,780	4,888	4,999	5,073	5,144	5,215	5,294	5,387	5,460	5,550	5,639	5,732	
AEO 2000						3,599	3,847	4,036	4,187	4,320	4,465	4,579	4,690	4,780	4,882	4,968	5,055	5,113	5,192	5,276	5,373	5,460	5,516	5,581	5,664	5,752	
AEO 2001							3,711	3,996	4,028	4,114	4,290	4,435	4,607	4,747	4,858	4,974	5,083	5,198	5,276	5,369	5,477	5,562	5,637	5,719	5,806	5,916	
AEO 2002								3,850	3,992	4,191	4,395	4,561	4,653	4,749	4,903	5,068	5,211	5,360	5,468	5,521	5,562	5,586	5,628	5,695	5,810	5,972	
AEO 2003									3,778	4,052	4,056	4,196	4,187	4,337	4,534	4,766	5,024	5,228	5,419	5,612	5,782	5,912	6,036	6,159	6,264	6,357	
AEO 2004										4,012	4,164	4,207	4,331	4,398	4,521	4,641	4,806	4,989	5,181	5,362	5,528	5,665	5,824	5,982	6,075	6,213	
AEO 2005											4,255	4,346	4,306	4,420	4,555	4,693	4,881	5,038	5,173	5,317	5,463	5,621	5,766	5,879	5,996	6,125	
AEO 2006												4,545	4,537	4,366	4,397	4,415	4,502	4,577	4,643	4,688	4,760	4,830	4,878	4,989	5,098	5,199	
AEO 2007													4,553	4,295	4,224	4,229	4,304	4,348	4,403	4,513	4,539	4,569	4,641	4,711	4,785	4,858	
AEO 2008														4,416	4,556	4,220	4,158	4,187	4,222	4,220	4,217	4,186	4,185	4,165	4,138	4,147	
AEO 2009															4,037	3,628	3,688	3,732	3,755	3,763	3,751	3,710	3,684	3,632	3,554	3,516	
AEO 2010																3,659	3,659	3,783	3,839	3,766	3,729	3,708	3,703	3,670	3,622	3,573	
AEO 2011																	3,478	3,506	3,695	3,705	3,649	3,617	3,564	3,494	3,463	3,427	
AEO 2012																		3,136	3,215	3,109	3,093	3,020	2,862	2,790	2,698	2,629	
AEO 2013																			2,775	2,642	2,507	2,550	2,482	2,480	2,472	2,461	
AEO 2014																				2,324	1,973	1,919	1,782	1,804	1,810	1,802	
AEO 2015																					1,854	1,559	1,433	1,168	1,069	995	
AEO 2016																						1,692	1,698	1,773	1,508	1,441	
AEO 2017																							1,764	1,734	1,495	1,285	
AEO 2018																								1,535	1,306	1,078	
AEO 2019																									36,462	36,827	
AEO 2020																											197
Actual	2,780	2,940	2,878	3,110	3,343	3,564	3,618	3,813	3,979	3,849	4,102	4,427	4,580	4,523	4,393	4,068	3,528	3,446	3,084	2,706	2,277	1,849	1,697	1,755	1,362	855	244
Average Absolute Difference	154	137	298	145	144	135	109	80	78	203	95	165	192	127	156	498	1,010	1,110	1,471	1,837	2,188	2,505	2,564	2,386	2,661	4,619	5,032

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	2018	2019	
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	564.3	2254.2	
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	559.8	2244.3	
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	562.8	2252.5	
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	579.4	2319.7	
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	579.9	2342.4	
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	632.9	2500.1	
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	610.8	2441.2	
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	601.6	2405.3	
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	496.5	2026.2	
AEO 2007														0.7	-2.2	3.9	19.9	24.9	41.0	62.7	88.2	145.5	169.2	164.5	245.8	459.9	1886.9	
AEO 2008															0.5	12.0	19.6	20.7	35.8	56.0	85.4	128.1	146.6	138.5	205.8	384.2	1596.2	
AEO 2009																-0.7	2.8	7.0	21.0	38.8	65.3	102.9	118.5	109.9	166.6	315.8	1338.1	
AEO 2010																	3.7	6.2	22.7	41.9	65.4	101.7	118.4	111.0	169.4	323.8	1361.5	
AEO 2011																		0.9	13.7	36.6	62.7	97.4	113.1	103.1	156.5	305.2	1301.5	
AEO 2012																			1.7	18.8	36.6	67.3	77.9	63.1	104.8	215.7	975.3	
AEO 2013																				2.6	16.0	35.6	50.2	41.4	82.1	189.3	906.4	
AEO 2014																					2.1	6.7	13.0	1.5	32.4	111.8	637.0	
AEO 2015																						0.3	-8.2	-18.3	-14.2	25.1	307.0	
AEO 2016																							-0.3	-3.2	30.2	76.5	489.3	
AEO 2017																								0.5	27.3	74.9	425.4	
AEO 2018																									12.7	52.8	340.9	
AEO 2019																											4166.7	14962.6
AEO 2020																												-19.4
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	540.4	2058.0

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 September 24, 2020. Series: TOTAL.PATCPUS.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	2018	2019	
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	3.07	3.10
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	3.23	3.24
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	3.26	3.29
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	3.43	3.50
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	3.78	3.82
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	4.16	4.18
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	4.79	4.75
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	4.93	5.10
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	5.26	5.41
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	5.72	5.67
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	5.98	6.04
AEO 2009	2007																8.87	4.56	5.13	5.45	5.52	5.54	5.68	5.89	6.08	6.27	6.48	6.74
AEO 2010	2008																	4.14	4.85	5.82	6.17	5.94	5.90	6.08	6.16	6.17	6.22	6.29
AEO 2011	2009																		5.07	4.72	4.65	4.64	4.60	4.67	4.71	4.75	4.80	4.87
AEO 2012	2010																			4.66	4.35	4.42	4.39	4.55	4.49	4.48	4.52	4.61
AEO 2013	2011																				3.32	3.72	3.76	3.84	4.28	4.45	4.70	4.82
AEO 2014	2012																					4.32	4.47	4.43	4.47	4.69	5.06	5.18
AEO 2015	2013																						5.25	4.65	4.78	4.85	5.08	5.66
AEO 2016	2014																							3.35	3.57	4.00	4.24	4.51
AEO 2017	2016																								3.02	3.53	3.81	4.18
AEO 2018	2017																									3.47	3.57	3.92
AEO 2019	2018																										3.42	3.28
AEO 2020	2019																											2.86
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	3.55	2.88
Average Absolute Difference		0.04	0.29	0.48	0.22	0.25	0.23	0.19	1.26	1.18	0.56	1.85	2.04	3.51	2.22	2.04	3.19	0.88	0.78	0.74	1.48	1.03	1.16	1.86	2.27	1.94	1.90	2.56

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	2018	2019		
AEO 1994		-1.6	17.0	39.5	10.4	10.3	34.3	26.4	-20.7	-19.6	6.0	-26.4	-28.9	-44.7	-30.4	-27.2	-39.3	16.5	13.1										
AEO 1995			10.2	31.5	-1.9	-2.2	15.2	10.0	-31.3	-28.2	-4.7	-31.4	-33.1	-48.0	-34.4	-33.4	-45.2	5.5	1.0										
AEO 1996				6.0	-16.8	-19.8	0.5	-6.9	-43.1	-44.1	-28.8	-51.8	-54.7	-66.0	-58.1	-57.5	-65.3	-32.8	-35.3	-26.2	8.1	-10.5	-17.2	34.4					
AEO 1997					-5.9	-16.5	-1.7	-8.8	-44.3	-45.8	-30.4	-52.3	-55.0	-66.3	-58.5	-58.2	-66.2	-35.7	-39.7	-33.2	-4.8	-23.1	-30.5	9.9					
AEO 1998						0.3	7.7	-0.4	-38.0	-38.4	-21.2	-46.8	-49.5	-61.9	-52.4	-51.6	-60.4	-24.0	-27.5	-19.1	14.9	-6.8	-16.9	30.3	50.4	31.4	30.3	65.3	
AEO 1999							5.3	4.8	-35.5	-36.0	-16.8	-42.6	-45.2	-58.1	-47.6	-47.2	-57.2	-18.9	-22.8	-14.7	20.8	-2.5	-13.0	36.3	57.5	36.9	34.9	69.6	
AEO 2000								-1.2	-37.0	-38.8	-21.5	-46.4	-48.6	-60.7	-50.1	-49.0	-58.2	-20.1	-23.7	-15.4	20.6	-2.2	-12.8	36.5	57.4	36.9	34.9	70.5	
AEO 2001									-6.5	-11.5	-3.2	-40.3	-46.4	-60.0	-50.3	-50.2	-59.4	-22.6	-26.1	-17.9	17.3	-4.3	-13.9	36.0	58.6	39.9	39.7	78.8	
AEO 2002										0.1	-25.1	-42.9	-43.1	-56.6	-46.2	-45.8	-55.6	-15.4	-19.2	-9.1	30.7	6.6	-4.7	50.0	73.1	51.5	50.5	90.8	
AEO 2003											-13.0	-34.7	-41.3	-56.5	-47.2	-46.0	-54.4	-10.4	-11.4	-0.3	44.4	17.9	6.1	66.1	92.2	65.9	62.2	104.3	
AEO 2004												5.8	-20.9	-45.3	-34.1	-33.7	-45.4	0.2	-6.9	6.0	55.8	30.6	18.0	89.1	117.9	88.8	84.0	128.9	
AEO 2005													3.2	-23.9	-16.9	-23.9	-43.1	5.0	-3.4	7.0	54.8	28.1	17.3	86.5	112.0	84.3	85.9	140.8	
AEO 2006														1.2	11.3	0.3	-23.2	34.5	20.2	27.3	79.1	47.3	28.4	92.0	118.9	91.1	93.2	148.8	
AEO 2007															3.8	5.8	-15.5	47.5	32.7	36.8	88.5	46.6	30.6	101.6	134.8	110.1	103.7	153.1	
AEO 2008																-0.4	-15.9	62.3	44.2	51.5	108.6	61.6	38.6	111.1	139.5	109.0	106.7	161.8	
AEO 2009																	0.3	-2.7	3.5	20.9	72.8	39.5	26.6	104.1	141.1	115.1	117.9	184.1	
AEO 2010																		-13.4	-4.1	26.6	89.5	46.8	29.0	106.5	139.7	107.7	105.2	160.0	
AEO 2011																			-0.4	1.8	41.7	13.7	-0.3	57.5	81.8	58.7	57.3	99.9	
AEO 2012																				-0.5	31.2	7.2	-5.9	51.6	71.2	47.9	46.2	87.2	
AEO 2013																					-2.0	-11.8	-21.1	25.5	60.0	43.9	49.1	91.7	
AEO 2014																						0.7	-7.9	41.9	64.1	48.8	57.5	102.1	
AEO 2015																							6.3	46.5	72.3	51.1	55.3	117.0	
AEO 2016																								3.6	26.3	22.5	27.4	69.9	
AEO 2017																										4.6	6.0	12.0	54.2
AEO 2018																											2.1	3.2	42.0
AEO 2019																												-3.5	16.1
AEO 2020																													-0.7
Average Absolute Percent Difference		1.6	13.6	25.7	8.7	9.8	10.8	8.4	32.0	29.2	17.1	38.3	39.1	49.9	38.7	35.4	44.0	21.6	18.6	18.5	43.6	21.5	17.3	57.9	83.7	59.5	57.3	97.3	

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 September 24, 2020. Series: TOTAL.NGEIUS.A & TOTAL.NGT XKUS.A. Shading indicates overestimation (blue) or underestimation (green). Bureau of Economic Analysis, US Dept. of Commerce, August 2020. Shading indicates overestimation (blue) or underestimation (green).

