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Annual Energy Outlook 2022 Retrospective: Evaluation of Previous Reference Case Projections

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Evaluation and Previous Reference Case Projections

We project U.S. energy production, consumption, and prices each year in the *Annual Energy Outlook* (AEO). We produce the AEO on an alternating cycle: in even years, we include complete documentation and a large number of alternative cases, and in odd years, we include limited documentation and fewer alternative cases. Following an even year AEO, we also produce an *Annual Energy Outlook Retrospective* (AEO Retrospective) which compares recent history with Reference case projections from previous editions of the AEO. The AEO Retrospective shows the relationship between past AEO projections and actual energy indicators, and it informs discussions about the underlying models.

AEO projections are not statements of what will happen but of what we believe would happen given specific assumptions supplied to our National Energy Modeling System (NEMS). Our assumptions are publicly available and include externally developed oil price paths and GDP projections.¹ The AEO Reference case projection generally assumes that other trends are consistent with historical and current market behavior as well as technological and demographic changes. The AEO Reference case assumes current laws and regulations are unchanged throughout the projection period and those policies with end dates expire without extensions.

Although the AEO Retrospective focuses on only Reference case projections, the AEO contains a range of cases, and this range explores some of the uncertainty inherent in long-term projections. Each year's AEO typically includes Low and High Economic Growth cases, Low and High Oil and Gas Supply cases, Low and High Oil Price cases, and Low and High Renewables Cost cases. Past AEOs have also included alternative cases examining the impact of proposed policy changes.

Methodology

The AEO Retrospective summarizes the relationship between the Reference case projections and realized energy use by comparing absolute differences and the average absolute percentage differences for many of the primary measures published in AEOs from 1994 to 2022.² The average absolute percentage difference is the simple mean of the absolute percentage difference between all of the Reference case projections for a given year and the associated historical value.³ Most historical data are from the *Monthly Energy Review* (MER), which can be accessed from our [open data API](#).⁴ Table 1 summarizes 31 comparisons based on 27 primary measures projected in the AEO given four measures are shown in nominal and real dollars.

¹ NEMS documentation is available on the [EIA website](#).

² We have used NEMS 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 the 1994 and 1995 AEOs ended in 2010, so these two publications have no entries for the later years in Tables 2 through 16 and Tables 23 through 29.

³ For each calendar year, the historic value is compared against each AEO projected value to find the absolute difference. If the historic value in year 2010 were 10, and there were three AEO estimates of 11, 12, and 13, the absolute differences would be 1, 2, and 3. The average absolute difference is 2. In the same example, we would have 10%, 20%, and 30% difference, which would average to 20% difference in that calendar year.

⁴ The exceptions include historical data related to GDP from the U.S. Department of Commerce, Bureau of Economic Analysis (BEA).

This year's AEO Retrospective includes measures for six sources of electricity generation: solar, wind, conventional hydroelectric, coal, natural gas, and nuclear. Through 2007, the combined net generation from solar and wind was less than 1.0% of U.S. generation, but it grew to 1.4% just a year later and to 12.0% by 2021. So, since AEO2007, the AEO Retrospective focuses on comparing actuals against projections to focus on the years when wind and solar formed a growing share of the nation's net generation mix. We expect to continue these measures in future AEO Retrospectives.

To illustrate the degree of variance, Table 2 shows the standard deviations of the percentage forecast errors between the Reference case projections and the actual values for every horizon $H=0$ to $H=15$ based on a 2017 paper authored by researchers Lynn H. Kaack, Jay Apt, M. Granger Morgan, and Patrick McSharry.^{5,6} For price estimates, we compute the standard deviations of the log errors because the authors in the aforementioned methodology⁷ found that the error distributions of price quantities are asymmetric as a result of prices being generally log-normally distributed.

Table 3 through Table 29 show detailed results that include the Reference case projections, historical values, and percentage differences between projected and actual values for all covered years. These tables also provide the average absolute difference across all AEOs for each covered year. Prior-year statistics can change from one year's evaluation to the next because of revisions to historical data in the MER and changes in the measurement of GDP. In addition, NEMS is not static, and statistical biases may change over time. EIA reviews this report and other analyses and modifies NEMS to capture developing energy market trends more accurately.

Key findings

Table 1 shows that 20 of the 31 variables have historically been overestimated more than they were underestimated. In a statistically unbiased projection, with a sufficiently large number of samples, over- or under-estimates over time would occur in equal measure. With some earlier years having only a small number of associated projections, many of these samples may not be statistically significant. The second 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 indicates that a measure was always underestimated, and 100% indicates a measure was always overestimated. Quantities that are over- or underestimated significantly more than 50% of the time may be considered biased, though formal statistical tests would be required to confirm.

As reflected in the average absolute percentage differences in the first column of Table 1, we project measures of energy consumption with greater accuracy than measures of net imports and of energy prices. AEO Reference case projections for total energy consumption varied, on average, 9.2% above or below actuals. Energy consumption tends to change at a slower pace than other indicators, in part, because many energy-using devices, such as appliances, automobiles, and industrial equipment, are

⁵ 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.

⁶ 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).

⁷ 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.

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.

Projections varied more widely from actuals for net imports of petroleum and natural gas. Projections of net imports of petroleum differed, on average, by nearly five times from actuals because of the earlier models underestimating net U.S. exports of crude oil and petroleum products. For example, the Reference cases from AEO1998 through AEO2018 showed the United States as a net importer of petroleum and other liquids through 2020 when, in fact, the United States became a net exporter starting in late 2019.

In general, we identify the input assumptions with the highest combination of uncertainty and impact and use those to form the basis for our alternative scenarios in the AEO. 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 we used in NEMS,⁸ which are both exogenous inputs to the model.⁹ These projections can greatly influence the other projections the model makes, which is why each recent AEO includes alternative cases exploring differences in economic growth (Low and High Economic Growth cases) and in oil prices (Low and High Oil Price cases). Changes in industry-specific market conditions, significant technological breakthroughs, and new laws or regulations (effective after we published an AEO) can also lead to significant differences between projections and realized outcomes.

For some measures, the AEO Reference case design contributes to the tendency to over- or underestimate measures. As an example, we produce the AEO Reference case with the assumption that current laws and regulations that affect the energy sector remain unchanged throughout the projection period. New laws and regulations tend to reduce energy intensity, and as a result, the AEO Reference case typically, but not always, overestimates energy intensity. In the AEO, tax credits with sunset dates expire according to existing law and regulation. This causes an underestimate of renewable energy, as the production tax credit (PTC) and investment tax credit (ITC), which incentivize the development of wind and solar projects, have been extended multiple times.

Among the six primary sources of electricity generation listed in the retrospective, our projections for nuclear generation show the least variance, differing, on average, 4.0% (31 billion kilowatthours [BkWh]) for years 2006-2021. Nuclear generators tend to have high capacity factors that are quite stable over time, with a relatively long realized asset life.¹⁰ Coal-fired generation projections were higher than actuals by an average of 48.8%, or 513 BkWh. Most AEO projections since the AEO2007 overestimated coal and hydroelectric generation figures and underestimated generation from natural gas, solar, and wind. Our projections were higher than actuals for natural gas-fired generation by about 19.8%, or 281

⁸ Although dynamic feedback in the model can modify these initial forecasts, the resulting changes tend to be small.

⁹ To improve these exogenous inputs, EIA relies on two sources. Each year, EIA purchases macroeconomic projections from an outside vendor, who themselves have a process for improving their GDP projections. EIA also undertakes a future World Oil Price analysis each year to best estimate a range of future oil prices.

¹⁰ U.S. Energy Information Administration, "In 2019, 9 of the 10 highest-generating U.S. power plants were nuclear plants." *Today in Energy*, September 25, 2020.

BkWh for years 2006-2021. Solar generation projections were under actuals by about 46.2%, or 38 BkWh, and for wind by 29.4%, or 74 BkWh over that time period. For wind and especially solar, the relatively high percent deviation is largely a function of the relatively small value of these series in relationship to the whole. That is, the 38 BkWh difference is about a third of the total solar power generated in the U.S. in 2021, which was 113.8 BkWh, and less than 2% of the 1,474 BkWh of generation from natural gas that same year. For solar, the lack of granular data before 2014 for small-scale systems that are less than 1 megawatt contributed to the variance. AEOs from 2009 to 2015 show that our estimates of grid-connected solar photovoltaic (PV) capacity were about 4% or higher than Solar Electric Industry Association estimates, depending on the level of assumed policies.¹¹

Because these six series represent the bulk of electricity generation, any overestimate in one series will tend to lead to an underestimate in one or more other series (and vice versa) because generation from all sources must equal projected electricity demand each year of the projection period.¹² Although individual generation resources showed more variance, estimates of electricity sales differed by only about 7.4% for years 1993-2021.

EIA has focused on adoption rates of renewable energy technologies in recent years, with significant revisions to NEMS modeling inputs since 2015. In 2016, we wrote “Wind and Solar Data and Projections from the U.S. Energy Information Administration: Past Performance and Ongoing Enhancements”,¹³ which identified policy as a major driver outside the Reference case analysis. EIA also carefully examines our technology costs each year,¹⁴ and periodically release a report that evaluates the overnight capital cost and performance characteristics for 25 electric generator types.¹⁵

These new measures, like existing measures, help inform EIA about the uncertainty in the Reference case. As discussed in this section, consumption metrics tend to vary less than price metrics. In areas with revolutionary technology cost changes or policy changes, the AEO Reference and core side cases will tend to have statistical biases as a feature of the case design. The retrospective highlights projection measures with unintended biases and measures warranting further research.

¹¹ U.S. Energy Information Administration. [Wind and Solar Data and Projections from the U.S. Energy Information Administration: Past Performance and Ongoing Enhancements](#). Washington, DC: U.S. Energy Information Administration, 2016. Accessed April 27, 2022.

¹² The price of electricity in NEMS affects projected demand for electricity, meaning that generation from higher cost sources can depress electricity demand. However, many sources of end-use demand cannot switch between fuels, and thus this tends to be a smaller effect.

¹³ U.S. Energy Information Administration. [Wind and Solar Data and Projections from the U.S. Energy Information Administration: Past Performance and Ongoing Enhancements](#). Washington, DC: U.S. Energy Information Administration, 2016. Accessed April 27, 2022.

¹⁴ U.S. Energy Information Administration. [Cost and Performance Characteristics of New Generating Technologies, Annual Energy Outlook 2022](#). Washington, DC: U.S. Energy Information Administration, 2022. Accessed July 29, 2022.

¹⁵ U.S. Energy Information Administration. [Capital Cost and Performance Characteristic Estimates for Utility Scale Electric Power Generating Technologies](#). Washington, DC: U.S. Energy Information Administration, 2022. Accessed July 29, 2022.