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	2018	2019		
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	5.85	6.13		
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	5.64	5.90		
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	5.02	5.23		
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	5.14	5.43		
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	6.01	6.28		
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	6.14	6.34		
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	7.17	7.36		
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	6.88	7.31		
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	7.30	7.70		
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	7.31	7.38		
AEO 2008															7.08	7.56	7.86	7.52	7.31	7.26	7.11	7.02	7.00	7.07	7.27	7.48	7.71		
AEO 2009																9.07	4.70	5.32	5.73	5.87	5.99	6.28	6.66	7.03	7.41	7.84	8.34		
AEO 2010																	4.20	4.99	6.07	6.53	6.40	6.47	6.77	6.99	7.13	7.32	7.53		
AEO 2011																		5.12	4.82	4.81	4.87	4.92	5.10	5.25	5.40	5.57	5.76		
AEO 2012																			4.76	4.51	4.61	4.65	4.90	4.92	5.00	5.13	5.33		
AEO 2013																				3.38	3.85	3.94	4.09	4.64	4.89	5.25	5.47		
AEO 2014																					4.39	4.62	4.65	4.77	5.07	5.56	5.77		
AEO 2015																						5.33	4.82	5.05	5.20	5.56	6.31		
AEO 2016																							3.39	3.67	4.21	4.55	4.93		
AEO 2017																								3.06	3.66	4.02	4.51		
AEO 2018																										3.53	3.72	4.17	
AEO 2019																											3.34	3.28	
AEO 2020																												2.86	
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	3.55	2.88		
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	2.28	3.08		

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	2018	2019		
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	64.9	113.1		
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	59.2	104.9		
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	41.6	81.8		
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	45.1	88.6		
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	69.6	118.4		
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	73.2	120.3		
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	102.1	155.7		
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	94.1	153.9		
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	105.8	167.7		
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	106.3	156.5		
AEO 2008																-0.5	-16.1	63.5	46.1	52.9	110.1	62.7	39.5	114.4	145.2	114.1	110.9	168.1	
AEO 2009																	0.6	-2.2	3.3	19.7	69.9	37.3	24.9	103.8	143.8	118.4	121.1	190.0	
AEO 2010																		-12.7	-3.1	27.0	89.1	46.5	28.6	107.4	142.4	110.1	106.4	161.7	
AEO 2011																			-0.7	0.8	39.1	11.6	-2.2	56.1	81.9	59.1	57.2	100.3	
AEO 2012																				-0.5	30.4	5.6	-7.6	50.1	70.7	47.2	44.6	85.2	
AEO 2013																						-2.1	-11.9	-21.6	25.4	60.8	44.0	48.1	90.1
AEO 2014																						0.4	-8.2	42.3	65.4	49.4	56.7	100.6	
AEO 2015																							6.0	47.5	75.0	53.3	56.7	119.2	
AEO 2016																								3.7	27.4	23.9	28.3	71.4	
AEO 2017																									6.1	7.8	13.4	56.6	
AEO 2018																										3.9	4.8	45.1	
AEO 2019																												-5.8	14.0
AEO 2020																													-0.7
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	64.4	107.1		

Sources: Projections: *Annual Energy Outlook*, Reference Case Projections, Various Editions.

Historical Data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved September 24, 2020. Series: TOTAL.NGEIUUS.A & TOTAL.NGTXKUS.A. Shading indicates overestimation (blue) or

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	2018	2019	
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	31.66	31.97	
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	31.95	32.16	
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	31.03	31.30	
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	33.66	34.16	
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	32.96	33.34	
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	30.95	31.54	
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	29.63	30.14	
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	29.48	29.76	
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	26.66	26.85	
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	25.73	25.93	
AEO 2008															22.90	23.12	23.31	23.25	23.37	23.54	23.35	23.42	23.66	23.83	23.78	23.61	23.42	
AEO 2009																23.04	22.55	21.89	21.45	21.11	21.10	21.00	21.04	21.10	21.18	21.31	21.42	
AEO 2010																	22.59	22.51	21.99	21.82	21.32	21.29	21.74	21.86	22.07	22.25	22.45	
AEO 2011																		23.83	23.86	23.91	24.44	24.72	25.11	25.10	25.20	25.34	25.43	
AEO 2012																			24.52	25.20	24.35	24.89	25.39	25.39	25.37	25.42	25.52	
AEO 2013																				25.63	25.30	25.00	25.30	26.23	26.07	26.23	26.29	
AEO 2014																					25.65	25.20	25.51	26.33	26.31	26.44	26.68	
AEO 2015																						27.12	26.56	27.04	26.39	26.43	26.33	
AEO 2016																							27.47	27.78	28.10	27.84	27.76	
AEO 2017																								27.68	27.85	28.09	27.85	
AEO 2018																									26.68	28.18	29.03	
AEO 2019																										29.34	29.61	
AEO 2020																											31.03	
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	30.08	31.01	
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	3.23	3.48	

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	2018	2019	
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	5.3	3.1
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	6.2	3.7
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	3.2	0.9
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	11.9	10.1
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	9.6	7.5
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	2.9	1.7
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	-1.5	-2.8
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	-2.0	-4.1
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	-11.4	-13.4
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	-14.5	-16.4
AEO 2008																-0.9	-0.7	1.8	-3.5	-4.5	-7.8	-10.7	-12.3	-13.9	-13.3	-12.2	-21.5	-24.5
AEO 2009																	-1.0	-1.6	-9.1	-12.4	-17.3	-19.3	-21.3	-23.4	-23.2	-21.8	-29.1	-30.9
AEO 2010																		-1.4	-6.5	-10.2	-14.6	-18.5	-20.2	-20.9	-20.5	-18.5	-26.0	-27.6
AEO 2011																			-1.1	-2.5	-6.4	-6.6	-7.4	-8.6	-8.7	-7.0	-15.7	-18.0
AEO 2012																				0.2	-1.3	-6.9	-6.8	-7.6	-7.6	-6.4	-15.5	-17.7
AEO 2013																					0.3	-3.3	-6.3	-7.9	-4.6	-3.8	-12.8	-15.2
AEO 2014																						-1.9	-5.6	-7.2	-4.2	-2.9	-12.1	-14.0
AEO 2015																							1.6	-3.3	-1.6	-2.6	-12.1	-15.1
AEO 2016																								0.0	1.1	3.7	-7.4	-10.5
AEO 2017																									0.7	2.8	-6.6	-10.2
AEO 2018																										-1.5	-6.3	-6.4
AEO 2019																											-2.4	-4.5
AEO 2020																												0.0
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	10.7	11.2

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 September 24, 2020. Series: TOTAL.NGTCPU.S.A. Shading indicates overestimation (blue) or underestimation (green).

Table 10. Natural Gas Production, 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	2018	2019		
AEO 1994	17.71	17.68	17.84	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	17.98	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	27.01	27.26		
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	27.07	27.24		
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	25.97	26.20		
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	28.10	28.53		
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	27.76	28.09		
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	24.36	24.71		
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	22.82	23.54		
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	22.06	22.05		
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	21.50	21.58		
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	20.16	20.67		
AEO 2008																19.00	19.18	19.28	19.29	19.26	19.40	19.41	19.39	19.52	19.64	19.62	19.53	19.41	
AEO 2009																	20.48	20.61	20.02	19.81	19.59	19.45	19.22	19.10	19.05	19.11	19.27	19.43	
AEO 2010																		20.60	20.01	19.46	19.28	18.90	18.91	19.29	19.30	19.42	19.59	19.79	
AEO 2011																			21.28	21.06	21.27	21.73	22.02	22.43	22.47	22.65	22.92	23.20	
AEO 2012																				22.95	23.66	22.76	23.14	23.65	24.00	24.23	24.41	24.78	
AEO 2013																					23.91	24.00	23.85	24.03	25.13	25.40	25.92	26.31	
AEO 2014																						24.19	24.28	24.63	25.68	26.38	27.20	28.19	
AEO 2015																							25.57	26.43	27.30	27.18	27.68	28.27	
AEO 2016																								27.24	27.44	28.19	28.92	29.56	
AEO 2017																										26.53	27.85	29.11	30.07
AEO 2018																											27.10	28.96	31.19
AEO 2019																												29.47	32.26
AEO 2020																													33.81
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	30.59	33.66		
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	5.60	7.75		

Table 10. Natural Gas 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	2018	2019		
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	-11.7	-19.0	
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	-11.5	-19.1	
AEO 2000								-2.5	-1.5	-5.9	-2.2	-1.1	3.0	9.1	9.5	8.5	6.3	5.4	5.4	0.1	-2.8	-1.6	-5.3	-7.6	-5.1	-4.4	-15.1	-22.2	
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	-8.1	-15.2	
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	-9.2	-16.6	
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	-20.4	-26.6	
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	-25.4	-30.0	
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	-27.9	-34.5	
AEO 2006														0.5	-1.9	-6.6	-8.8	-10.4	-12.8	-17.4	-20.4	-19.1	-23.4	-24.8	-21.1	-20.7	-29.7	-35.9	
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	-34.1	-38.6	
AEO 2008																-1.4	-4.9	-6.5	-9.5	-15.9	-19.3	-19.8	-24.6	-28.0	-26.3	-26.9	-36.1	-42.3	
AEO 2009																	1.6	-0.1	-6.1	-13.5	-18.5	-19.7	-25.3	-29.5	-28.6	-28.8	-37.0	-42.3	
AEO 2010																		-0.1	-6.1	-15.0	-19.8	-21.9	-26.5	-28.8	-27.6	-27.7	-35.9	-41.2	
AEO 2011																			-0.2	-8.1	-11.5	-10.2	-14.4	-17.2	-15.7	-15.7	-25.1	-31.1	
AEO 2012																				0.2	-1.6	-6.0	-10.1	-12.7	-10.0	-9.8	-20.2	-26.4	
AEO 2013																					-0.5	-0.8	-7.3	-11.3	-5.7	-5.4	-15.3	-21.8	
AEO 2014																						-0.1	-5.6	-9.1	-3.7	-1.8	-11.1	-16.2	
AEO 2015																								-0.6	-2.5	2.4	1.2	-9.5	-16.0
AEO 2016																									0.5	2.9	5.0	-5.4	-12.2
AEO 2017																										-0.5	3.7	-4.8	-10.6
AEO 2018																											0.9	-5.3	-7.3
AEO 2019																												-3.7	-4.2
AEO 2020																													0.5
Average Absolute Percent 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	18.3	23.0	