Table 1. Comparison of AEO Reference case projections with realized outcomes, 1994-2021

Variable	Average absolute percentage differences (%)	Percentage of projections over-estimated (%)
Gross domestic product		
Real gross domestic product (average cumulative growth) ¹ (table 3)	0.8	61.1
Petroleum		
Imported refiner acquisition cost of crude oil (constant dollars) (table 4a)	45.6	32.8
Imported refiner acquisition cost of crude oil (nominal dollars) (table 4b)	44.6	35.6
Total petroleum and other liquids consumption (table 5)	10.5	72.5
Crude oil production (table 6)	19.4	31.6
Petroleum net imports (table 7)	487.5	73.5
Natural gas		
Natural gas price, electric power sector (constant dollars) ² (table 8a)	46.9	57.8
Natural gas price, electric power sector (nominal dollars) ² (table 8b)	49.7	59.6
Total natural gas consumption (table 9)	8.9	54.8
Dry natural gas production (table 10)	11.3	39.4
Natural gas net imports (table 11) ³	284.9	59.6
Coal		
Coal prices to electric generating plants (constant dollars) ⁴ (table 12a)	20.5	42.2
Coal prices to electric generating plants (nominal dollars) ⁴ (table 12b)	19.6	45.7
Total coal consumption (table 13)	36.0	79.8
Coal production excluding waste coal (table 14)	29.5	80.8
Electricity		
Average electricity prices (constant dollars) (table 15a)	9.8	31.6
Average electricity prices (nominal dollars) (table 15b)	9.8	38.9
Total electricity sales excluding direct use (table 16)	7.4	70.5
Solar net generation (all sectors), projected versus actual (table 17) ^{5,6}	46.2	19.9
Wind net generation (all sectors), projected versus actual (table 18) ⁵	29.4	16.2
Conventional hydroelectric power net generation (all sectors), Projected versus actual (table 19) ⁵	7.4	72.8
Coal net generation (all sectors), projected versus actual (table 20) ⁵	48.8	97.8
Natural gas net generation (all sectors), projected versus actual (table 21) ⁵	19.8	8.1
Nuclear net generation (all sectors), projected versus actual (table 22) ⁵	3.9	63.2
Total energy, carbon, and intensity		
Total energy consumption (all sectors) (table 23)	9.2	81.3
Delivered residential energy consumption (table 24)	7.0	67.4
Delivered commercial energy consumption (table 25)	7.2	56.8
Delivered industrial energy consumption (table 26)	11.2	82.8
Delivered transportation energy consumption (table 27)	11.6	78.8
Total energy-related carbon dioxide emissions (table 28)	14.6	79.8
Energy intensity (energy consumption / real dollar GDP) (table 29)	11.7	96.2

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>; GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/national/xls/gdplev.xlsx>

Notes: AEO = Annual Energy Outlook. These statistics summarize the calculations in Tables 2 through 29. Tables 17-22 are based on AEO2007 through AEO2022 Reference case projections. The remaining tables are based on the AEO1994 through AEO2022 Reference case projections.

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 for GDP growth rates is absolute percentage point differences; for all other AEO concepts, the comparison basis is absolute percentage 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 percentage 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.

⁵ Beginning with the AEO2022 Retrospective, EIA included projections from AEO2007 through AEO2021 for net generation from solar, wind, conventional hydro, coal, natural gas, and nuclear.

⁶ Does not include off-grid photovoltaics. Differences in data availability prior to 2014 for small-scale solar (systems less than 1 megawatt [MW] each) also contributed to the variances between projections and actuals.

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 3)	0.007	0.011	0.011	0.011	0.011	0.011	0.010	0.010	0.010	0.010	0.010	0.010	0.009	0.009	0.009	0.008
Petroleum																
Imported refiner acquisition cost of crude oil (constant \$) (table 4a)	0.046	0.206	0.367	0.440	0.543	0.617	0.675	0.746	0.798	0.813	0.808	0.778	0.740	0.647	0.549	0.515
Imported refiner acquisition cost of crude oil (nominal \$) (table 4b)	0.046	0.213	0.376	0.450	0.552	0.626	0.682	0.750	0.802	0.815	0.806	0.774	0.735	0.640	0.541	0.500
Total petroleum and other liquids consumption (table 5)	0.009	0.032	0.040	0.049	0.060	0.074	0.082	0.094	0.104	0.110	0.120	0.119	0.113	0.107	0.096	0.086
Crude oil production (table 6)	0.017	0.063	0.115	0.142	0.152	0.160	0.172	0.184	0.195	0.204	0.212	0.217	0.220	0.221	0.219	0.213
Petroleum net imports (table 7)	0.100	1.174	1.518	1.769	2.889	4.093	5.205	4.782	7.965	10.539	11.374	14.811	15.938	16.300	20.168	24.998
Natural Gas																
Natural gas price, electric power sector (constant \$) ² (table 8a)	0.054	0.215	0.344	0.401	0.471	0.530	0.578	0.589	0.613	0.634	0.660	0.670	0.664	0.609	0.544	0.493
Natural gas price, electric power sector (nominal \$) ² (table 8b)	0.054	0.218	0.349	0.408	0.475	0.532	0.577	0.582	0.605	0.623	0.644	0.651	0.641	0.582	0.518	0.472
Total natural gas consumption (table 9)	0.019	0.038	0.060	0.074	0.090	0.106	0.117	0.131	0.140	0.150	0.158	0.161	0.162	0.153	0.125	0.101
Dry natural gas production (table 10)	0.016	0.041	0.066	0.079	0.098	0.116	0.135	0.157	0.176	0.196	0.208	0.215	0.219	0.204	0.186	0.170
Natural gas net imports (table 11) ³	0.111	0.692	0.360	0.560	0.506	1.734	2.385	4.823	5.124	4.565	8.267	11.572	10.321	15.292	14.876	13.692
Coal																
Coal prices to electric generating plants (constant \$) ⁴ (table 12a)	0.027	0.066	0.111	0.156	0.201	0.241	0.280	0.314	0.335	0.343	0.343	0.329	0.308	0.296	0.270	0.233
Coal prices to electric generating plants (nominal \$) ⁴ (table 12b)	0.028	0.070	0.119	0.169	0.216	0.256	0.295	0.328	0.349	0.358	0.360	0.346	0.324	0.310	0.283	0.248
Total coal consumption (table 13)	0.021	0.053	0.096	0.132	0.175	0.214	0.273	0.307	0.324	0.358	0.413	0.473	0.522	0.563	0.600	0.616
Coal production excluding waste coal (table 14)	0.023	0.046	0.091	0.114	0.148	0.179	0.236	0.280	0.295	0.299	0.324	0.365	0.403	0.428	0.457	0.485
Electricity																
Average electricity prices (constant \$) (table 15a)	0.021	0.036	0.064	0.083	0.105	0.119	0.130	0.134	0.131	0.136	0.136	0.131	0.127	0.118	0.107	0.099
Average electricity prices (nominal \$) (table 15b)	0.022	0.040	0.074	0.099	0.122	0.137	0.149	0.154	0.154	0.162	0.162	0.155	0.148	0.139	0.135	0.138
Total electricity sales excluding direct use (table 16)	0.008	0.016	0.023	0.031	0.036	0.046	0.053	0.062	0.070	0.078	0.086	0.096	0.105	0.112	0.118	0.123
Solar net generation (all sectors), Projected versus actual (table 17) ^{5,6}	0.142	0.123	0.116	0.149	0.161	0.118	0.138	0.084	0.083	0.068	0.060	0.059	0.054	0.047	0.002	NA
Wind net generation (all sectors), Projected versus actual (table 18) ⁵	0.041	0.115	0.098	0.156	0.192	0.228	0.247	0.158	0.146	0.145	0.150	0.143	0.142	0.064	0.084	NA
actual (table 19) ⁵	0.028	0.085	0.076	0.087	0.078	0.085	0.074	0.073	0.076	0.078	0.067	0.062	0.053	0.052	0.058	NA
Coal net generation (all sectors), Projected versus actual (table 20) ⁵	0.018	0.061	0.108	0.132	0.174	0.182	0.265	0.252	0.206	0.153	0.248	0.300	0.292	0.347	0.385	NA
Natural gas net generation (all sectors), Projected versus actual (table 21) ⁵	0.017	0.057	0.086	0.096	0.102	0.098	0.092	0.106	0.101	0.087	0.100	0.117	0.095	0.073	0.096	NA
Nuclear net generation (all sectors), Projected versus actual (table 22) ⁵	0.011	0.024	0.028	0.036	0.037	0.032	0.031	0.032	0.041	0.052	0.053	0.045	0.039	0.012	0.002	NA
Total energy, carbon, and intensity																
Total energy consumption (all sectors) (table 23)	0.009	0.023	0.030	0.035	0.041	0.050	0.057	0.063	0.069	0.074	0.080	0.081	0.081	0.080	0.081	0.081
Delivered residential energy consumption (table 24)	0.024	0.045	0.046	0.051	0.058	0.066	0.073	0.075	0.079	0.086	0.090	0.094	0.093	0.086	0.091	0.096
Delivered commercial energy consumption (table 25)	0.019	0.032	0.040	0.051	0.059	0.068	0.079	0.085	0.092	0.101	0.104	0.110	0.112	0.114	0.126	0.132
Delivered industrial energy consumption (table 26)	0.018	0.033	0.044	0.050	0.055	0.061	0.066	0.079	0.090	0.098	0.106	0.106	0.108	0.101	0.080	0.069
Delivered transportation energy consumption (table 27)	0.017	0.037	0.039	0.043	0.058	0.060	0.071	0.080	0.093	0.100	0.111	0.115	0.115	0.116	0.118	0.117
Total energy-related carbon dioxide emissions (table 28)	0.019	0.032	0.041	0.049	0.059	0.072	0.084	0.094	0.102	0.110	0.122	0.130	0.135	0.144	0.155	0.160
Energy intensity (energy consumption / real \$ gdp) (table 29)	0.036	0.041	0.047	0.055	0.062	0.067	0.071	0.077	0.082	0.086	0.093	0.096	0.099	0.105	0.104	0.107
Data source: projections are from Annual Energy Outlook Reference case projections from various editions																
Note: NA = not available																
Standard deviations are based on 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.																