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 September 24, 2020. Series: TOTAL.NGPRPUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 11. Natural Gas Net Imports, 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	2018	2019		
AEO 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											
AEO 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											
AEO 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						
AEO 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						
AEO 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	4.81	4.86		
AEO 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	4.97	5.00		
AEO 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	5.06	5.10	
AEO 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	5.68	5.74	
AEO 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	5.42	5.47	
AEO 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	6.19	6.41	
AEO 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	6.64	6.43	
AEO 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	7.25	7.54	
AEO 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	4.71	4.83	
AEO 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	5.44	5.13	
AEO 2008																3.80	3.85	3.95	3.85	4.01	4.02	3.83	3.92	4.03	4.08	4.04	3.97	3.90	
AEO 2009																	3.03	2.73	2.34	1.99	1.76	1.79	1.80	1.86	1.96	1.98	1.95	1.90	
AEO 2010																		2.76	2.82	2.78	2.62	2.36	2.32	2.38	2.48	2.57	2.58	2.59	
AEO 2011																			2.74	2.75	2.64	2.72	2.71	2.69	2.63	2.55	2.42	2.22	
AEO 2012																				1.90	1.64	1.59	1.74	1.73	1.37	1.12	0.99	0.72	
AEO 2013																					1.72	1.69	1.45	1.42	1.25	0.83	0.47	0.14	
AEO 2014																						1.34	1.35	1.08	0.76	0.03	-0.66	-1.40	
AEO 2015																							1.14	0.80	0.35	-0.46	-1.12	-1.81	
AEO 2016																								0.95	0.40	0.04	-0.84	-1.59	
AEO 2017																									0.94	0.29	-0.78	-2.05	
AEO 2018																											-0.09	-0.73	-2.10
AEO 2019																												-0.13	-0.77
AEO 2020																													-1.72
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	-0.72	-1.91		
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	3.69	4.40		

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	2018	2019		
AEO 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										
AEO 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										
AEO 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					
AEO 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					
AEO 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	-769.8	-354.1	
AEO 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	-791.1	-361.1	
AEO 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	-804.5	-366.4	
AEO 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	-890.7	-399.9	
AEO 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	-854.3	-385.5	
AEO 2003											-9.3	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	-960.8	-434.9	
AEO 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	-1024.2	-435.6	
AEO 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	-1108.5	-493.6	
AEO 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	-755.2	-352.2	
AEO 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	-857.7	-368.1	
AEO 2008																0.5	27.3	47.3	47.7	104.0	164.9	192.1	231.7	331.2	508.6	-3318.0	-652.4	-303.7	
AEO 2009																	0.3	2.1	-10.2	1.5	16.0	36.2	52.0	98.5	191.6	-1674.7	-371.2	-199.0	
AEO 2010																		3.0	8.3	41.4	72.6	79.7	96.1	154.2	269.6	-2147.7	-459.3	-235.1	
AEO 2011																			5.3	40.2	74.0	107.1	129.2	187.6	291.6	-2127.6	-437.2	-216.2	
AEO 2012																				-3.3	7.8	21.1	47.6	84.9	103.8	-992.9	-237.2	-137.8	
AEO 2013																					13.1	29.0	22.5	52.0	86.4	-758.0	-164.8	-107.1	
AEO 2014																						2.2	13.9	16.0	12.6	-123.9	-8.3	-26.7	
AEO 2015																							-3.7	-14.7	-47.6	268.0	56.1	-5.4	
AEO 2016																								2.1	-41.1	-130.7	16.4	-16.9	
AEO 2017																									39.9	-334.0	7.9	7.3	
AEO 2018																										-27.7	1.0	9.5	
AEO 2019																												-81.3	-59.9
AEO 2020																													-10.1
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	514.1	229.8		

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 September 24, 2020. Series: TOTAL.NGNIPUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 11a. 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	2018	2019		
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	1.39	1.39	1.42	1.41	1.43	1.44	1.45	1.46	1.46	1.46	1.47	1.50											
AEO 1996	1994			1.32	1.29	1.28	1.27	1.26	1.26	1.25	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	1.00	0.99	0.98	
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	0.96	0.96	0.94	
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	1.02	1.01	1.00	0.99	
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	1.00	1.00	0.99	
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	1.00	0.98	0.97	
AEO 2003	2001										1.22	1.22	1.22	1.22	1.21	1.20	1.19	1.18	1.17	1.16	1.16	1.15	1.15	1.14	1.14	1.13	1.13	1.13	
AEO 2004	2002											1.24	1.23	1.23	1.23	1.22	1.23	1.23	1.22	1.22	1.22	1.22	1.22	1.22	1.21	1.21	1.20	1.19	
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	1.23	1.24	1.24	
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	1.40	1.39	1.39	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	1.59	1.58	1.58	
AEO 2008	2006															1.73	1.77	1.82	1.84	1.81	1.78	1.76	1.75	1.74	1.72	1.72	1.71	1.71	
AEO 2009	2007																1.93	1.98	1.86	1.87	1.86	1.88	1.90	1.91	1.92	1.93	1.94	1.95	
AEO 2010	2008																	2.15	1.99	1.98	1.99	1.99	1.99	2.01	1.99	2.00	1.99	1.99	
AEO 2011	2009																			2.26	2.22	2.16	2.12	2.10	2.11	2.13	2.14	2.13	2.14
AEO 2012	2010																				2.34	2.38	2.37	2.38	2.35	2.34	2.37	2.38	2.39
AEO 2013	2011																					2.41	2.34	2.40	2.40	2.46	2.47	2.48	2.48
AEO 2014	2012																						2.37	2.33	2.40	2.42	2.49	2.55	2.59
AEO 2015	2013																							2.35	2.34	2.33	2.35	2.38	2.42
AEO 2016	2014																								2.19	2.10	2.09	2.20	2.23
AEO 2017	2016																									2.14	2.18	2.23	2.28
AEO 2018	2017																										2.15	2.16	2.21
AEO 2019	2018																											2.11	2.10
AEO 2020	2019																												2.05
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	2.06	2.02	
Average Absolute Difference		0.12	0.12	0.15	0.17	0.16	0.16	0.18	0.19	0.16	0.15	0.14	0.14	0.18	0.23	0.24	0.40	0.47	0.49	0.56	0.50	0.56	0.54	0.43	0.42	0.40	0.49	0.58	

Table 11a. 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	2018	2019	
AEO 1994	8.6	14.2	23.9	32.4	37.2	40.2	50.2	57.5	61.6	62.8	62.9	59.3	43.3	39.3	38.9	22.5	20.0	20.7										
AEO 1995		4.8	10.0	13.7	18.8	22.1	26.7	31.2	33.4	32.7	33.8	30.2	19.4	12.9	10.7	-3.5	-8.3	-7.9										
AEO 1996			2.2	4.2	6.3	8.4	12.5	16.3	15.2	16.6	16.5	12.5	3.2	-3.7	-5.2	-17.9	-21.9	-24.1	-25.2	-22.7	-19.9	-20.2	-14.3					
AEO 1997				4.8	7.2	9.4	14.5	17.1	17.1	15.9	12.8	7.9	-2.4	-7.0	-9.8	-22.7	-27.6	-29.5	-33.4	-32.1	-30.9	-31.7	-27.0					
AEO 1998					-0.1	1.1	4.6	6.6	5.1	4.0	2.2	-2.4	-11.8	-18.2	-20.6	-31.4	-35.5	-37.2	-39.7	-39.2	-37.9	-38.1	-34.0	-30.7	-29.2	-27.4	-25.3	
AEO 1999						-0.7	2.3	4.4	3.1	2.1	0.6	-3.9	-13.3	-19.8	-22.2	-33.4	-38.0	-39.6	-42.5	-41.9	-40.7	-41.2	-37.4	-34.3	-32.9	-31.3	-29.6	
AEO 2000							5.1	7.1	2.0	0.1	-2.7	-7.0	-16.3	-21.9	-23.9	-34.1	-39.2	-39.7	-42.0	-41.2	-39.6	-39.9	-35.6	-32.3	-30.6	-29.0	-27.1	
AEO 2001								2.0	0.5	0.1	-1.8	-6.3	-15.7	-21.9	-24.9	-35.6	-40.2	-41.6	-43.9	-43.0	-41.4	-41.5	-37.4	-33.7	-31.9	-30.1	-28.0	
AEO 2002									-0.8	-3.9	-4.9	-8.2	-18.0	-24.8	-27.2	-37.3	-41.5	-42.9	-44.8	-44.0	-42.6	-42.7	-38.8	-35.4	-33.9	-32.5	-30.6	
AEO 2003										-1.1	-1.3	-5.0	-12.8	-19.1	-21.5	-32.2	-36.6	-37.9	-40.0	-38.9	-36.9	-36.8	-32.2	-28.2	-26.2	-24.0	-21.5	
AEO 2004											-1.3	-5.0	-13.7	-19.3	-21.2	-31.0	-34.9	-36.1	-38.0	-36.6	-34.3	-34.4	-29.3	-25.1	-22.7	-20.5	-18.2	
AEO 2005												-3.1	-11.3	-16.6	-19.0	-29.5	-34.1	-35.8	-38.1	-37.0	-34.9	-34.6	-29.5	-25.2	-22.5	-19.7	-16.3	
AEO 2006													0.1	-3.9	-6.7	-19.5	-25.4	-26.0	-29.7	-28.6	-26.7	-27.1	-21.9	-17.5	-15.1	-12.3	-9.2	
AEO 2007														1.9	1.1	-11.2	-16.4	-17.4	-21.7	-21.3	-19.4	-19.3	-13.8	-8.8	-5.9	-3.5	0.3	
AEO 2008															0.5	-10.6	-13.3	-13.6	-17.3	-17.0	-15.0	-15.2	-9.1	-4.0	-0.9	1.8	5.8	
AEO 2009																-4.9	-7.9	-14.7	-16.8	-15.6	-11.5	-10.0	-2.8	3.9	7.8	12.4	17.0	
AEO 2010																	-1.9	-10.5	-13.7	-11.4	-8.0	-7.5	0.4	5.9	9.7	13.1	17.1	
AEO 2011																		0.8	-3.9	-4.4	-2.8	-3.5	4.8	12.1	16.4	20.2	25.2	
AEO 2012																			0.1	4.1	7.2	8.5	15.1	21.8	27.6	32.7	38.2	
AEO 2013																				3.0	3.6	6.7	15.1	25.5	30.5	35.3	40.7	
AEO 2014																					3.2	1.9	13.3	21.4	28.8	36.5	43.9	
AEO 2015																						1.0	8.5	14.6	19.8	25.5	32.4	
AEO 2016																							-0.6	1.6	4.2	13.8	19.6	
AEO 2017																									1.3	6.8	13.0	19.7
AEO 2018																										3.2	7.4	13.8
AEO 2019																											2.2	5.6
AEO 2020																												1.4
Average Absolute Percent Difference	8.6	9.5	12.0	13.8	13.9	13.6	16.6	17.8	15.4	13.9	12.8	12.6	14.0	16.5	16.9	23.6	26.0	26.5	28.9	26.8	24.0	23.1	20.0	19.2	19.4	20.2	21.2	

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 September 24, 2020. Series: TOTAL.CLERDUS.A Bureau of Economic Analysis, US Dept. of Commerce, August 2020. 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	2018	2019
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	1.89	1.94
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	1.67	1.72
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	1.54	1.57
AEO 2001								1.22	1.24	1.25	1.26	1.28	1.29	1.30	1.30	1.30	1.31	1.33	1.34	1.36	1.38	1.40	1.43	1.46	1.50	1.53	
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	1.57	1.60
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	1.67	1.71
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	1.80	1.84
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	1.73	1.78
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	1.92	1.97
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	2.01	2.05
AEO 2008															1.78	1.85	1.93	1.99	1.99	1.99	2.00	2.02	2.05	2.07	2.11	2.14	2.19
AEO 2009																1.97	2.05	1.93	1.97	1.97	2.04	2.10	2.15	2.22	2.28	2.35	2.41
AEO 2010																	2.18	2.05	2.07	2.10	2.15	2.19	2.24	2.26	2.31	2.34	2.38
AEO 2011																		2.28	2.27	2.23	2.23	2.24	2.31	2.37	2.43	2.47	2.53
AEO 2012																			2.39	2.46	2.47	2.52	2.53	2.56	2.64	2.70	2.76
AEO 2013																				2.45	2.42	2.51	2.55	2.66	2.72	2.77	2.82
AEO 2014																					2.41	2.41	2.52	2.58	2.69	2.80	2.89
AEO 2015																						2.39	2.43	2.46	2.53	2.61	2.70
AEO 2016																							2.21	2.16	2.19	2.36	2.44
AEO 2017																								2.17	2.26	2.36	2.46
AEO 2018																									2.18	2.25	2.35
AEO 2019																										2.05	2.10
AEO 2020																											2.05
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	2.06	2.02
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	0.35	0.36

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	2018	2019
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	-8.1	-3.7
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	-18.9	-14.9
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	-25.5	-22.3
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	-27.4	-24.0
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	-23.9	-20.6
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	-18.9	-15.3
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	-12.7	-8.7
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	-16.1	-11.8
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	-6.6	-2.3
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	-2.2	1.7
AEO 2008															0.4	-10.8	-12.7	-12.5	-16.5	-16.4	-14.5	-14.6	-7.7	-1.8	1.6	3.9	8.3
AEO 2009																-4.7	-7.4	-14.9	-17.7	-17.0	-13.0	-11.2	-2.9	5.0	9.5	14.0	19.4
AEO 2010																	-1.2	-9.6	-13.5	-11.6	-8.2	-7.8	0.8	7.1	10.9	13.7	17.8
AEO 2011																		0.5	-4.8	-6.1	-4.6	-5.4	3.8	12.2	16.7	20.1	25.4
AEO 2012																			0.1	3.5	5.5	6.5	13.9	21.4	27.0	31.3	36.7
AEO 2013																				2.9	3.4	6.1	15.0	26.1	30.6	34.4	39.5
AEO 2014																					3.0	1.6	13.6	22.3	29.2	35.9	42.9
AEO 2015																						0.8	9.3	16.4	21.5	26.6	33.7
AEO 2016																							-0.5	2.5	5.4	14.5	20.7
AEO 2017																								2.8	8.7	14.4	21.6
AEO 2018																									5.0	9.1	16.3
AEO 2019																										-0.3	3.7
AEO 2020																											1.4
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	15.8	16.5

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 September 24, 2020. Series: TOTAL.CLERDUS.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	2018	2019	
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	1239	1250	
AEO 1999						1040	1075	1092	1109	1113	1118	1120	1120	1133	1139	1150	1155	1156	1173	1177	1191	1198	1211	1222	1237	1247	1259	
AEO 2000							1053	1086	1103	1124	1142	1164	1175	1184	1189	1194	1199	1195	1200	1206	1213	1219	1232	1237	1249	1259	1269	
AEO 2001								1078	1112	1135	1153	1165	1183	1191	1220	1228	1228	1235	1240	1244	1251	1254	1261	1269	1279	1280	1286	
AEO 2002									1088	1092	1126	1147	1176	1199	1227	1235	1243	1251	1256	1265	1275	1282	1294	1307	1322	1334	1350	
AEO 2003										1040	1059	1082	1106	1138	1172	1185	1200	1218	1231	1239	1250	1261	1282	1297	1316	1328	1345	
AEO 2004											1100	1098	1126	1156	1183	1193	1216	1229	1240	1254	1266	1277	1291	1311	1327	1339	1363	
AEO 2005												1102	1137	1159	1189	1210	1224	1229	1237	1248	1255	1264	1273	1284	1298	1313	1331	
AEO 2006													1144	1150	1172	1196	1224	1233	1245	1264	1268	1272	1276	1290	1308	1327	1347	
AEO 2007														1135	1147	1152	1169	1195	1222	1233	1245	1272	1282	1299	1315	1331	1350	
AEO 2008															1127	1126	1135	1145	1181	1199	1203	1214	1225	1240	1262	1295	1312	
AEO 2009																1109	1077	1117	1152	1178	1192	1205	1202	1214	1223	1232	1235	
AEO 2010																	1015	1035	1094	1122	1137	1163	1141	1153	1155	1167	1179	
AEO 2011																		1055	1026	1024	1017	1007	1013	1025	1031	1043	1055	
AEO 2012																			1039	984	961	938	914	927	936	950	963	
AEO 2013																				905	934	945	937	880	907	929	953	
AEO 2014																					942	965	964	917	938	957	965	
AEO 2015																						933	921	906	924	933	966	
AEO 2016																							801	801	810	823	824	
AEO 2017																									716	730	739	773
AEO 2018																										728	725	695
AEO 2019																											677	651
AEO 2020																												592
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	688	587	
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	425	513	

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	2018	2019		
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	80.1	112.8	
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	81.3	114.4	
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	83.0	116.0	
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	86.1	119.0	
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	93.9	129.8	
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	93.0	129.0	
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	94.6	132.1	
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	90.8	126.7	
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	92.9	129.4	
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	93.4	129.9	
AEO 2008																-0.1	0.5	13.8	9.2	17.8	34.8	30.1	32.4	52.9	69.6	76.0	88.2	123.3	
AEO 2009																	-1.0	7.9	6.5	14.9	32.5	28.9	31.4	49.9	66.1	70.6	79.1	110.3	
AEO 2010																		1.8	-1.3	9.1	26.2	23.0	26.8	42.3	57.8	61.1	69.6	100.7	
AEO 2011																			0.6	2.3	15.2	10.0	9.8	26.4	40.2	43.9	51.6	79.6	
AEO 2012																				3.6	10.7	4.0	2.3	14.1	26.8	30.5	38.0	63.9	
AEO 2013																					1.8	1.0	3.1	16.9	20.4	26.4	35.0	62.3	
AEO 2014																						1.9	5.3	20.3	25.4	30.8	39.0	64.2	
AEO 2015																								1.7	14.9	23.9	28.8	35.6	64.5
AEO 2016																									-0.1	9.6	12.9	19.6	40.3
AEO 2017																										-2.0	1.9	7.3	31.6
AEO 2018																											1.5	5.3	18.3
AEO 2019																												-1.7	10.8
AEO 2020																													0.8
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	56.6	80.4		

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 September 24, 2020. 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	2018	2019	
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	1346	1358	
AEO 1999						1116	1145	1159	1177	1184	1188	1188	1187	1199	1206	1218	1222	1222	1239	1248	1259	1273	1285	1297	1312	1321	1339	
AEO 2000							1111	1127	1143	1165	1180	1201	1208	1216	1222	1228	1232	1228	1238	1245	1248	1259	1265	1277	1287	1296		
AEO 2001								1102	1126	1172	1188	1198	1213	1219	1247	1255	1254	1259	1264	1271	1278	1283	1285	1294	1304	1306	1312	
AEO 2002									1158	1132	1152	1172	1198	1220	1248	1257	1265	1271	1279	1289	1296	1304	1316	1329	1344	1356	1372	
AEO 2003										1076	1089	1091	1111	1141	1174	1186	1200	1217	1226	1235	1248	1258	1276	1289	1308	1320	1337	
AEO 2004											1090	1110	1128	1154	1178	1185	1206	1217	1226	1238	1251	1262	1275	1295	1310	1321	1343	
AEO 2005												1114	1165	1164	1193	1211	1223	1225	1228	1238	1245	1252	1260	1270	1283	1297	1315	
AEO 2006													1132	1151	1190	1209	1239	1247	1253	1266	1267	1265	1263	1272	1285	1289	1301	
AEO 2007														1134	1129	1130	1145	1175	1201	1214	1228	1251	1257	1263	1269	1270	1287	
AEO 2008															1141	1138	1139	1152	1186	1200	1199	1202	1206	1221	1226	1234	1248	
AEO 2009																1144	1096	1131	1169	1194	1207	1216	1203	1203	1204	1203	1211	
AEO 2010																		1068	1049	1107	1138	1149	1170	1146	1157	1158	1173	1179
AEO 2011																			1087	1050	1045	1036	1022	1031	1042	1050	1060	1070
AEO 2012																				1080	1037	1026	1009	984	994	995	1005	1015
AEO 2013																					1021	1024	1037	1043	989	1017	1040	1066
AEO 2014																						1012	1037	1053	1013	1035	1056	1065
AEO 2015																							978	976	969	990	1001	1036
AEO 2016																								863	839	844	868	872
AEO 2017																									731	753	767	803
AEO 2018																										775	780	729
AEO 2019																											623	726
AEO 2020																												671
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	756	706	
Average Absolute Difference	45	28	12	39	47	52	38	40	41	45	62	40	39	36	46	41	112	110	111	181	209	194	288	424	374	388	425	

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	2018	2019		
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	78.0	92.3	
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	74.7	89.6	
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	70.2	83.5	
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	72.7	85.7	
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	79.3	94.3	
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	74.6	89.2	
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	74.7	90.2	
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	71.5	86.1	
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	70.5	84.3	
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	68.0	82.2	
AEO 2008																-0.5	-2.9	6.0	6.2	8.2	18.1	21.8	20.2	34.6	67.6	58.4	63.2	76.7	
AEO 2009																	-2.3	1.9	4.3	6.7	17.5	22.6	21.6	34.3	65.1	55.6	59.1	71.5	
AEO 2010																		-0.6	-3.3	1.0	11.9	16.7	17.0	27.9	58.9	49.6	55.2	67.0	
AEO 2011																			0.2	-4.2	2.8	5.2	2.2	15.0	43.0	35.6	40.2	51.5	
AEO 2012																				-1.4	2.0	4.2	0.9	9.8	36.5	28.6	32.9	43.7	
AEO 2013																					0.5	4.0	3.7	16.4	35.7	31.4	37.6	50.9	
AEO 2014																						2.8	3.7	17.5	39.0	33.7	39.7	50.8	
AEO 2015																							-2.2	9.0	33.1	27.9	32.4	46.7	
AEO 2016																								-3.6	15.2	9.0	14.8	23.4	
AEO 2017																									0.4	-2.7	1.4	13.7	
AEO 2018																										0.1	0.5	3.3	
AEO 2019																												-17.6	2.8
AEO 2020																													-5.0
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	19.4	32.1	58.3	48.3	51.3	60.2		

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 September 24, 2020. 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	2018	2019		
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	6.96	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	5.49	5.46			
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	5.74	5.68			
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	5.86	5.86	5.83		
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	5.98	5.97			
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	6.43	6.45			
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	6.56	6.55			
AEO 2004	2002									7.13	6.96	6.84	6.73	6.63	6.63	6.67	6.64	6.64	6.71	6.71	6.76	6.82	6.86	6.84	6.87	6.83			
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	7.06	7.15			
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	7.18	7.25			
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	7.89	7.88			
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	8.60	8.64			
AEO 2009	2007															9.49	9.11	8.28	8.56	8.55	8.56	8.65	8.68	8.79	8.91	9.03	9.12		
AEO 2010	2008																9.58	9.14	8.60	8.90	8.93	8.86	8.86	8.94	8.99	9.00	8.98		
AEO 2011	2009																	9.57	9.03	9.01	8.94	8.89	8.89	8.84	8.84	8.83	8.81		
AEO 2012	2010																		9.73	9.59	9.63	9.60	9.68	9.70	9.65	9.61	9.55		
AEO 2013	2011																			9.41	9.19	9.24	9.18	9.33	9.41	9.43	9.39		
AEO 2014	2012																				9.79	9.80	9.91	9.93	9.99	10.10	10.19		
AEO 2015	2013																					10.46	10.45	10.66	10.70	10.62	10.70		
AEO 2016	2014																						10.27	10.16	10.10	10.19	10.42		
AEO 2017	2016																							10.28	10.35	10.24	10.35		
AEO 2018	2017																									10.55	10.59	10.69	
AEO 2019	2018																										10.56	10.45	
AEO 2020	2019																											10.39	
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	10.53	10.60	
Average Absolute Difference		0.03	0.11	0.33	0.36	0.37	0.43	0.55	0.44	0.40	0.44	0.51	0.49	0.64	0.86	0.88	1.13	1.11	1.10	1.11	0.91	1.44	1.57	1.40	1.27	1.28	1.54	1.90	