Table 3. Real gross domestic product growth trends, projected versus 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	2020	2021	
AEO1994	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												
AEO1995		3.66																												
AEO1996			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												
AEO1997			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							
AEO1998				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							
AEO1998					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	1.91		
AEO1999						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	2.08		
AEO2000							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	2.20		
AEO2001								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	3.00		
AEO2002									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	2.96		
AEO2003										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	3.10	3.08	
AEO2004											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	3.04	3.01	
AEO2005												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	3.17	3.15	
AEO2006													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	3.12	3.10	3.08		
AEO2007														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	2.95	2.95	
AEO2008															2.14	1.87	2.11	2.41	2.58	2.60	2.57	2.55	2.55	2.55	2.53	2.52	2.51	2.50	2.48	
AEO2009																1.28	-0.83	0.22	1.07	1.52	1.78	1.89	1.95	2.01	2.08	2.15	2.21	2.25	2.28	
AEO2010																	-2.83	-0.90	0.55	1.32	1.61	1.75	1.90	2.02	2.11	2.20	2.28	2.36	2.39	
AEO2011																		2.65	2.40	2.91	3.16	2.97	2.95	2.92	2.88	2.84	2.80	2.78	2.78	
AEO2012																			1.76	1.51	1.79	2.25	2.49	2.59	2.59	2.53	2.51	2.49	2.49	
AEO2013																				2.11	1.84	2.19	2.50	2.61	2.68	2.69	2.69	2.67	2.64	
AEO2014																					1.84	2.32	2.63	2.75	2.78	2.74	2.70	2.65	2.59	
AEO2015																						2.20	2.65	2.61	2.54	2.57	2.57	2.60	2.58	
AEO2016																							2.18	2.11	2.45	2.71	2.67	2.53	2.42	
AEO2017																								1.55	2.16	2.19	2.10	2.15	2.24	
AEO2018																									2.15	2.32	2.36	2.34	2.29	
AEO2019																										2.84	2.89	2.64	2.39	
AEO2020																											2.67	2.30	2.12	
AEO2021																													-4.82	-0.93
AEO2022																														5.73
Average absolute difference	0.34	0.30	0.32	1.04	1.26	1.42	1.64	1.62	1.09	0.90	0.79	0.71	0.61	0.60	0.60	0.80	1.01	0.89	0.88	0.85	0.80	0.74	0.70	0.72	0.69	0.60	0.57	0.97	0.79	

Table 3. Real gross domestic product growth trends, projected versus actual (continued)

Projected versus actual (percentage point 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	2020	2021		
AEO1994	0.3	-0.2	-0.3	-0.5	-0.8	-1.0	-1.2	-1.3	-1.0	-0.8	-0.8	-0.9	-0.9	-0.9	-0.8	-0.7	-0.4	-0.4													
AEO1995		-0.4	-0.6	-1.0	-1.0	-1.2	-1.4	-1.5	-1.2	-1.0	-0.9	-1.0	-1.0	-1.0	-0.9	-0.7	-0.4	-0.5													
AEO1996			-0.1	-1.0	-1.2	-1.4	-1.6	-1.6	-1.1	-0.9	-0.9	-1.0	-1.0	-1.0	-0.9	-0.7	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.5								
AEO1997				-1.6	-2.2	-2.2	-2.2	-2.0	-1.5	-1.2	-1.1	-1.2	-1.2	-1.1	-1.0	-0.8	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.6								
AEO1998					-1.0	-1.6	-1.9	-1.9	-1.3	-1.0	-1.0	-1.1	-1.1	-1.0	-0.9	-0.7	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.4	-0.5	-0.2			
AEO1999						-1.1	-2.2	-1.9	-1.2	-0.8	-0.8	-0.9	-0.9	-0.8	-0.7	-0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.2	-0.2	0.0		
AEO2000							-1.0	-1.6	-0.5	-0.2	-0.2	-0.4	-0.5	-0.5	-0.4	-0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.3			
AEO2001								1.1	2.0	1.9	1.5	1.0	0.8	0.7	0.7	0.9	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.1	1.1	1.0	1.0	1.2			
AEO2002									0.1	0.3	0.3	0.0	-0.1	-0.1	0.1	0.5	1.2	1.2	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.3			
AEO2003										0.7	0.6	0.2	0.0	0.1	0.3	0.7	1.4	1.4	1.4	1.4	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.4	1.1		
AEO2004											-0.5	-0.3	-0.1	0.1	0.4	0.8	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.0	1.3	1.1		
AEO2005												0.5	0.3	0.3	0.5	1.0	1.8	1.6	1.6	1.5	1.5	1.4	1.3	1.3	1.3	1.2	1.2	1.5	1.3		
AEO2006														0.2	0.3	0.6	1.3	2.2	1.9	1.8	1.6	1.6	1.5	1.4	1.4	1.4	1.3	1.2	1.6	1.3	
AEO2007															0.5	0.5	1.3	2.4	2.0	1.9	1.7	1.6	1.5	1.3	1.3	1.2	1.2	1.5	1.3		
AEO2008																0.1	0.8	2.3	1.9	1.8	1.6	1.5	1.3	1.1	1.1	1.0	0.9	0.8	1.2	0.9	
AEO2009																		1.2	0.4	0.2	0.6	0.7	0.8	0.7	0.6	0.6	0.6	0.5	1.0	0.7	
AEO2010																			-0.2	-0.9	0.0	0.4	0.5	0.4	0.4	0.5	0.5	0.5	1.0	0.7	
AEO2011																				-0.1	0.3	0.7	1.1	0.8	0.7	0.8	0.7	0.6	0.6	1.1	0.7
AEO2012																					0.2	-0.4	-0.1	0.3	0.4	0.5	0.5	0.3	0.3	0.9	0.5
AEO2013																						-0.2	-0.2	0.1	0.2	0.5	0.5	0.4	0.4	1.0	0.6
AEO2014																							0.0	0.3	0.3	0.6	0.6	0.5	0.4	1.1	0.6
AEO2015																								-0.1	0.2	0.4	0.3	0.2	0.2	1.1	0.6
AEO2016																									-0.5	-0.1	0.2	0.3	0.3	1.1	0.4
AEO2017																										-0.1	0.2	-0.1	-0.2	1.0	0.4
AEO2018																											-0.1	-0.3	-0.1	1.4	0.4
AEO2019																												-0.1	0.3	2.1	0.6
AEO2020																												0.4	2.9	0.7	
AEO2021																													-1.4	-2.0	
AEO2022																															0.1

Table 3. Real gross domestic product growth trends, projected versus actual (continued)

Historical real GDP growth trend																													
(cumulative average percentage 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	2020	2021
AEO1994	2.75	3.39	3.15	3.31	3.53	3.69	3.85	3.88	3.55	3.36	3.31	3.36	3.36	3.32	3.24	3.04	2.70	2.70											
AEO1995		4.03	3.35	3.49	3.73	3.88	4.03	4.04	3.65	3.43	3.37	3.41	3.42	3.37	3.27	3.06	2.69	2.69											
AEO1996			2.68	3.23	3.63	3.84	4.03	4.04	3.59	3.35	3.29	3.35	3.36	3.31	3.21	2.99	2.61	2.61	2.55	2.53	2.50	2.49	2.50						
AEO1997				3.77	4.11	4.23	4.37	4.31	3.75	3.45	3.37	3.42	3.43	3.37	3.26	3.01	2.60	2.61	2.54	2.53	2.49	2.48	2.49						
AEO1998					4.45	4.46	4.57	4.45	3.74	3.40	3.31	3.38	3.39	3.33	3.21	2.95	2.51	2.52	2.46	2.45	2.41	2.41	2.42	2.38	2.38	2.40	2.40	2.15	
AEO1999						4.48	4.64	4.45	3.57	3.19	3.12	3.23	3.26	3.21	3.09	2.81	2.35	2.38	2.32	2.32	2.29	2.29	2.31	2.28	2.27	2.31	2.30	2.05	
AEO2000							4.80	4.44	3.26	2.87	2.85	3.02	3.09	3.05	2.93	2.65	2.16	2.20	2.15	2.16	2.14	2.15	2.18	2.15	2.16	2.20	2.20	1.94	
AEO2001								4.08	2.50	2.23	2.37	2.67	2.80	2.80	2.70	2.41	1.90	1.97	1.94	1.96	1.95	1.98	2.02	2.00	2.02	2.06	2.07	1.81	
AEO2002									0.95	1.32	1.81	2.32	2.55	2.59	2.51	2.21	1.66	1.76	1.74	1.79	1.79	1.83	1.89	1.87	1.90	1.95	1.97	1.69	
AEO2003										1.70	2.24	2.78	2.95	2.92	2.77	2.39	1.75	1.85	1.82	1.87	1.86	1.90	1.95	1.93	1.95	2.01	2.03	1.73	1.93
AEO2004											2.80	3.32	3.38	3.23	2.98	2.50	1.76	1.87	1.84	1.88	1.88	1.91	1.97	1.95	1.97	2.03	2.05	1.74	1.94
AEO2005												3.85	3.67	3.37	3.03	2.44	1.58	1.74	1.72	1.78	1.79	1.83	1.91	1.89	1.91	1.98	2.00	1.67	1.89
AEO2006													3.48	3.13	2.76	2.09	1.14	1.40	1.42	1.53	1.56	1.63	1.73	1.77	1.85	1.88	1.54	1.78	
AEO2007														2.78	2.40	1.63	0.56	0.98	1.08	1.25	1.32	1.43	1.56	1.57	1.62	1.72	1.76	1.41	1.67
AEO2008															2.01	1.06	-0.17	0.54	0.74	1.00	1.12	1.26	1.42	1.45	1.52	1.64	1.69	1.31	1.60
AEO2009																0.12	-1.25	0.05	0.43	0.79	0.97	1.16	1.35	1.38	1.47	1.60	1.66	1.26	1.57
AEO2010																	-2.60	0.02	0.53	0.96	1.14	1.33	1.52	1.54	1.62	1.75	1.80	1.35	1.68
AEO2011																		2.71	2.13	2.18	2.09	2.13	2.23	2.15	2.16	2.25	2.25	1.72	2.05
AEO2012																			1.55	1.91	1.89	1.99	2.13	2.05	2.08	2.19	2.20	1.62	1.99
AEO2013																				2.28	2.06	2.14	2.28	2.16	2.17	2.28	2.28	1.63	2.03
AEO2014																					1.84	2.06	2.28	2.13	2.15	2.28	2.28	1.55	2.00
AEO2015																						2.29	2.50	2.22	2.23	2.37	2.35	1.51	2.02
AEO2016																							2.71	2.19	2.21	2.39	2.37	1.38	1.98
AEO2017																								1.67	1.96	2.28	2.28	1.12	1.86
AEO2018																									2.26	2.59	2.49	0.98	1.90
AEO2019																										2.92	2.60	0.56	1.82
AEO2020																											2.29	-0.60	1.45
AEO2021																												-3.40	1.03
AEO2022																													5.68
Growth rate, real GDP*	2.75	4.03	2.68	3.77	4.45	4.48	4.80	4.08	0.95	1.70	2.80	3.85	3.48	2.78	2.01	0.12	-2.60	2.71	1.55	2.28	1.84	2.29	2.71	1.67	2.26	2.92	2.29	-3.40	5.68

GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/national/xls/gdplev.xlsx>

Notes: shading indicates overestimation (blue) or underestimation (green).