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	2018	2019	
AEO 1994		0.4	2.9	6.9	9.3	11.4	14.5	19.6	19.2	15.4	18.7	18.7	19.1	14.9	9.7	9.8	6.4	7.8	10.4									
AEO 1995		0.5	2.9	3.7	5.7	8.6	11.8	11.5	8.0	11.1	11.1	11.5	7.5	2.8	2.9	-0.3	-0.3	2.1										
AEO 1996			5.0	5.9	7.2	10.0	13.7	13.3	8.3	11.5	10.0	10.4	6.5	-0.1	0.0	-4.5	-4.3	-3.4	-2.7	-0.9	-1.8	-2.9	-0.3					
AEO 1997				3.0	4.2	7.2	10.7	9.4	4.2	6.2	4.0	3.2	-1.4	-7.3	-7.8	-12.6	-12.7	-12.3	-12.4	-11.4	-13.0	-14.6	-12.6					
AEO 1998					1.0	0.7	3.3	1.2	-4.8	-3.2	-5.1	-5.9	-10.2	-16.3	-16.7	-21.0	-21.5	-21.0	-21.4	-20.6	-21.4	-23.4	-23.4	-21.9	-22.9	-21.4	-21.0	
AEO 1999						0.5	3.1	1.3	-4.7	-3.6	-4.5	-4.1	-8.3	-14.1	-14.8	-19.3	-19.8	-19.3	-19.5	-18.6	-19.8	-21.6	-21.3	-19.8	-20.9	-19.2	-19.2	
AEO 2000							0.8	0.0	-6.2	-5.7	-7.9	-8.3	-13.1	-18.1	-18.3	-22.5	-23.6	-22.5	-22.3	-20.8	-21.5	-22.7	-21.5	-19.8	-20.4	-18.5	-18.0	
AEO 2001								2.1	-3.3	-3.8	-6.5	-6.9	-12.9	-18.9	-20.6	-25.1	-25.6	-24.9	-24.2	-22.6	-22.9	-23.7	-22.4	-20.0	-20.2	-18.0	-17.2	
AEO 2002									-1.1	-3.2	-7.4	-7.2	-11.6	-17.7	-18.0	-21.6	-21.7	-20.6	-19.2	-17.6	-18.0	-19.7	-18.7	-16.1	-16.3	-13.7	-12.5	
AEO 2003										-2.7	-7.9	-8.4	-12.5	-19.2	-19.6	-23.3	-22.6	-22.0	-20.6	-18.7	-18.7	-19.8	-18.7	-15.8	-16.6	-13.9	-13.0	
AEO 2004											-2.4	-4.3	-9.4	-16.0	-17.1	-20.8	-20.4	-19.9	-18.9	-15.8	-16.4	-17.2	-15.5	-12.8	-13.8	-11.2	-10.7	
AEO 2005												0.0	-3.9	-12.8	-16.5	-22.0	-22.2	-21.8	-20.8	-17.8	-17.2	-17.3	-15.6	-13.3	-13.4	-10.4	-8.3	
AEO 2006													5.7	-2.0	-6.6	-13.7	-15.3	-15.7	-16.0	-14.4	-14.0	-15.9	-15.6	-13.5	-13.9	-11.2	-9.4	
AEO 2007															-3.7	-3.9	-8.2	-9.3	-9.7	-10.7	-9.6	-10.6	-12.7	-11.6	-8.8	-8.5	-5.4	-4.6
AEO 2008															0.1	-2.6	0.4	-0.4	-1.7	-0.5	-2.8	-5.7	-4.9	-2.3	-2.7	0.0	1.6	
AEO 2009																-0.7	-4.7	-12.4	-8.2	-6.1	-6.5	-7.3	-5.7	-2.1	-1.6	2.3	4.5	
AEO 2010																	-1.7	-5.3	-9.6	-4.0	-4.3	-6.8	-5.7	-2.4	-2.5	-0.1	0.8	
AEO 2011																		-1.5	-5.8	-3.7	-4.9	-7.2	-6.1	-4.2	-4.9	-2.6	-1.7	
AEO 2012																			0.3	1.4	1.2	-1.0	1.2	3.9	2.6	4.8	5.3	
AEO 2013																					-2.5	-5.3	-6.6	-6.1	-2.1	-2.0	0.7	1.4
AEO 2014																						-1.1	-2.8	-0.4	2.2	2.1	5.8	7.9
AEO 2015																						2.0	3.1	7.8	7.5	9.3	11.3	
AEO 2016																							-0.5	0.9	-0.4	3.0	6.5	
AEO 2017																								0.1	0.0	1.4	3.7	
AEO 2018																									0.1	2.9	5.1	
AEO 2019																										0.2	0.4	
AEO 2020																											-2.0	
Average Absolute Percent Difference		0.4	1.7	4.9	5.5	5.9	6.9	9.0	7.2	6.2	7.0	7.8	7.5	9.1	11.3	11.5	14.0	13.8	13.6	13.8	11.5	11.6	12.5	11.0	9.5	9.2	8.0	8.1

Sources: Projections: *Annual Energy Outlook*, Reference Case Projections, Various Editions.

Historical Data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved September 24, 2020. Series: TOTAL_ESTCUUS.A Bureau of Economic Analysis, US Dept. of Commerce, August 2020. 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	2018	2019	
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	10.47	10.80	
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	10.04	10.35	
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	9.01	9.26	
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	8.97	9.26	
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	10.24	10.61	
AEO 2003										6.99	6.90	7.01	7.10	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	9.67	9.94
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	10.27	10.57	
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	9.85	10.26	
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	9.96	10.33	
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	10.09	10.25	
AEO 2008															9.13	9.46	9.93	9.92	9.82	9.86	9.86	9.92	10.06	10.27	10.51	10.75	11.03	
AEO 2009																9.69	9.40	8.60	8.99	9.09	9.27	9.55	9.81	10.16	10.53	10.93	11.30	
AEO 2010																	9.72	9.41	8.97	9.43	9.62	9.71	9.87	10.14	10.39	10.59	10.76	
AEO 2011																		9.65	9.23	9.31	9.40	9.52	9.70	9.84	10.05	10.25	10.44	
AEO 2012																			9.93	9.92	10.03	10.16	10.43	10.63	10.76	10.92	11.04	
AEO 2013																				9.58	9.52	9.70	9.78	10.10	10.34	10.53	10.65	
AEO 2014																					9.94	10.13	10.41	10.58	10.80	11.09	11.36	
AEO 2015																						10.63	10.82	11.25	11.49	11.61	11.92	
AEO 2016																							10.38	10.46	10.61	10.92	11.39	
AEO 2017																								10.43	10.72	10.81	11.17	
AEO 2018																									10.55	10.82	11.18	
AEO 2019																										10.30	10.45	
AEO 2020																											10.39	
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	10.53	10.60	
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	0.60	0.50	0.48	

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	2018	2019	
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	-0.5	1.9	
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	-4.7	-2.3	
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	-14.5	-12.6	
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	-14.9	-12.7	
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	-2.8	0.1	
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	-8.1	-6.2	
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	-2.5	-0.2	
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	-6.4	-3.2	
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	-5.4	-2.6	
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	-4.2	-3.3	
AEO 2008															0.0	-2.8	1.1	0.9	-0.8	0.2	-2.1	-5.1	-3.4	0.0	-0.3	2.1	4.0	
AEO 2009																-0.5	-4.3	-12.6	-9.2	-7.7	-8.0	-8.6	-5.8	-1.1	-0.1	3.8	6.6	
AEO 2010																	-1.0	-4.3	-9.4	-4.2	-4.5	-7.1	-5.3	-1.2	-1.4	0.5	1.5	
AEO 2011																		-1.8	-6.8	-5.4	-6.7	-8.9	-6.9	-4.2	-4.7	-2.7	-1.5	
AEO 2012																			0.3	0.8	-0.4	-2.8	0.1	3.5	2.1	3.7	4.1	
AEO 2013																				-2.7	-5.5	-7.2	-6.1	-1.6	-1.9	0.0	0.5	
AEO 2014																					-1.3	-3.0	-0.1	3.0	2.5	5.3	7.2	
AEO 2015																						1.7	3.9	9.5	9.0	10.3	12.5	
AEO 2016																							-0.4	1.8	0.7	3.7	7.4	
AEO 2017																								1.5	1.7	2.7	5.4	
AEO 2018																									0.1	2.8	5.5	
AEO 2019																											-2.2	-1.4
AEO 2020																												-2.0
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	5.7	4.7	4.6	

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 September 24, 2020. Series: TOTAL.ESTCUUS.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	2018	2019
AEO 1994	2,843	2,891	2,928	2,962	3,004	3,039	3,071	3,112	3,148	3,185	3,228	3,263	3,298	3,332	3,371	3,406	3,433	3,469									
AEO 1995		2,951	2,967	2,983	3,026	3,058	3,085	3,108	3,134	3,166	3,204	3,248	3,285	3,321	3,357	3,396	3,433	3,475									
AEO 1996			2,973	2,998	3,039	3,074	3,106	3,137	3,173	3,215	3,262	3,317	3,363	3,409	3,454	3,505	3,553	3,604	3,660	3,722	3,775	3,833	3,889				
AEO 1997				3,075	3,115	3,168	3,229	3,290	3,328	3,379	3,437	3,497	3,545	3,596	3,649	3,697	3,736	3,784	3,838	3,899	3,948	4,003	4,044				
AEO 1998					3,106	3,204	3,255	3,318	3,388	3,438	3,488	3,546	3,601	3,658	3,716	3,775	3,825	3,877	3,939	3,996	4,035	4,075	4,115	4,158	4,195	4,232	4,271
AEO 1999						3,205	3,262	3,333	3,402	3,454	3,492	3,534	3,585	3,639	3,691	3,745	3,793	3,843	3,900	3,958	4,005	4,059	4,113	4,163	4,208	4,253	4,298
AEO 2000							3,288	3,360	3,402	3,461	3,523	3,585	3,647	3,699	3,753	3,812	3,861	3,909	3,958	4,012	4,059	4,109	4,155	4,196	4,230	4,266	4,307
AEO 2001								3,364	3,440	3,530	3,608	3,681	3,761	3,838	3,918	3,998	4,068	4,147	4,212	4,286	4,352	4,417	4,484	4,552	4,610	4,671	4,737
AEO 2002									3,443	3,502	3,619	3,711	3,793	3,869	3,948	4,022	4,090	4,170	4,252	4,332	4,404	4,481	4,556	4,630	4,696	4,769	4,842
AEO 2003										3,414	3,527	3,617	3,684	3,762	3,848	3,940	4,014	4,101	4,183	4,266	4,336	4,411	4,481	4,551	4,619	4,692	4,772
AEO 2004											3,495	3,582	3,669	3,750	3,830	3,909	3,977	4,055	4,133	4,212	4,285	4,357	4,429	4,502	4,576	4,653	4,730
AEO 2005												3,547	3,649	3,722	3,813	3,912	3,997	4,070	4,145	4,220	4,285	4,360	4,430	4,501	4,577	4,657	4,732
AEO 2006													3,675	3,700	3,767	3,847	3,911	3,978	4,047	4,116	4,173	4,234	4,300	4,370	4,433	4,501	4,564
AEO 2007														3,694	3,757	3,836	3,891	3,953	4,014	4,082	4,138	4,194	4,251	4,312	4,358	4,408	4,466
AEO 2008															3,744	3,773	3,807	3,869	3,927	3,978	3,979	4,016	4,059	4,108	4,146	4,188	4,225
AEO 2009																3,725	3,658	3,737	3,796	3,847	3,869	3,894	3,921	3,957	3,998	4,043	4,085
AEO 2010																	3,589	3,617	3,728	3,800	3,809	3,836	3,870	3,908	3,944	3,989	4,040
AEO 2011																		3,749	3,692	3,734	3,770	3,777	3,811	3,843	3,872	3,906	3,941
AEO 2012																			3,763	3,729	3,710	3,735	3,753	3,773	3,799	3,833	3,874
AEO 2013																				3,712	3,665	3,704	3,757	3,797	3,846	3,888	3,940
AEO 2014																					3,686	3,702	3,772	3,828	3,888	3,933	3,964
AEO 2015																						3,739	3,750	3,796	3,831	3,884	3,926
AEO 2016																							3,729	3,740	3,766	3,797	3,834
AEO 2017																								3,727	3,719	3,774	3,804
AEO 2018																									3,681	3,730	3,806
AEO 2019																										3,776	3,776
AEO 2020																											3,729
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	3859	3750
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	351	455

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	2018	2019	
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	9.7	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	10.2	14.6	
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	10.5	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	21.0	26.3	
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	23.6	29.1	
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	21.6	27.3	
AEO 2004											0.0	1.0	0.2	2.2	1.7	4.7	10.6	8.0	10.2	14.0	15.0	17.0	18.9	19.7	24.3	20.6	26.2	
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	20.7	26.2	
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	16.6	21.7	
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	14.2	19.1	
AEO 2008															-0.6	1.0	5.8	3.0	4.7	7.7	6.8	7.8	9.0	9.2	12.6	8.5	12.7	
AEO 2009																-0.3	1.7	-0.5	1.2	4.1	3.9	4.6	5.3	5.2	8.6	4.8	9.0	
AEO 2010																-0.2	-3.7	-0.6	2.8	2.3	3.0	3.9	3.9	7.1	3.4	7.7		
AEO 2011																	-0.2	-1.5	1.1	1.2	1.4	2.3	2.1	5.2	1.2	5.1		
AEO 2012																			0.4	0.9	-0.4	0.3	0.8	0.3	3.2	-0.7	3.3	
AEO 2013																				0.5	-1.6	-0.5	0.9	0.9	4.4	0.8	5.1	
AEO 2014																					-1.0	-0.6	1.3	1.7	5.6	1.9	5.7	
AEO 2015																						0.4	0.7	0.9	4.1	0.6	4.7	
AEO 2016																							0.1	-0.6	2.3	-1.6	2.2	
AEO 2017																								-0.9	1.0	-2.2	1.5	
AEO 2018																									0.0	-3.3	1.5	
AEO 2019																										-2.2	0.7	
AEO 2020																											-0.6	
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	9.7	12.5	9.1	12.1	

Sources: Projections: *Annual Energy Outlook*, Reference Case Projections, Various Editions.

Historical Data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opendata/>) (Washington, DC). Retrieved September 24, 2020. Series: TOTAL.ESTCPUS.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	2018	2019
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	117.1	117.7
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	117.8	118.6
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	118.7	119.6
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	124.0	125.3
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	127.6	129.1
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	126.2	128.0
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	124.2	125.9
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	122.4	123.8
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	117.8	119.0
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	115.2	116.5
AEO 2008															101.1	102.0	101.8	102.8	104.1	105.0	105.4	106.1	106.9	107.7	108.4	109.1	109.7
AEO 2009																100.2	97.6	98.6	100.0	101.1	101.8	101.8	101.7	102.0	102.4	102.9	103.5
AEO 2010																	95.2	96.1	96.0	99.5	100.2	100.9	101.2	101.8	102.4	103.0	103.9
AEO 2011																		97.3	97.8	98.9	100.4	100.7	101.7	102.2	102.7	103.2	103.8
AEO 2012																			97.8	97.4	96.3	96.8	97.1	97.5	97.7	98.0	98.5
AEO 2013																				95.5	95.9	96.2	97.4	98.0	98.8	99.5	100.3
AEO 2014																					96.1	96.3	97.4	98.1	99.0	99.6	100.1
AEO 2015																						98.5	97.8	98.7	99.0	99.7	100.5
AEO 2016																							96.7	97.6	98.7	99.4	100.2
AEO 2017																								96.5	97.3	98.6	99.5
AEO 2018																									97.3	99.0	99.9
AEO 2019																										100.1	100.3
AEO 2020																											100.0
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	101.1	100.3
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	10.4	10.6

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	2018	2019
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	15.8	17.4
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	16.5	18.3
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	17.4	19.2
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	22.7	24.9
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	26.2	28.7
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	24.8	27.6
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	22.8	25.5
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	21.1	23.5
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	16.5	18.6
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	14.0	16.1
AEO 2008															0.1	3.1	8.1	5.5	7.4	11.1	8.4	7.8	9.6	10.4	10.9	7.9	9.4
AEO 2009																1.3	3.7	1.1	3.2	7.0	4.7	3.4	4.3	4.6	4.8	1.8	3.2
AEO 2010																	1.1	-1.4	1.2	5.4	3.1	2.5	3.8	4.3	4.8	1.9	3.5
AEO 2011																		-0.2	0.9	4.7	3.3	2.3	4.2	4.8	5.1	2.1	3.5
AEO 2012																			1.0	3.1	-1.0	-1.6	-0.5	-0.1	-0.1	-3.1	-1.8
AEO 2013																				1.1	-1.4	-2.3	-0.2	0.4	1.1	-1.5	0.0
AEO 2014																					-1.1	-2.2	-0.2	0.6	1.3	-1.5	-0.3
AEO 2015																					0.0	0.3	1.2	1.3	-1.4	0.1	
AEO 2016																						-0.8	0.0	1.0	-1.7	-0.1	
AEO 2017																							-1.1	-0.4	-2.5	-0.8	
AEO 2018																								-0.4	-2.1	-0.4	
AEO 2019																									-1.0	-0.1	
AEO 2020																											-0.3
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	10.3	10.6

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 September 24, 2020. 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	2018	2019	
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	13.0	13.1	
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	12.8	12.9	
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	12.6	12.7	
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	13.5	13.6	
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	13.2	13.4	
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	13.2	13.4	
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	13.4	13.5	
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	13.6	13.7	
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	13.1	13.2	
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	13.0	13.1	
AEO 2008															11.5	11.7	11.7	11.7	11.8	11.9	11.8	11.9	11.9	12.1	12.1	12.2	12.2	
AEO 2009																11.6	11.6	11.6	11.4	11.4	11.3	11.4	11.4	11.5	11.5	11.5	11.6	
AEO 2010																	11.2	11.3	11.1	11.1	11.0	11.0	11.1	11.1	11.2	11.2	11.3	
AEO 2011																		11.4	11.1	11.1	11.0	11.0	11.0	11.1	11.1	11.1	11.1	
AEO 2012																			11.6	11.6	11.3	11.3	11.2	11.2	11.3	11.3	11.3	
AEO 2013																				10.7	11.2	11.0	11.0	11.0	11.0	10.9	11.0	
AEO 2014																					11.3	11.0	10.8	10.8	10.8	10.8	10.8	
AEO 2015																						11.7	10.9	10.8	10.8	10.7	10.7	
AEO 2016																							10.9	10.9	11.1	11.1	11.0	
AEO 2017																								10.9	11.1	11.1	11.0	
AEO 2018																										11.1	11.1	11.0
AEO 2019																											11.4	11.3
AEO 2020																												11.6
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	12.0	11.9	
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	1.0	1.0	

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	2018	2019	
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	8.8	10.2	
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	7.2	8.7	
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	5.1	6.5	
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	12.5	14.4	
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	10.5	12.3	
AEO 2003										-0.9	0.3	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	10.5	12.2	
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	11.7	13.4	
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	13.5	14.9	
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	9.4	10.8	
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	8.2	9.6	
AEO 2008															0.9	0.4	3.6	1.2	3.6	13.6	1.9	-0.1	5.9	12.3	12.8	1.5	2.7	
AEO 2009																0.2	2.7	0.8	0.5	9.1	-2.1	-4.4	1.0	6.7	7.0	-3.8	-2.7	
AEO 2010																	-0.9	-2.2	-2.2	6.2	-4.8	-7.1	-1.8	3.7	4.0	-6.4	-5.2	
AEO 2011																		-0.7	-2.2	6.1	-4.8	-7.2	-2.3	3.0	3.1	-7.6	-6.7	
AEO 2012																			2.2	11.0	-2.5	-5.2	-0.4	4.7	5.0	-5.7	-4.8	
AEO 2013																				2.7	-3.0	-7.3	-2.6	2.1	2.1	-8.7	-7.9	
AEO 2014																					-2.9	-7.2	-4.1	0.6	0.8	-9.9	-9.5	
AEO 2015																						-1.4	-3.3	0.3	0.3	-10.3	-10.0	
AEO 2016																							-3.2	1.9	3.4	-7.7	-7.5	
AEO 2017																								1.9	3.4	-7.7	-7.5	
AEO 2018																									3.4	-7.7	-7.5	
AEO 2019																											-4.6	-5.1
AEO 2020																												-2.9
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	12.5	8.1	8.4