*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.

Table 4a-4b. Imported refiner acquisition cost of crude oil, projected versus actual

Table 4a. Imported refiner acquisition cost of crude oil, projected versus actual																															
Projected price in constant U.S. dollars																															
(constant USD per barrel in "dollar year" specific to each AEO)																															
	AEO dollar 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	2020	2021	
AEO1994	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												
AEO1995	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												
AEO1996	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							
AEO1997	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							
AEO1998	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	22.32		
AEO1999	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	22.73		
AEO2000	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	22.04		
AEO2001	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	22.41		
AEO2002	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	24.68		
AEO2003	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	25.48	25.70	
AEO2004	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	26.02	26.21	
AEO2005	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	28.50	28.86	
AEO2006	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	44.99	45.59	
AEO2007	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	46.47	47.08	
AEO2008	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	51.55	52.08	
AEO2009	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	114.50	115.80	
AEO2010	2008																	56.49	67.40	66.63	72.94	79.09	83.84	86.88	90.10	92.72	95.59	96.89	98.14	99.33	
AEO2011	2009																			74.86	80.32	80.65	82.87	85.07	86.83	88.96	91.56	94.04	96.42	98.65	100.74
AEO2012	2010																				99.99	99.08	106.64	110.90	113.97	111.53	113.12	113.75	114.63	115.74	116.81
AEO2013	2011																					101.31	96.02	93.95	92.92	94.04	96.15	98.16	100.21	102.19	104.36
AEO2014	2012																						101.56	98.00	88.93	85.16	83.72	84.18	85.84	88.07	90.44
AEO2015	2013																							100.91	57.58	73.57	78.22	78.22	79.78	81.38	83.82
AEO2016	2015																								52.32	36.84	48.08	58.11	70.11	76.57	81.00
AEO2017	2016																									38.48	45.54	56.31	63.08	67.06	70.32
AEO2018	2017																									46.73	46.00	47.11	62.99	69.90	
AEO2019	2018																										64.51	64.44	68.36	70.26	
AEO2020	2019																											56.76	48.68	58.65	
AEO2021	2020																												38.86	41.63	
AEO2022	2021																													67.71	
Actual in nominal dollars		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	37.41	65.78	
Average absolute difference		0.92	0.94	0.33	1.87	0.53	5.91	2.57	5.85	1.78	1.69	3.44	9.09	17.86	23.06	26.36	43.39	19.09	28.32	45.68	45.58	39.86	37.98	28.18	31.27	33.13	36.02	38.03	38.90	41.78	

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

Projected versus actual (percentage 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	2020	2021	2022				
AEO1994		5.9	10.8	5.8	-7.0	9.1	77.0	30.7	-13.3	16.7	14.8	4.2	-14.7	-33.7	-41.8	-46.0	-59.2	-34.0	-46.9																
AEO1995			-1.9	-0.2	-13.1	1.7	63.3	18.9	-21.8	3.5	0.0	-10.7	-27.7	-44.1	-51.2	-55.0	-66.1	-45.2	-55.6																
AEO1996				0.2	-14.5	-0.8	59.7	16.9	-22.9	2.7	-0.5	-11.1	-28.1	-44.3	-51.7	-55.6	-66.8	-46.7	-57.3	-67.3	-65.6	-63.5	-58.7	-18.4											
AEO1997					-3.7	3.6	58.4	12.2	-28.6	-5.9	-9.6	-20.0	-35.8	-50.8	-57.7	-61.5	-71.4	-54.6	-64.0	-72.6	-71.5	-70.0	-66.4	-34.1											
AEO1998						-0.3	53.7	12.3	-26.4	-4.0	-8.8	-19.3	-35.4	-50.6	-57.7	-61.5	-71.5	-54.6	-63.9	-72.6	-71.5	-69.9	-66.2	-33.7	-19.3	-34.7	-45.7	-41.4	-7.3						
AEO1999							3.9	-21.3	-47.1	-25.9	-25.4	-30.0	-41.5	-53.7	-58.6	-61.2	-71.2	-54.3	-63.7	-72.4	-71.3	-69.8	-66.1	-33.6	-19.2	-34.6	-45.6	-41.3	-7.2						
AEO2000								0.6	-20.7	-3.3	-8.3	-19.6	-36.0	-51.2	-58.2	-62.0	-71.9	-55.4	-64.6	-73.2	-72.1	-70.6	-67.1	-35.4	-21.6	-36.6	-47.5	-43.5	-11.0						
AEO2001								1.9	13.2	-3.9	-19.6	-35.8	-51.1	-58.0	-61.9	-71.8	-55.3	-64.5	-73.1	-72.0	-70.5	-67.0	-35.3	-21.3	-36.4	-47.3	-43.3	-10.8							
AEO2002									4.5	-7.5	-14.4	-31.6	-47.8	-55.2	-59.3	-69.9	-52.2	-62.0	-71.2	-70.1	-68.4	-64.6	-30.6	-15.6	-31.8	-43.4	-39.0	-3.9							
AEO2003										-0.1	-3.5	-28.8	-47.8	-55.1	-59.2	-69.8	-52.0	-61.9	-71.1	-69.9	-68.3	-64.4	-30.1	-14.9	-31.2	-42.9	-38.5	-3.0	-42.0						
AEO2004											0.3	-30.5	-48.5	-55.7	-59.7	-70.1	-52.4	-62.2	-71.2	-70.1	-68.4	-64.4	-30.2	-14.9	-31.1	-42.7	-38.2	-2.4	-41.8						
AEO2005												0.1	-26.3	-44.5	-54.3	-67.8	-50.8	-61.6	-70.7	-69.2	-67.3	-63.0	-27.0	-10.5	-27.1	-39.1	-34.0	4.8	-37.1						
AEO2006													4.9	-2.8	-16.2	-41.2	-12.0	-34.3	-50.6	-49.2	-47.0	-41.1	14.3	39.6	13.2	-5.7	1.9	61.1	-3.3						
AEO2007														7.9	-6.1	-33.4	-0.5	-25.8	-47.0	-47.7	-46.6	-41.3	15.0	39.7	13.4	-5.6	2.0	61.3	-3.2						
AEO2008															-4.9	-17.9		21.6	-8.4	-33.5	-34.1	-34.0	-29.9	30.1	49.3	20.4	0.6	9.4	73.6	3.9					
AEO2009																6.0		-32.8	-33.0	-36.0	-23.0	-9.3	10.7	135.7	200.2	151.5	116.0	136.0	275.5	124.9					
AEO2010																		-3.9	-9.5	-32.5	-23.6	-13.1	2.8	107.6	160.4	115.4	83.3	98.9	215.8	89.3					
AEO2011																			-0.1	-19.2	-16.0	-9.6	3.6	106.2	155.5	111.4	79.1	96.7	215.4	90.8					
AEO2012																					-0.5	1.9	15.0	33.5	167.4	216.5	158.0	114.1	131.0	265.6	118.6				
AEO2013																						2.1	1.4	10.8	113.6	161.4	114.9	81.0	97.9	216.3	91.3				
AEO2014																							5.3	13.4	100.6	132.4	83.7	52.4	66.4	167.5	62.7				
AEO2015																								14.8	27.7	97.3	68.6	39.1	52.0	143.0	48.2				
AEO2016																								12.8	-4.0	0.7	0.5	29.8	122.2	39.2					
AEO2017																										-0.7	-5.5	-3.6	15.6	92.7	19.7				
AEO2018																										-4.9	-22.7	-15.3	77.6	16.7					
AEO2019																											5.8	13.2	88.3	14.6					
AEO2020																												-2.0	31.7	-6.0					
AEO2021																													-1.5	-34.1					
AEO2022																																			2.9
Average absolute percentage difference		5.9	6.3	2.0	9.6	3.1	52.7	16.1	22.8	8.8	7.9	13.9	28.8	42.7	46.9	48.3	57.9	39.9	46.6	55.0	50.1	45.7	42.5	54.3	69.7	53.6	43.8	47.3	93.8	47.4					

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>; series: TOTALRAIMUUS.A; projections: Annual Energy Outlook, Reference case projections from various editions
 GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/historical/xls/gdplev.xlsx>
 Notes: shading indicates overestimation (blue) or underestimation (green).
 *Dollar year refers to the year that GDP is reported in constant dollars in a respective AEO.

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

Projected price in nominal U.S. dollars (USD)																															
(nominal USD 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	2020	2021		
AEO1994	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													
AEO1995		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													
AEO1996			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								
AEO1997				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								
AEO1998					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	45.82			
AEO1999						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	43.31			
AEO2000							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	36.32			
AEO2001								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	36.04			
AEO2002									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	42.12			
AEO2003											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	39.77	41.26	
AEO2004												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	41.70	43.52	
AEO2005													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	42.03	43.81	
AEO2006														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	65.84	68.53	
AEO2007															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	61.60	63.60	
AEO2008																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	67.23	69.32	
AEO2009																	98.58	39.99	50.84	65.08	76.70	87.64	97.94	109.32	117.78	125.56	133.76	139.73	145.39	150.79	
AEO2010																		57.35	69.43	69.54	77.21	85.19	91.87	96.82	102.20	107.12	112.49	116.13	119.94	123.96	
AEO2011																			75.52	82.10	83.37	87.10	91.03	94.78	99.05	104.05	109.12	114.16	119.18	124.05	
AEO2012																					102.10	102.50	111.15	117.41	122.81	122.33	126.23	129.18	132.42	136.02	139.60
AEO2013																						103.10	99.38	98.61	99.02	101.79	105.65	109.60	113.66	117.84	122.42
AEO2014																							103.07	101.27	93.33	90.75	90.53	92.41	95.70	99.75	104.11
AEO2015																								102.51	59.61	77.64	83.99	85.57	88.91	92.30	96.70
AEO2016																									52.86	37.91	50.52	62.26	76.62	85.47	92.56
AEO2017																										38.48	46.53	58.65	67.09	72.91	78.12
AEO2018																											46.73	47.03	49.28	67.62	76.89
AEO2019																												64.51	66.02	71.99	75.96
AEO2020																													56.76	49.87	61.56
AEO2021																														36.86	42.07
AEO2022																															67.71
Actual in nominal dollars	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	37.41	65.78		
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	35.21	28.43		