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 September 24, 2020. Series: TOTAL.TERCBUS.A & TOTAL.LORCBUS.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	2018	2019	
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	8.2	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	8.2	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	8.9	8.9	9.0	9.0	9.0	9.0	
AEO 1999						7.4	7.8	7.9	8.0	8.1	8.2	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	9.3	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	9.1	9.2	9.2	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	10.4	10.5	
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	11.3	11.5	
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	11.0	11.2	
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	11.0	11.2	
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	11.0	11.2	
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	10.4	10.5	
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	10.3	10.5	
AEO 2008															8.6	8.7	8.5	8.6	8.8	8.9	9.1	9.2	9.4	9.5	9.6	9.8	9.9	
AEO 2009																8.6	8.9	8.9	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.5	9.6	
AEO 2010																	8.4	8.6	8.8	8.9	8.9	9.0	9.0	9.1	9.2	9.3	9.4	
AEO 2011																		8.5	8.7	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	
AEO 2012																			8.7	8.7	8.7	8.7	8.8	8.9	8.9	9.0	9.1	
AEO 2013																				8.3	8.6	8.7	8.8	8.8	8.8	8.8	8.9	8.9
AEO 2014																					8.6	8.5	8.5	8.6	8.6	8.7	8.7	
AEO 2015																						8.9	8.8	8.8	8.8	8.9	8.9	
AEO 2016																							8.8	9.0	9.1	9.1	9.1	
AEO 2017																								8.8	8.8	8.8	8.7	
AEO 2018																										8.9	9.2	9.2
AEO 2019																											9.2	9.1
AEO 2020																												9.3
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	9.5	9.4	
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	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	2018	2019	
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	-5.0	-3.9
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	-2.0	-0.7
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	-3.2	-2.1
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	10.0	11.7
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	19.1	22.0
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	16.0	19.1
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	15.7	18.8
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	16.0	19.0
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	9.1	11.7
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	9.0	11.7
AEO 2008																1.0	0.1	0.4	0.8	2.1	8.3	4.2	2.8	7.6	6.0	7.2	3.0	5.2
AEO 2009																	-1.2	4.2	3.9	4.2	9.6	4.8	2.7	6.8	4.5	5.1	0.5	2.2
AEO 2010																		-1.1	0.6	2.2	7.9	2.3	-0.1	3.9	1.7	2.4	-1.9	0.1
AEO 2011																			-0.5	0.8	6.0	1.3	-0.6	3.7	1.6	2.4	-1.8	0.2
AEO 2012																				1.5	6.1	0.0	-2.4	1.1	-1.2	-0.6	-4.9	-3.1
AEO 2013																					1.5	-1.1	-3.4	0.6	-2.0	-2.0	-6.8	-5.3
AEO 2014																						-1.1	-4.9	-2.0	-4.4	-4.0	-8.5	-7.2
AEO 2015																							-0.2	0.8	-2.2	-2.0	-6.6	-5.4
AEO 2016																								1.2	-0.3	0.6	-4.0	-3.6
AEO 2017																									-1.7	-2.0	-7.5	-7.1
AEO 2018																										-0.7	-2.6	-1.8
AEO 2019																											-3.6	-2.8
AEO 2020																												-1.1
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	7.1	7.2	

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 September 24, 2020. Series: TOTAL.TECCBUS.A & TOTAL.LOCCBUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 20. Total Delivered Industrial Energy Consumption, 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	2018	2019		
Projected (quadrillion Btu)																													
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	30.5	30.6	30.7	30.8	30.8	31.0		
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	30.9	31.1	31.4	31.7	31.9		
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	30.9	31.2		
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	32.2	32.6		
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	32.4	32.7		
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	31.8	32.2		
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	30.6	31.0		
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	29.2	29.4		
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	28.4	28.6		
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	27.3	27.6		
AEO 2008															25.2	25.8	25.3	25.8	26.2	26.2	26.2	26.2	26.3	26.4	26.4	26.5	26.5		
AEO 2009																25.1	23.3	22.8	23.5	23.9	24.3	24.2	23.9	23.9	23.9	23.9	24.0		
AEO 2010																	22.2	22.3	23.0	23.8	24.2	24.6	24.8	24.9	25.0	25.1	25.3		
AEO 2011																		23.1	24.2	25.0	26.0	26.2	26.7	26.8	26.9	27.0	27.1		
AEO 2012																			23.8	23.8	23.1	23.7	24.0	24.2	24.2	24.2	24.3	24.4	
AEO 2013																				24.3	23.8	24.0	24.9	25.5	26.0	26.4	26.7		
AEO 2014																					23.8	24.2	25.3	26.0	26.5	27.0	27.3		
AEO 2015																						24.7	25.2	25.9	26.2	26.6	27.1		
AEO 2016																							24.5	24.3	24.7	25.1	25.8		
AEO 2017																								24.6	25.0	25.8	26.4		
AEO 2018																									24.8	25.6	26.4		
AEO 2019																										26.0	26.4		
AEO 2020																											26.3		
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	26.2	26.4		
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	2.4	2.3		

Table 20. Total Delivered Industrial 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	2018	2019			
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	17.6	17.3		
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	20.7	20.7		
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	18.0	18.4		
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	22.8	23.4		
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	23.7	24.1		
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	21.3	22.2		
AEO 2004												-1.9	-3.7	3.3	4.7	6.7	12.1	23.9	16.7	17.3	17.3	16.6	17.8	19.7	18.6	19.6	16.5	17.4		
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	11.2	11.5		
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	8.2	8.3	
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	4.2	4.5	
AEO 2008																	1.4	7.7	15.7	9.4	10.0	8.8	6.3	6.3	7.4	5.4	5.1	1.1	0.6	
AEO 2009																		4.7	6.6	-3.4	-1.4	-0.8	-1.5	-1.9	-2.3	-4.6	-5.1	-8.8	-9.1	
AEO 2010																			1.7	-5.5	-3.4	-1.2	-1.6	-0.2	1.1	-0.6	-0.7	-4.3	-4.2	
AEO 2011																				-2.1	1.6	3.9	5.8	6.4	9.2	7.3	7.1	3.0	2.8	
AEO 2012																					-0.2	-1.3	-6.0	-3.7	-2.2	-3.2	-3.8	-7.4	-7.4	
AEO 2013																						0.7	-3.4	-2.6	1.7	-1.9	3.2	0.6	1.2	
AEO 2014																								-3.1	-1.7	3.2	3.8	5.5	2.8	3.6
AEO 2015																									0.4	3.0	3.5	4.0	1.5	2.6
AEO 2016																									0.0	-2.7	-1.8	-4.2	-2.2	
AEO 2017																										-1.8	-0.8	-1.6	0.2	
AEO 2018																											-1.5	-2.3	0.1	
AEO 2019																												-0.9	0.1	
AEO 2020																													-0.2	
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	9.2	8.8			

Sources: Projections: *Annual Energy Outlook*, Reference Case Projections, Various Editions.

Historical Data: U.S. Energy Information Administration open data API (<http://www.eia.gov/opa/data/>) (Washington, DC). Retrieved September 24, 2020. 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 industrial energy consumption that was not incorporated in the earlier projections.

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	2018	2019
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	35.1	35.4
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	35.4	35.7
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	36.0	36.4
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	36.8	37.3
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	38.0	38.6
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	38.5	39.2
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	36.6	37.1
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	36.0	36.5
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	34.1	34.6
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	33.0	33.5
AEO 2008															28.3	28.1	28.2	28.5	28.8	29.1	29.6	29.8	30.0	30.3	30.4	30.6	30.7
AEO 2009																27.6	27.1	27.5	28.0	28.1	28.4	28.3	28.3	28.2	28.2	28.3	28.4
AEO 2010																	26.5	26.8	27.3	27.6	27.9	28.0	28.1	28.1	28.3	28.4	28.6
AEO 2011																		26.9	27.1	27.4	27.9	28.0	28.1	28.3	28.4	28.4	28.5
AEO 2012																			26.6	26.8	27.0	27.2	27.2	27.2	27.2	27.2	27.0
AEO 2013																				26.2	26.4	26.6	26.8	26.9	26.9	26.9	26.9
AEO 2014																					26.4	26.3	26.3	26.4	26.4	26.3	26.2
AEO 2015																						26.8	27.1	27.3	27.3	27.3	27.2
AEO 2016																							27.3	26.6	26.9	26.6	26.0
AEO 2017																								28.2	28.4	28.5	28.5
AEO 2018																									27.7	27.6	27.7
AEO 2019																										28.0	28.2
AEO 2020																											28.1
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	28.4	28.3
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	4.0	4.1

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	2018	2019	
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	23.7	25.0
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	24.6	26.2
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	26.6	28.4
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	29.7	31.8
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	33.9	36.2
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	35.6	38.5
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	28.8	31.1
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	26.8	29.0
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	20.2	22.0
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	16.3	18.3
AEO 2008																-1.8	2.6	6.0	5.5	8.0	11.3	10.7	10.1	8.5	8.3	8.1	7.6	8.3
AEO 2009																	0.6	1.6	1.8	5.0	7.6	6.3	4.8	2.2	1.0	0.3	-0.4	0.3
AEO 2010																		-0.4	-0.8	2.6	5.5	4.5	3.5	1.5	0.7	0.5	-0.1	0.8
AEO 2011																			-0.3	1.7	4.6	4.5	3.5	1.7	1.2	0.9	0.1	0.6
AEO 2012																				-0.2	2.3	1.3	0.5	-1.5	-2.5	-3.4	-4.8	-4.8
AEO 2013																					0.1	-1.0	-1.6	-3.2	-3.9	-4.3	-5.2	-4.9
AEO 2014																						-1.1	-2.6	-4.8	-5.5	-6.1	-7.3	-7.6
AEO 2015																							-1.0	-1.9	-2.2	-2.9	-3.9	-3.8
AEO 2016																								-1.4	-4.9	-4.3	-6.5	-8.0
AEO 2017																									0.9	1.0	0.5	0.7
AEO 2018																										-1.5	-2.7	-2.4
AEO 2019																											-1.4	-0.4
AEO 2020																												-0.8
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	13.9	14.3

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 September 24, 2020. 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	2018	2019
AEO 1994	5,060	5,130	5,185	5,240	5,287	5,335	5,379	5,438	5,482	5,529	5,599	5,658	5,694	5,738	5,797	5,874	5,925	5,984									
AEO 1995		5,137	5,174	5,188	5,262	5,309	5,361	5,394	5,441	5,489	5,551	5,621	5,680	5,727	5,775	5,841	5,889	5,944									
AEO 1996			5,182	5,224	5,295	5,355	5,417	5,464	5,525	5,589	5,660	5,735	5,812	5,879	5,925	5,981	6,030	6,087	6,142	6,203	6,258	6,322	6,362				
AEO 1997				5,295	5,381	5,491	5,586	5,658	5,715	5,781	5,863	5,934	6,009	6,106	6,184	6,236	6,268	6,316	6,365	6,417	6,467	6,542	6,597				
AEO 1998					5,474	5,621	5,711	5,784	5,893	5,957	6,026	6,098	6,192	6,292	6,379	6,465	6,542	6,612	6,683	6,752	6,801	6,862	6,924	6,973	7,034	7,094	7,141
AEO 1999						5,522	5,689	5,810	5,913	5,976	6,036	6,084	6,152	6,244	6,325	6,418	6,493	6,563	6,641	6,703	6,771	6,846	6,930	6,991	7,066	7,129	7,183
AEO 2000							5,573	5,692	5,777	5,865	5,971	6,078	6,172	6,262	6,345	6,420	6,480	6,551	6,610	6,678	6,755	6,841	6,942	6,999	7,068	7,131	7,193
AEO 2001								5,630	5,781	5,909	6,023	6,114	6,197	6,281	6,387	6,470	6,541	6,633	6,709	6,788	6,881	6,970	7,070	7,152	7,244	7,318	7,394
AEO 2002									5,723	5,808	5,981	6,095	6,210	6,323	6,438	6,530	6,624	6,727	6,839	6,937	7,032	7,117	7,206	7,299	7,390	7,478	7,569
AEO 2003										5,633	5,749	5,856	5,954	6,095	6,232	6,360	6,475	6,602	6,719	6,828	6,927	7,024	7,129	7,224	7,322	7,423	7,537
AEO 2004											5,743	5,826	5,986	6,124	6,251	6,357	6,453	6,559	6,657	6,763	6,857	6,944	7,028	7,123	7,219	7,320	7,429
AEO 2005												5,905	6,023	6,138	6,274	6,415	6,533	6,627	6,721	6,812	6,889	6,979	7,052	7,135	7,236	7,334	7,427
AEO 2006													5,967	5,978	6,080	6,182	6,281	6,365	6,440	6,536	6,595	6,654	6,718	6,794	6,869	6,952	7,030
AEO 2007														5,940	5,999	6,059	6,124	6,214	6,296	6,369	6,442	6,527	6,589	6,662	6,716	6,777	6,854
AEO 2008															5,977	5,983	5,978	6,011	6,087	6,144	6,154	6,187	6,226	6,272	6,308	6,350	6,368
AEO 2009																5,849	5,699	5,746	5,803	5,842	5,858	5,852	5,830	5,844	5,857	5,875	5,889
AEO 2010																	5,507	5,521	5,643	5,706	5,707	5,741	5,731	5,749	5,761	5,787	5,826
AEO 2011																		5,643	5,601	5,622	5,659	5,651	5,680	5,700	5,707	5,724	5,742
AEO 2012																			5,632	5,570	5,453	5,438	5,407	5,408	5,402	5,402	5,421
AEO 2013																				5,361	5,368	5,361	5,381	5,336	5,370	5,404	5,441
AEO 2014																					5,421	5,426	5,418	5,382	5,418	5,452	5,469
AEO 2015																						5,488	5,428	5,436	5,405	5,425	5,477
AEO 2016																							5,273	5,292	5,321	5,329	5,322
AEO 2017																								5,157	5,183	5,222	5,272
AEO 2018																									5,151	5,257	5,230
AEO 2019																										5,250	5,217
AEO 2020																											5,123
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	5281	5142
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	1022	1145

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	2018	2019
AEO 1994		-2.4	-2.5	-2.6	-4.9	-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	-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	34.3	38.9
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	35.0	39.7
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	35.0	39.9
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	38.6	43.8
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	41.6	47.2
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	40.6	46.6
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	38.6	44.5
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	38.9	44.4
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	31.6	36.7
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	28.3	33.3
AEO 2008															-0.4	3.0	11.0	7.8	11.9	17.6	14.9	14.5	18.4	20.9	22.7	20.2	23.9
AEO 2009																0.7	5.8	3.0	6.7	11.8	9.4	8.3	10.9	12.6	13.9	11.2	14.5
AEO 2010																	2.3	-1.0	3.7	9.2	6.6	6.2	9.0	10.8	12.1	9.6	13.3
AEO 2011																		1.2	3.0	7.6	5.7	4.5	8.0	9.9	11.0	8.4	11.7
AEO 2012																			3.5	6.6	1.8	0.6	2.9	4.2	5.1	2.3	5.4
AEO 2013																				2.6	0.2	-0.8	2.3	2.9	4.5	2.3	5.8
AEO 2014																					1.2	0.4	3.1	3.7	5.4	3.2	6.4
AEO 2015																						1.5	3.2	4.8	5.1	2.7	6.5
AEO 2016																							0.3	2.0	3.5	0.9	3.5
AEO 2017																								-0.6	0.8	-1.1	2.5
AEO 2018																									0.2	-0.5	1.7
																										-0.6	1.5
																											-0.4
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	17.7	20.5

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 September 24, 2020. Series: TOTAL.TETCEUS.A. Shading indicates overestimation (blue) or underestimation (green).

Table 23. Energy Intensity, Projected vs. Actual

Projected																											
(quadrillion Btu / \$Billion 2012 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	2018	2019
AEO 1994	9.9	9.8	9.7	9.5	9.4	9.3	9.1	9.0	8.9	8.8	8.7	8.6	8.5	8.4	8.3	8.2	8.2	8.1									
AEO 1995		9.6	9.5	9.3	9.2	9.1	8.9	8.8	8.7	8.6	8.5	8.4	8.3	8.2	8.1	8.0	8.0	7.9									
AEO 1996			9.4	9.3	9.2	9.0	8.9	8.8	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	7.6				
AEO 1997				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	7.9	7.9	7.8	7.7	7.7	7.6	7.5				
AEO 1998					8.9	8.9	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	7.7	7.7	7.6	7.5	7.5	7.4	7.4
AEO 1999						8.5	8.6	8.5	8.5	8.4	8.3	8.2	8.0	7.9	7.8	7.7	7.6	7.5	7.4	7.4	7.3	7.3	7.2	7.1	7.1	7.0	6.9
AEO 2000							8.3	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	6.9	6.8	6.7
AEO 2001								7.7	7.5	7.5	7.4	7.3	7.1	7.0	6.9	6.8	6.7	6.6	6.4	6.3	6.2	6.1	6.0	5.9	5.8	5.8	5.7
AEO 2002									7.7	7.8	7.7	7.7	7.6	7.5	7.3	7.2	7.0	6.8	6.7	6.6	6.5	6.4	6.3	6.2	6.0	5.9	5.9
AEO 2003										7.6	7.5	7.4	7.3	7.2	7.1	7.0	6.9	6.7	6.6	6.5	6.4	6.3	6.2	6.1	6.0	5.9	5.9
AEO 2004											7.4	7.3	7.2	7.1	7.0	6.9	6.8	6.7	6.6	6.5	6.4	6.3	6.2	6.1	6.0	5.9	5.8
AEO 2005												7.2	7.1	7.0	6.9	6.8	6.7	6.6	6.5	6.4	6.3	6.2	6.1	5.9	5.8	5.7	5.6
AEO 2006													7.0	6.9	6.8	6.6	6.5	6.4	6.3	6.2	6.1	6.0	5.9	5.8	5.7	5.5	5.4
AEO 2007														6.9	6.8	6.7	6.6	6.5	6.4	6.3	6.2	6.1	5.9	5.8	5.7	5.6	5.5
AEO 2008															6.8	6.8	6.6	6.4	6.3	6.2	6.1	6.0	5.9	5.8	5.7	5.6	5.5
AEO 2009																6.7	6.7	6.6	6.5	6.4	6.2	6.1	5.9	5.8	5.6	5.5	5.4
AEO 2010																	6.6	6.6	6.5	6.3	6.2	6.1	5.9	5.8	5.7	5.6	5.4
AEO 2011																		6.4	6.3	6.2	6.0	5.9	5.8	5.7	5.6	5.4	5.3
AEO 2012																			6.4	6.3	6.1	5.9	5.7	5.6	5.5	5.4	5.3
AEO 2013																				6.1	6.1	5.9	5.8	5.7	5.5	5.4	5.3
AEO 2014																					6.1	5.9	5.8	5.7	5.6	5.4	5.3
AEO 2015																						5.8	5.6	5.5	5.4	5.3	5.2
AEO 2016																							5.6	5.6	5.5	5.3	5.2
AEO 2017																								5.5	5.4	5.4	5.3
AEO 2018																									5.4	5.4	5.3
AEO 2019																										5.4	5.3
AEO 2020																											5.2
Actual*	8.8	8.6	8.6	8.5	8.2	7.9	7.7	7.5	7.3	7.2	7.1	6.9	6.7	6.5	6.5	6.3	6.2	6.2	6.1	5.8	5.9	5.8	5.6	5.5	5.4	5.4	5.3
Average Absolute Difference	1.1	1.1	1.0	0.8	0.9	1.1	1.1	1.0	1.1	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0	0.8	0.7	0.9	0.7	0.6	0.7	0.5	0.5	0.4	0.4

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	2018	2019	
AEO 1994		12.8	13.4	12.9	11.8	14.4	17.5	19.4	20.1	23.1	21.9	23.6	24.2	27.0	30.1	28.8	30.0	31.7	29.2									
AEO 1995			11.1	10.5	9.5	11.7	14.7	16.5	17.1	20.0	18.7	20.1	20.4	23.0	26.2	25.3	26.6	28.4	26.1									
AEO 1996				10.1	9.4	11.9	14.6	16.3	16.6	19.2	18.1	20.0	20.7	23.4	26.4	25.4	26.9	28.7	26.4	28.1	33.5	31.2	31.3	35.3				
AEO 1997					6.3	9.7	13.4	15.4	16.0	19.0	18.2	20.0	20.7	23.4	26.5	25.4	26.6	28.4	26.0	27.5	32.7	30.2	30.6	34.6				
AEO 1998						8.4	12.5	15.7	16.7	20.3	19.5	21.3	21.7	24.6	27.9	27.0	28.2	30.0	27.6	29.0	34.1	31.5	31.8	36.0	37.0	38.8	37.0	40.0
AEO 1999							7.4	11.6	13.4	17.1	16.1	17.3	17.3	19.5	22.2	20.8	21.6	23.0	20.1	21.6	26.4	24.2	24.6	28.3	29.3	31.1	29.5	32.1
AEO 2000								8.0	9.9	12.6	12.0	13.7	13.9	16.4	19.5	18.6	19.8	21.3	18.7	20.2	24.9	22.2	22.1	25.5	26.4	27.8	25.8	28.1
AEO 2001									1.7	4.0	3.0	4.4	4.5	6.3	8.4	7.1	7.3	8.0	5.1	5.4	8.5	5.6	5.0	7.6	7.7	8.4	6.4	8.1
AEO 2002										6.5	7.3	9.8	10.3	12.4	14.9	13.3	12.9	13.0	9.5	9.6	13.0	10.2	9.6	12.0	11.8	12.1	9.8	11.4
AEO 2003											4.5	6.3	6.3	8.4	11.1	9.9	10.2	10.8	7.7	8.3	11.8	9.0	8.6	11.3	11.5	12.1	9.9	11.4
AEO 2004												5.3	5.3	7.5	9.8	8.3	8.7	9.4	6.9	7.8	11.5	8.7	8.2	10.7	10.9	11.6	9.4	11.3
AEO 2005													3.5	5.4	7.8	6.4	7.7	8.6	5.8	6.4	9.8	6.7	6.0	8.2	8.1	8.5	6.1	7.4
AEO 2006														4.7	5.8	4.8	4.8	5.5	2.8	3.3	6.9	4.0	3.2	5.3	5.0	4.9	2.4	3.6
AEO 2007															6.1	5.4	5.7	6.3	3.5	3.8	7.3	4.5	4.1	6.3	6.0	6.0	3.5	4.5
AEO 2008																5.6	7.0	6.5	3.2	3.3	6.4	3.3	2.8	5.1	5.0	5.4	3.2	4.4
AEO 2009																	5.7	8.7	6.2	6.2	8.9	5.2	3.9	5.5	5.0	4.9	2.0	2.7
AEO 2010																		6.1	4.9	5.6	8.5	5.2	4.6	6.3	5.7	5.5	2.6	3.3
AEO 2011																			2.9	3.4	5.6	2.1	1.4	3.6	3.1	3.1	0.6	1.7
AEO 2012																				5.0	8.2	3.4	1.6	2.5	1.5	1.3	-0.9	0.1
AEO 2013																					5.4	3.1	1.8	3.6	2.9	2.8	0.5	1.5
AEO 2014																						3.0	1.6	3.5	2.9	3.1	0.7	1.7
AEO 2015																							0.1	0.4	0.5	0.5	-1.9	-0.7
AEO 2016																								0.7	1.2	1.5	-1.7	-0.5
AEO 2017																									0.0	0.3	-1.1	0.9
AEO 2018																										0.5	-0.7	0.8
AEO 2019																											0.0	0.2
AEO 2020																												-0.2
Average Absolute Percent Difference	12.8	12.2	11.1	9.3	11.2	13.4	14.7	13.9	15.7	13.9	14.7	14.1	15.5	17.3	15.5	15.6	16.1	12.9	11.5	14.6	11.2	10.1	12.0	9.1	9.1	7.1	7.7	

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 2012 chained dollars.