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

Projected versus actual
(percentage 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	2020	2021
AEO1994	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											
AEO1995		-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											
AEO1996			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						
AEO1997				-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						
AEO1998					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	22.5	
AEO1999						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	15.8	
AEO2000							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	-2.9	
AEO2001								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	-3.7	
AEO2002									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	12.6	
AEO2003										-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	6.3	-37.3
AEO2004											-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	11.5	-33.8
AEO2005												-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	12.4	-33.4
AEO2006													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	76.0	4.2
AEO2007														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	64.7	-3.3
AEO2008															-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	79.7	5.4
AEO2009																6.3	-32.4	-33.0	-36.6	-24.1	-10.7	9.4	135.6	203.9	155.6	119.5	141.2	288.6	129.2
AEO2010																	-3.1	-8.5	-32.2	-23.6	-13.2	2.6	108.7	163.7	118.1	84.6	100.4	220.6	88.5
AEO2011																		-0.5	-20.0	-17.5	-11.2	1.6	104.3	155.6	111.8	79.0	97.0	218.6	88.6
AEO2012																			-0.5	1.4	13.3	31.1	164.7	215.7	157.0	111.9	128.6	263.6	112.2
AEO2013																				2.0	1.3	10.1	113.4	162.7	115.1	79.8	96.2	215.0	86.1
AEO2014																					5.1	13.1	101.1	134.2	84.3	51.6	65.2	166.6	58.3
AEO2015																						14.5	28.5	100.4	71.0	40.4	53.5	146.7	47.0
AEO2016																							13.9	-2.2	2.9	2.2	32.2	128.5	40.7
AEO2017																								-0.7	-5.3	-3.8	15.8	94.9	18.8
AEO2018																									-4.9	-22.8	-14.9	80.8	16.9
AEO2019																										5.8	14.0	92.4	15.5
AEO2020																											-2.0	33.3	-6.4
AEO2021																												-1.5	-36.0
AEO2022																													2.9
Average absolute 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	94.1	43.2

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>; series: TOTAL.RAIMUUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/national/xls/gdplev.xlsx>

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 5. Total petroleum and other liquids consumption, projected versus 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	2020	2021		
AEO1994	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													
AEO1995		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													
AEO1996			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								
AEO1997				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								
AEO1998					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	8,901			
AEO1999						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	9,000			
AEO2000							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	9,161			
AEO2001								7,119	7,314	7,431	7,528	7,634	7,740	7,863	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	9,428			
AEO2002									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	9,731			
AEO2003										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	9,902	10,034		
AEO2004											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	9,640	9,774		
AEO2005												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	9,606	9,715		
AEO2006													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	9,057	9,141		
AEO2007														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	8,769	8,871		
AEO2008															7,940	7,628	7,558	7,660	7,737	7,796	7,833	7,868	7,914	7,955	7,975	7,989	8,006	8,017	8,042		
AEO2009																7,071	6,851	7,229	7,333	7,380	7,400	7,362	7,308	7,278	7,257	7,257	7,281	7,317	7,329		
AEO2010																	6,830	7,026	7,214	7,312	7,336	7,349	7,366	7,386	7,414	7,425	7,470	7,506	7,533		
AEO2011																				6,926	6,973	7,293	7,402	7,427	7,461	7,493	7,512	7,517	7,524	7,547	7,565
AEO2012																					6,909	6,951	6,881	6,948	6,971	6,978	6,967	6,950	6,944	6,942	6,947
AEO2013																						6,806	6,850	6,988	7,104	7,158	7,191	7,218	7,243	7,240	7,221
AEO2014																							6,803	6,826	6,996	7,069	7,113	7,131	7,134	7,128	7,113
AEO2015																								6,935	7,031	7,068	7,050	7,114	7,148	7,171	7,170
AEO2016																									7,088	7,114	7,210	7,254	7,321	7,340	7,332
AEO2017																										7,151	7,231	7,323	7,370	7,351	7,347
AEO2018																											7,260	7,419	7,440	7,392	7,360
AEO2019																												7,445	7,535	7,450	7,424
AEO2020																													7,425	7,546	7,471
AEO2021																														6,590	7,258
AEO2022																															7,059
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	6,656	7,220		
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	1,505	724		

Table 5. Total petroleum and other liquids consumption, projected versus actual (continued)																															
Projected versus actual																															
(percentage 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	2020	2021		
AEO1994	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													
AEO1995		-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													
AEO1996			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								
AEO1997				-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								
AEO1998					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	33.7			
AEO1999						-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	35.2			
AEO2000							-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	37.6			
AEO2001								-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	41.7			
AEO2002									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	46.2			
AEO2003										-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	48.8	39.0		
AEO2004											-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	44.8	35.4		
AEO2005												-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	44.3	34.6		
AEO2006														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	36.1	26.6	
AEO2007															-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	31.7	22.9	
AEO2008																-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	20.4	11.4	
AEO2009																	-0.9	0.0	3.3	6.4	9.0	6.9	5.6	3.2	1.0	0.0	-3.1	-2.9	9.9	1.5	
AEO2010																		-0.3	0.4	4.7	8.0	6.0	5.4	4.1	2.5	2.2	-0.8	-0.4	12.8	4.3	
AEO2011																				-1.1	1.2	7.8	6.9	6.5	5.4	4.0	3.5	0.4	0.3	13.4	4.8
AEO2012																					0.3	2.7	-0.6	-0.4	-1.5	-3.2	-4.0	-7.2	-7.4	4.3	-3.8
AEO2013																					0.6	-1.0	0.2	0.3	-0.7	-0.9	-3.6	-3.4	8.8	0.0	
AEO2014																						-1.7	-2.1	-1.2	-1.9	-2.0	-4.8	-4.9	7.1	-1.5	
AEO2015																							-0.5	-0.7	-1.9	-2.8	-5.0	-4.7	7.7	-0.7	
AEO2016																								0.1	-1.3	-0.6	-3.1	-2.4	10.3	1.5	
AEO2017																									-0.8	-0.3	-2.2	-1.7	10.4	1.8	
AEO2018																										0.1	-0.9	-0.8	11.0	1.9	
AEO2019																											-0.6	0.5	11.9	2.8	
AEO2020																												-1.0	13.4	3.5	
AEO2021																													-1.0	0.5	
AEO2022																														-2.2	
Average absolute percentage 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	22.6	10.0		
Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), http://www.eia.gov/opa/data/ , series: TOTAL.PATCPUS.A; projections: Annual Energy Outlook, Reference case projections from various editions																															
Notes: shading indicates overestimation (blue) or underestimation (green).																															

Table 6. Domestic crude oil production, projected versus actual

Projected (million barrels)	Projected																																		
	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	2020	2021						
AEO1994	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																	
AEO1995		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																	
AEO1996			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												
AEO1997				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												
AEO1998					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	1,798							
AEO1999						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	1,811							
AEO2000							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	1,919							
AEO2001									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	1,844						
AEO2002										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	2,055						
AEO2003											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	1,994	1,991					
AEO2004												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	1,808	1,767					
AEO2005													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	1,902	1,849					
AEO2006														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	2,025	1,987					
AEO2007															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	2,151	2,143					
AEO2008																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	2,273	2,249					
AEO2009																	1,809	1,955	2,015	2,024	2,039	2,033	2,004	1,978	1,966	1,978	2,028	2,075	2,114	2,168					
AEO2010																		1,913	1,936	1,980	1,999	2,079	2,098	2,108	2,097	2,126	2,161	2,211	2,239	2,252					
AEO2011																			2,011	1,993	1,962	2,037	2,102	2,122	2,175	2,218	2,228	2,235	2,219	2,216					
AEO2012																					2,033	2,094	2,154	2,191	2,244	2,344	2,360	2,390	2,425	2,444	2,418				
AEO2013																							2,312	2,492	2,618	2,660	2,744	2,737	2,735	2,750	2,726	2,692			
AEO2014																								2,819	3,113	3,299	3,483	3,488	3,495	3,507	3,487	3,437			
AEO2015																									3,151	3,404	3,486	3,651	3,786	3,861	3,870	3,837			
AEO2016																										3,440	3,225	3,122	3,289	3,352	3,423	3,433			
AEO2017																											3,191	3,174	3,400	3,536	3,608	3,663			
AEO2018																											3,374	3,630	3,809	3,906	4,006				
AEO2019																											3,920	4,369	4,776	4,988					
AEO2020																													4,476	4,808	4,993				
AEO2021																														4,187	4,076				
AEO2022																															4,063				
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	4,130	4,082						
Average absolute difference	9	44	78	107	139	127	116	107	101	105	94	92	132	163	165	176	103	86	85	338	640	1,010	1,185	949	1,051	1,501	1,845	1,520	1,253						

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

Projected versus actual (percentage 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	2020	2021		
AEO1994		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													
AEO1995			-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													
AEO1996				-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								
AEO1997					-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								
AEO1998						-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	-56.5			
AEO1999							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	-56.1			
AEO2000								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	-53.5			
AEO2001									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	-55.4			
AEO2002										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	-50.2			
AEO2003											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	-56.6	-51.7	-51.2		
AEO2004												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	-56.2	-56.7		
AEO2005													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	-54.0	-54.7		
AEO2006														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	-51.0	-51.3		
AEO2007															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	-47.9	-47.5		
AEO2008																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	-45.0	-44.9		
AEO2009																		-1.2	0.0	0.8	-1.6	-14.0	-25.3	-37.0	-42.5	-39.4	-42.1	-49.3	-53.6	-48.8	-46.9	
AEO2010																			-2.1	-3.1	-3.8	-15.7	-23.6	-34.0	-38.8	-35.3	-37.7	-46.0	-50.5	-45.8	-44.8	
AEO2011																			0.6	-3.1	-17.2	-25.1	-33.9	-38.4	-32.9	-35.1	-44.3	-50.0	-46.3	-45.7		
AEO2012																					-1.2	-11.6	-20.8	-31.1	-34.8	-27.7	-30.9	-40.3	-45.8	-40.8	-40.8	
AEO2013																						-2.4	-8.4	-17.6	-22.7	-15.3	-19.8	-31.6	-38.5	-34.0	-34.1	
AEO2014																							3.6	-2.1	-4.2	7.4	2.2	-12.7	-15.6	-15.8		
AEO2015																									-0.9	-1.1	7.6	6.9	-5.4	-13.6	-6.3	-6.0
AEO2016																										-0.1	-0.5	-8.6	-17.8	-25.0	-17.1	-15.9
AEO2017																											-1.6	-7.0	-15.0	-20.9	-12.6	-10.3
AEO2018																											-1.2	-9.3	-14.8	-5.4	-1.9	
AEO2019																												-2.1	-2.3	15.7	22.2	
AEO2020																													0.1	16.4	22.3	
AEO2021																														1.4	-0.2	
AEO2022																															-0.5	

Average absolute percentage 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, 36.8, 30.7

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>; series: TOTAL.PAPRUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 7. Petroleum net imports, projected versus actual

Table 7. Petroleum net imports, projected versus 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	2020	2021		
AEO1994	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													
AEO1995		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													
AEO1996			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								
AEO1997				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								
AEO1998					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	5,832			
AEO1999						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	5,830			
AEO2000							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	5,851			
AEO2001								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	6,028			
AEO2002									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	6,075			
AEO2003										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	6,468	6,598		
AEO2004											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	6,382	6,563		
AEO2005												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	6,245	6,404		
AEO2006													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	5,264	5,334		
AEO2007														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	4,949	5,032		
AEO2008															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	4,148	4,136		
AEO2009																4,037	3,628	3,688	3,732	3,755	3,763	3,751	3,710	3,684	3,632	3,554	3,516	3,472	3,389		
AEO2010																		3,659	3,659	3,783	3,839	3,766	3,729	3,708	3,703	3,670	3,622	3,573	3,549	3,542	
AEO2011																			3,478	3,506	3,695	3,705	3,649	3,617	3,564	3,494	3,463	3,427	3,424	3,412	
AEO2012																					3,136	3,215	3,109	3,093	3,020	2,862	2,790	2,698	2,629	2,568	2,565
AEO2013																						2,775	2,642	2,507	2,550	2,482	2,480	2,472	2,461	2,472	2,490
AEO2014																							2,324	1,973	1,919	1,782	1,804	1,810	1,802	1,824	1,873
AEO2015																								1,854	1,559	1,433	1,168	1,069	995	988	992
AEO2016																									1,692	1,698	1,773	1,508	1,441	1,353	1,313
AEO2017																										1,764	1,734	1,495	1,285	1,135	1,033
AEO2018																											1,535	1,306	1,078	849	653
AEO2019																												863	575	(168)	(438)
AEO2020																													197	(202)	(498)
AEO2021																														(161)	296
AEO2022																															(81)
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	(232)	(60)		
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	3,000	3,455	3,740	2,874		

Table 7. Petroleum net imports, projected versus actual (continued)																														
Projected versus actual																														
(percentage 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	2020	2021	
AEO1994	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												
AEO1995		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												
AEO1996			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							
AEO1997				-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							
AEO1998					-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	-2610.1		
AEO1999						-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	-2609.2		
AEO2000							-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	-2618.2		
AEO2001								-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	-2694.4		
AEO2002									-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	-2714.6		
AEO2003										-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	-2883.6	-11110.9	
AEO2004											-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	-2846.5	-11052.6	
AEO2005												-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	-2787.7	-10786.5	
AEO2006													-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	-2365.4	-9001.7	
AEO2007														0.7	-2.2	3.9	19.9	24.9	41.0	62.7	98.2	145.5	169.2	164.5	245.8	459.9	1886.9	-2229.9	-8498.5	
AEO2008															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	-1885.0	-7002.8	
AEO2009																-0.7	2.8	7.0	21.0	38.8	65.3	102.9	118.5	109.9	166.6	315.8	1338.1	-1594.1	-5755.7	
AEO2010																	3.7	6.2	22.7	41.9	65.4	101.7	118.4	111.0	169.4	323.8	1361.5	-1627.5	-6010.4	
AEO2011																		0.9	13.7	36.6	62.7	97.4	113.1	103.1	156.5	305.2	1301.5	-1573.5	-5794.1	
AEO2012																			1.7	18.8	36.6	67.3	77.9	63.1	104.8	215.7	975.3	-1205.0	-4380.3	
AEO2013																					2.6	16.0	35.6	50.2	41.4	82.1	189.3	906.4	-1164.1	-4255.3
AEO2014																						2.1	6.7	13.0	1.5	32.4	111.8	637.0	-885.1	-3225.0
AEO2015																							0.3	-8.2	-18.3	-14.2	25.1	307.0	-525.2	-1755.6
AEO2016																								-0.3	-3.2	30.2	76.5	489.3	-682.1	-2291.2
AEO2017																									0.5	27.3	74.9	425.4	-588.6	-1823.9
AEO2018																										12.7	52.8	340.9	-465.5	-1190.0
AEO2019																											1.0	135.4	-27.8	631.7
AEO2020																												-19.4	-13.0	730.3
AEO2021																													-30.5	-593.7
AEO2022																														34.7
Average absolute percentage 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	351.1	1413.3	1609.4	4796.2	

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>, series: TOTAL_PANIPUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 8a-8b. Natural gas price, electric power sector, actual versus projected

Table 8a. Natural gas price, electric power sector, actual versus projected																															
Projected price in constant dollars																															
(constant dollars per million British thermal units in dollar year specific to each AEO)																															
AEO dollar 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	2020	2021		
AEO1994	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												
AEO1995	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												
AEO1996	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							
AEO1997	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							
AEO1998	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	3.15		
AEO1999	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	3.24		
AEO2000	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	3.33		
AEO2001	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	3.59		
AEO2002	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	3.87		
AEO2003	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	4.30	4.30	
AEO2004	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	4.85	5.00	
AEO2005	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	5.20	5.29	
AEO2006	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	5.40	5.52	
AEO2007	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	5.76	5.73	
AEO2008	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	5.95	5.81	
AEO2009	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	7.03	7.25	
AEO2010	2008																	4.14	4.85	5.82	6.17	5.94	5.90	6.08	6.16	6.17	6.22	6.29	6.42	6.52	
AEO2011	2009																		5.07	4.72	4.65	4.64	4.60	4.67	4.71	4.75	4.80	4.87	5.01	5.15	
AEO2012	2010																				4.66	4.35	4.42	4.39	4.55	4.49	4.48	4.52	4.61	4.72	4.93
AEO2013	2011																					3.32	3.72	3.76	3.84	4.28	4.45	4.70	4.82	4.90	5.01
AEO2014	2012																						4.32	4.47	4.43	4.47	4.69	5.06	5.18	5.07	5.24
AEO2015	2013																							5.25	4.65	4.78	4.85	5.08	5.66	6.26	6.68
AEO2016	2014																								3.35	3.57	4.00	4.24	4.51	4.83	4.82
AEO2017	2016																									3.02	3.53	3.81	4.18	4.54	4.57
AEO2018	2017																										3.47	3.57	3.92	4.16	4.10
AEO2019	2018																											3.42	3.28	3.41	3.35
AEO2020	2019																												2.86	2.65	2.82
AEO2021	2020																													2.45	3.50
AEO2022	2021																														5.15
Actual in nominal dollars		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	2.40	4.98	
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	2.03	3.50	2.21	2.03	3.18	0.88	0.78	0.74	1.48	1.02	1.16	1.87	2.27	1.94	1.90	2.44	2.80	1.96	

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

Projected versus actual (percentage 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	2020	2021	
AEO1994	-1.6	17.0	39.5	10.4	10.3	34.3	26.4	-20.7	-19.5	6.0	-26.3	-28.9	-44.6	-30.2	-27.1	-39.1	16.6	13.2												
AEO1995		10.2	31.5	-1.9	-2.2	15.2	10.0	-31.3	-28.1	-4.7	-31.3	-33.0	-47.9	-34.3	-33.3	-45.1	5.6	1.1												
AEO1996			6.0	-16.8	-19.8	0.5	-6.9	-43.1	-44.1	-28.8	-51.7	-54.6	-65.9	-58.0	-57.4	-65.3	-32.7	-35.2	-26.1	8.2	-10.4	-17.2	34.5							
AEO1997				-5.9	-16.5	-1.7	-8.9	-44.3	-45.8	-30.4	-52.2	-54.9	-66.2	-58.4	-58.1	-66.1	-35.6	-39.6	-33.1	-4.7	-23.1	-30.4	10.1							
AEO1998					0.3	7.7	-0.4	-38.0	-38.3	-21.2	-46.7	-49.4	-61.8	-52.3	-51.4	-60.3	-24.0	-27.4	-19.1	15.0	-6.8	-16.8	30.5	50.5	31.5	30.4	65.4	104.5		
AEO1999						5.3	4.8	-35.5	-36.0	-16.8	-42.5	-45.1	-58.0	-47.5	-47.0	-57.2	-18.8	-22.7	-14.6	20.9	-2.4	-12.9	36.4	57.6	37.0	35.0	69.7	106.4		
AEO2000							-1.2	-37.0	-38.8	-21.5	-46.3	-48.5	-60.6	-50.0	-48.9	-58.1	-20.0	-23.7	-15.3	20.7	-2.2	-12.8	36.7	57.5	37.1	35.0	70.6	110.0		
AEO2001								-6.5	-11.5	-3.2	-40.2	-46.3	-59.9	-50.2	-50.1	-59.3	-22.5	-25.9	-17.8	17.4	-4.2	-13.8	36.2	58.8	40.1	39.9	79.0	123.1		
AEO2002									0.2	-25.1	-42.8	-43.0	-56.5	-46.1	-45.7	-55.5	-15.4	-19.1	-9.0	30.8	6.6	-4.6	50.1	73.2	51.7	50.6	91.0	135.2		
AEO2003										-13.1	-34.6	-41.3	-56.5	-47.1	-45.9	-54.3	-10.4	-11.3	-0.3	44.4	17.9	6.1	66.2	92.2	66.0	62.3	104.4	155.4	28.3	
AEO2004											5.9	-20.8	-45.2	-34.0	-33.5	-45.3	0.3	-6.8	6.1	55.9	30.6	18.1	89.2	118.0	88.9	84.1	129.0	184.0	46.8	
AEO2005												3.2	-23.9	-16.9	-23.9	-43.0	4.9	-3.4	7.0	54.7	27.9	17.2	86.5	111.8	84.3	85.8	140.6	198.6	52.4	
AEO2006													1.2	11.4	0.4	-23.2	34.5	20.2	27.3	79.0	47.1	28.3	91.9	118.8	91.0	93.1	148.7	201.8	54.8	
AEO2007														3.9	5.8	-15.4	47.4	32.7	36.7	88.4	46.4	30.5	101.5	134.6	110.0	103.5	152.9	212.4	55.7	
AEO2008															-0.4	-15.9	62.1	44.1	51.3	108.3	61.3	38.4	110.9	139.1	108.8	106.4	161.4	212.6	53.1	
AEO2009																0.3	-2.8	3.4	20.8	72.5	39.3	26.4	103.9	140.8	114.8	117.6	183.7	259.7	86.3	
AEO2010																	-13.5	-4.2	26.5	89.2	46.6	28.8	106.4	139.4	107.5	105.0	159.7	222.4	64.2	
AEO2011																		1.9	41.6	13.7	-0.3	57.6	81.8	58.7	57.3	99.9	149.9	28.9		
AEO2012																			-0.5	31.1	7.2	-5.9	51.6	71.2	47.8	46.1	87.2	132.8	21.9	
AEO2013																				-2.0	-11.8	-21.1	25.5	60.0	43.9	49.1	91.7	136.6	21.3	
AEO2014																				0.7	-7.9	42.0	64.1	48.9	57.5	102.1	140.6	24.7		
AEO2015																						6.3	46.6	72.4	51.2	55.3	117.1	191.8	56.2	
AEO2016																							3.7	26.3	22.6	27.4	69.9	120.9	10.6	
AEO2017																									4.6	6.0	12.0	54.2	103.4	2.9
AEO2018																										2.1	3.2	42.0	83.0	-9.5
AEO2019																											-3.5	16.1	46.5	-27.7
AEO2020																												-0.7	12.0	-40.3
AEO2021																													2.1	-26.7
AEO2022																														3.5
Average absolute percentage difference	1.6	13.6	25.7	8.7	9.8	10.8	8.4	32.0	29.2	17.1	38.2	39.1	49.9	38.6	35.3	44.0	21.6	18.6	18.4	43.6	21.4	17.2	58.0	83.6	59.5	57.3	97.3	139.4	35.8	

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>; series: TOTALNGEJUS A; projections: Annual Energy Outlook, Reference case projections from various editions

GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/national/xls/gdplev.xlsx>

Notes: shading indicates overestimation (blue) or underestimation (green).

*Dollar year refers to the year that GDP is reported in constant dollars in a respective AEO.

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

Projected price in nominal dollars (nominal dollars per million British thermal units)																														
	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	2020	2021	
AEO1994	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												
AEO1995		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												
AEO1996			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							
AEO1997			2.48	2.19	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							
AEO1998				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	6.48			
AEO1999					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	6.17			
AEO2000						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	5.49			
AEO2001							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	5.77			
AEO2002								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	6.60			
AEO2003									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	6.71	6.91		
AEO2004										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	7.78	8.30		
AEO2005											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	7.67	8.04		
AEO2006												8.29	7.58	6.96	6.76	6.40	6.18	6.10	6.23	6.53	6.80	6.51	6.65	6.88	7.30	7.70	7.90	8.30		
AEO2007													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	7.64	7.74		
AEO2008															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	7.76	7.73	
AEO2009																9.07	4.70	5.32	5.73	5.87	5.99	6.28	6.66	7.03	7.41	7.84	8.34	8.92	9.45	
AEO2010																	4.20	4.99	6.07	6.53	6.40	6.47	6.77	6.99	7.13	7.32	7.53	7.85	8.13	
AEO2011																		5.12	4.82	4.81	4.87	4.92	5.10	5.25	5.40	5.57	5.76	6.05	6.34	
AEO2012																			4.76	4.51	4.61	4.65	4.90	4.92	5.00	5.13	5.33	5.55	5.89	
AEO2013																				3.38	3.85	3.94	4.09	4.64	4.89	5.25	5.47	5.65	5.87	
AEO2014																					4.39	4.62	4.65	4.77	5.07	5.56	5.77	5.75	6.03	
AEO2015																						5.33	4.82	5.05	5.20	5.56	6.31	7.10	7.71	
AEO2016																							3.39	3.67	4.21	4.55	4.93	5.39	5.50	
AEO2017																								3.06	3.66	4.02	4.51	5.00	5.15	
AEO2018																									3.53	3.72	4.17	4.54	4.59	
AEO2019																										3.34	3.28	3.50	3.54	
AEO2020																												2.86	2.72	2.96
AEO2021																													2.45	3.59
AEO2022																														5.15
Actual in nominal dollars	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	2.40	4.98	
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	3.70	1.89	

Table 8b. Natural gas price, electric power sector, actual versus projected (continued)																														
Projected versus actual																														
(percentage 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	2020	2021	
AEO1994	-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												
AEO1995		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												
AEO1996			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							
AEO1997				-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							
AEO1998					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	170.2		
AEO1999						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	157.3		
AEO2000							-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	129.0		
AEO2001								-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	140.8		
AEO2002									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	175.6		
AEO2003										-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	179.8	38.8	
AEO2004											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	224.4	66.8	
AEO2005												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	220.2	61.5	
AEO2006													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	229.7	66.8	
AEO2007														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	218.8	55.5	
AEO2008															-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	223.6	55.3	
AEO2009																0.6	-2.2	3.3	19.7	69.9	37.3	24.9	103.8	143.8	118.4	121.1	190.0	272.4	89.8	
AEO2010																	-12.7	-3.1	27.0	89.1	46.5	28.6	107.4	142.4	110.1	106.4	161.7	227.4	63.4	
AEO2011																		-0.7	0.8	39.1	11.6	-2.2	56.1	81.9	59.1	57.2	100.3	152.4	27.4	
AEO2012																				-0.5	30.4	5.6	-7.6	50.1	70.7	47.2	44.6	85.2	131.5	18.3
AEO2013																					-2.1	-11.9	-21.6	25.4	60.8	44.0	48.1	90.1	135.6	18.0
AEO2014																						0.4	-8.2	42.3	65.4	49.4	56.7	100.6	139.8	21.3
AEO2015																							6.0	47.5	75.0	53.3	56.7	119.2	196.3	54.9
AEO2016																								3.7	27.4	23.9	28.3	71.4	124.9	10.6
AEO2017																									6.1	7.8	13.4	56.6	108.7	3.6
AEO2018																										3.9	4.8	45.1	89.5	-7.8
AEO2019																											-5.8	14.0	46.1	-28.9
AEO2020																												-0.7	13.3	-40.6
AEO2021																													2.1	-27.9
AEO2022																														3.5
Average absolute percentage 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	154.6	38.0	

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTALNGEIIUS.A; projections: Annual Energy Outlook, Reference case projections from various editions
 GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/national/xls/gdplev.xlsx>
 Notes: shading indicates overestimation (blue) or underestimation (green).
 Projected prices are calculated from real values.

Table 9. Total natural gas consumption, projected versus 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	2020	2021	
AEO1994	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												
AEO1995		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												
AEO1996			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							
AEO1997				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							
AEO1998					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	32.20		
AEO1999						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	32.30		
AEO2000							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	31.53		
AEO2001								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	34.73		
AEO2002									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	33.78		
AEO2003										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	32.14	32.80	
AEO2004											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	30.44	30.41	
AEO2005												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	29.95	30.06	
AEO2006													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	26.92	26.93	
AEO2007														21.72	22.68	23.40	23.77	24.02	24.18	24.67	24.80	25.09	25.32	25.53	25.60	25.73	25.93	26.26	26.24	
AEO2008															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	23.33	23.34	
AEO2009																23.04	22.55	21.89	21.45	21.11	21.10	21.00	21.04	21.10	21.18	21.31	21.42	21.53	21.66	
AEO2010																	22.59	22.51	21.99	21.82	21.32	21.29	21.74	21.86	22.07	22.25	22.45	22.63	22.58	
AEO2011																		23.83	23.86	23.91	24.44	24.72	25.11	25.10	25.20	25.34	25.43	25.34	25.14	
AEO2012																				24.52	25.20	24.35	24.89	25.39	25.39	25.37	25.42	25.52	25.47	25.48
AEO2013																					25.63	25.30	25.00	25.30	26.23	26.07	26.23	26.29	26.32	26.38
AEO2014																						25.65	25.20	25.51	26.33	26.31	26.44	26.68	27.06	27.30
AEO2015																							27.12	26.56	27.04	26.39	26.43	26.33	26.14	26.09
AEO2016																								27.47	27.78	28.10	27.84	27.76	27.46	27.34
AEO2017																									27.68	27.85	28.09	27.85	27.32	27.21
AEO2018																										26.68	28.18	29.03	29.03	29.16
AEO2019																											29.34	29.61	30.26	30.45
AEO2020																												31.03	31.08	31.92
AEO2021																													30.76	28.97
AEO2022																														30.25
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	30.48	30.28	
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	3.20	3.24	

Projected versus actual (percentage 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	2020	2021	
AEO1994	-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												
AEO1995		-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												
AEO1996			-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							
AEO1997				-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							
AEO1998					-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	5.7		
AEO1999						-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	6.0		
AEO2000							-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	3.5		
AEO2001								-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	14.0		
AEO2002									-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	10.8		
AEO2003										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	5.5	8.3	
AEO2004											-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	-0.1	0.4	
AEO2005												-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	-1.7	-0.7	
AEO2006													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	-11.7	-11.1	
AEO2007														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	-13.8	-13.4	
AEO2008															-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	-23.5	-22.9	
AEO2009																-1.0	-1.6	-9.1	-12.4	-17.3	-19.3	-21.3	-23.4	-23.2	-21.8	-29.1	-30.9	-29.4	-28.5	
AEO2010																	-1.4	-6.5	-10.2	-14.6	-18.5	-20.2	-20.9	-20.5	-18.5	-26.0	-27.6	-25.7	-25.4	
AEO2011																		-1.1	-2.5	-6.4	-6.6	-7.4	-8.6	-8.7	-7.0	-15.7	-18.0	-16.9	-17.0	
AEO2012																			0.2	-1.3	-6.9	-6.8	-7.6	-7.6	-6.4	-15.5	-17.7	-16.4	-15.9	
AEO2013																				0.3	-3.3	-6.3	-7.9	-4.6	-3.8	-12.8	-15.2	-13.6	-12.9	
AEO2014																					-1.9	-5.6	-7.2	-4.2	-2.9	-12.1	-14.0	-11.2	-9.9	
AEO2015																						1.6	-3.3	-1.6	-2.6	-12.1	-15.1	-14.2	-13.8	
AEO2016																							0.0	1.1	3.7	-7.4	-10.5	-9.9	-9.7	
AEO2017																								0.7	2.8	-6.6	-10.2	-10.3	-10.2	
AEO2018																									-1.5	-6.3	-6.4	-4.7	-3.7	
AEO2019																										-2.4	-4.5	-0.7	0.6	
AEO2020																											0.0	2.0	5.4	
AEO2021																													0.9	-4.3
AEO2022																														-0.1
Average absolute percentage 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	10.5	10.7	

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.NGTCUPUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 10. Dry natural gas production, projected versus 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	2020	2021			
AEO1994	17.7	17.7	17.8	18.1	18.3	18.4	18.6	18.9	19.3	19.5	19.8	19.9	20.1	20.2	20.4	20.4	20.2	20.2														
AEO1995		18.3	18.0	17.9	18.2	18.6	18.9	19.1	19.2	19.4	19.5	19.8	19.9	20.2	20.3	20.6	20.6	20.9														
AEO1996			18.9	19.2	19.5	19.6	19.6	19.7	19.7	20.0	20.4	20.8	21.3	21.4	21.7	22.1	22.5	22.8	23.4	23.8	24.1	24.7	25.0									
AEO1997				19.1	19.7	20.2	20.3	20.5	20.8	21.3	21.9	22.3	22.7	22.9	23.4	23.7	24.0	24.3	24.7	25.0	25.4	26.0	26.1									
AEO1998					18.9	19.1	20.3	20.3	20.6	20.9	21.4	21.8	22.3	22.7	23.2	23.7	24.2	24.7	25.0	25.3	25.7	25.8	26.1	26.3	26.8	27.0	27.3	27.4				
AEO1999						18.8	19.1	19.3	19.8	20.2	20.8	21.0	21.6	22.0	22.5	22.9	23.3	23.8	24.2	24.7	25.0	25.6	26.1	26.4	26.8	27.1	27.2	27.4				
AEO2000							18.4	18.9	18.5	18.5	18.9	19.1	19.7	20.3	20.9	21.4	21.7	22.5	22.9	23.4	23.8	24.4	25.0	25.3	25.7	26.0	26.2	26.4				
AEO2001									18.6	18.9	19.7	20.3	20.7	20.8	21.1	21.3	21.8	22.4	23.1	23.6	24.2	24.8	25.5	26.2	26.9	27.5	28.1	28.5	29.0			
AEO2002										19.3	19.5	20.2	20.5	20.7	21.3	21.7	22.3	22.8	23.5	24.2	24.8	25.3	25.8	26.3	26.8	27.3	27.8	28.1	28.5			
AEO2003											19.4	20.0	20.2	20.1	20.4	20.5	21.1	21.5	21.9	22.4	22.9	23.2	23.6	23.8	23.9	23.9	24.4	24.7	25.1	25.5		
AEO2004												19.6	19.5	19.6	19.7	20.0	20.2	20.3	20.5	20.8	21.1	21.3	21.4	21.6	21.6	22.0	22.8	23.5	23.8	23.5		
AEO2005													18.9	19.3	19.2	19.5	19.9	20.4	20.4	20.9	21.2	21.1	21.2	20.8	20.8	21.6	22.1	22.0	21.9	21.8		
AEO2006														18.1	18.2	18.0	18.4	18.5	18.6	18.9	19.1	19.6	19.7	20.4	21.0	21.3	21.5	21.6	21.4	21.4		
AEO2007															18.6	19.1	19.4	19.4	19.3	19.2	19.4	19.3	19.7	19.6	19.6	19.7	20.2	20.7	20.8	20.9		
AEO2008																19.0	19.2	19.3	19.3	19.3	19.4	19.4	19.4	19.5	19.6	19.6	19.5	19.4	19.7	20.0		
AEO2009																	20.5	20.6	20.0	19.8	19.6	19.4	19.2	19.1	19.1	19.1	19.3	19.4	19.6	19.8		
AEO2010																		20.6	20.0	19.5	19.3	18.9	18.9	19.3	19.3	19.4	19.6	19.8	20.0	19.9		
AEO2011																				21.3	21.1	21.3	21.7	22.0	22.4	22.5	22.7	22.9	23.2	23.4	23.5	
AEO2012																						23.0	23.7	22.8	23.1	23.7	24.0	24.2	24.4	24.8	25.1	25.4
AEO2013																							23.9	24.0	23.9	24.0	25.1	25.4	25.9	26.3	26.6	26.9
AEO2014																								24.2	24.3	24.6	25.7	26.4	27.2	28.2	29.1	29.7
AEO2015																									25.6	26.4	27.3	27.2	27.7	28.3	28.8	29.2
AEO2016																										27.2	27.4	28.2	28.9	29.6	30.6	31.1
AEO2017																											26.5	27.9	29.1	30.1	30.8	31.0
AEO2018																												27.1	29.0	31.2	32.7	33.1
AEO2019																												29.5	32.3	33.6	34.1	
AEO2020																													33.8	34.8	36.0	
AEO2021																														33.9	32.3	
AEO2022																															34.4	
Actual	18.1	18.8	18.6	18.9	18.9	19.0	18.8	19.2	19.6	18.9	19.1	18.6	18.1	18.5	19.3	20.2	20.6	21.3	22.9	24.0	24.2	25.7	27.1	26.7	26.9	30.6	33.7	33.5	34.1			
Average absolute difference	0.4	0.8	0.6	0.6	0.6	0.5	0.7	0.5	0.6	1.0	1.2	1.8	2.4	2.1	1.7	1.4	1.4	1.6	1.9	2.1	2.2	2.8	3.6	3.1	3.0	5.6	7.8	7.4	2.9			

Table 10. Dry natural gas production, projected versus actual (continued)

Projected versus actual (percentage 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	2020	2021			
AEO1994		-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														
AEO1995			-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														
AEO1996				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									
AEO1997					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									
AEO1998						-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	-18.0				
AEO1999							-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	-18.3				
AEO2000								-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	-21.2				
AEO2001									-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	-13.3				
AEO2002										-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	-15.0				
AEO2003											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	-25.1	-25.3			
AEO2004												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	-29.0	-31.0			
AEO2005													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	-34.6	-36.3			
AEO2006														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	-36.0	-37.3			
AEO2007															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	-37.9	-38.8			
AEO2008																-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	-41.3	-41.6			
AEO2009																	1.6	-0.1	-6.1	-13.5	-18.5	-19.7	-25.3	-29.5	-28.6	-28.8	-37.0	-42.3	-41.5	-42.1			
AEO2010																			-0.1	-6.1	-15.0	-19.8	-21.9	-26.5	-28.8	-27.6	-27.7	-35.9	-41.2	-40.3	-41.7		
AEO2011																				-0.2	-8.1	-11.5	-10.2	-14.4	-17.2	-15.7	-15.7	-25.1	-31.1	-30.0	-31.1		
AEO2012																					0.2	-1.6	-6.0	-10.1	-12.7	-10.0	-9.8	-20.2	-26.4	-25.1	-25.6		
AEO2013																						-0.5	-0.8	-7.3	-11.3	-5.7	-5.4	-15.3	-21.8	-20.5	-21.1		
AEO2014																							-0.1	-5.6	-9.1	-3.7	-1.8	-11.1	-16.2	-13.1	-13.0		
AEO2015																								-0.6	-2.5	2.4	1.2	-9.5	-16.0	-13.9	-14.6		
AEO2016																									0.5	2.9	5.0	-5.4	-12.2	-8.7	-8.9		
AEO2017																										-0.5	3.7	-4.8	-10.6	-8.1	-9.3		
AEO2018																											0.9	-5.3	-7.3	-2.5	-3.1		
AEO2019																												-3.7	-4.2	0.2	-0.1		
AEO2020																													0.5	3.9	5.5		
AEO2021																														1.2	-5.4		
AEO2022																																0.7	
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	20.8	21.6			

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.NGPRPUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 11. Natural gas net imports, projected versus 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	2020	2021			
AEO1994	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														
AEO1995		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														
AEO1996			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									
AEO1997				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									
AEO1998					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	4.91				
AEO1999						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	5.02				
AEO2000							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	5.14				
AEO2001								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	5.80				
AEO2002									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	5.51				
AEO2003										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	6.66	6.87			
AEO2004											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	6.47	6.69			
AEO2005												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	7.89	8.11			
AEO2006													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	5.02	5.08			
AEO2007														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	5.35	5.21			
AEO2008															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	3.55	3.27			
AEO2009																3.03	2.73	2.34	1.99	1.76	1.79	1.80	1.86	1.96	1.98	1.95	1.90	1.85	1.78			
AEO2010																	2.76	2.82	2.78	2.62	2.36	2.32	2.38	2.48	2.57	2.58	2.59	2.57	2.58			
AEO2011																			2.74	2.75	2.64	2.72	2.71	2.69	2.63	2.55	2.42	2.22	1.90	1.60		
AEO2012																				1.90	1.64	1.59	1.74	1.73	1.37	1.12	0.99	0.72	0.35	0.05		
AEO2013																					1.72	1.69	1.45	1.42	1.25	0.83	0.47	0.14	-0.14	-0.42		
AEO2014																						1.34	1.35	1.08	0.76	0.03	-0.66	-1.40	-1.93	-2.30		
AEO2015																							1.14	0.80	0.35	-0.46	-1.12	-1.81	-2.55	-2.95		
AEO2016																								0.95	0.40	0.04	-0.84	-1.59	-2.89	-3.56		
AEO2017																									0.94	0.29	-0.78	-2.05	-3.36	-3.66		
AEO2018																										-0.09	-0.73	-2.10	-3.55	-3.83		
AEO2019																											-0.13	-0.77	-2.48	-3.25		
AEO2020																												-1.72	-2.67	-3.80		
AEO2021																													-2.67	-3.65		
AEO2022																														-4.01		
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	-2.73	-3.85			
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	4.35	1.74			

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

Projected versus actual (percentage 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	2020	2021	2022	
AEO1994		-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													
AEO1995			-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													
AEO1996				-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													
AEO1997					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								
AEO1998						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	-279.8			
AEO1999							-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	-283.9			
AEO2000								-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	-288.0			
AEO2001									-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	-312.4			
AEO2002										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	-301.7			
AEO2003											-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	-343.6	-278.6		
AEO2004												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	-336.9	-273.9		
AEO2005													-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	-388.7	-310.9		
AEO2006														-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	-283.8	-232.0		
AEO2007																-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	-295.6	-235.4	
AEO2008																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	-230.1	-185.1		
AEO2009																	0.3	2.1	-10.2	1.5	16.0	36.2	52.0	98.5	191.6	-1674.7	-371.2	-199.0	-167.8	-146.3		
AEO2010																		3.0	8.3	41.4	72.6	79.7	96.1	154.2	269.6	-2147.7	-459.3	-235.1	-194.0	-167.0		
AEO2011																			5.3	40.2	74.0	107.1	129.2	187.6	291.6	-2127.6	-437.2	-216.2	-169.7	-141.7		
AEO2012																					-3.3	7.8	21.1	47.6	84.9	103.8	-992.9	-237.2	-137.8	-112.8	-101.2	
AEO2013																						13.1	29.0	22.5	52.0	86.4	-758.0	-164.8	-107.1	-95.0	-89.1	
AEO2014																							2.2	13.9	16.0	12.6	-123.9	-8.3	-26.7	-29.5	-40.2	
AEO2015																								-3.7	-14.7	-47.6	268.0	56.1	-5.4	-6.6	-23.3	
AEO2016																									2.1	-41.1	-130.7	16.4	-16.9	5.9	-7.5	
AEO2017																										39.9	-334.0	7.9	7.3	23.1	-4.8	
AEO2018																											-27.7	1.0	9.5	29.8	-0.3	
AEO2019																												-81.3	-59.9	-9.2	-15.5	
AEO2020																													-10.1	-2.2	-1.2	
AEO2021																														-2.3	-5.1	
AEO2022																															4.3	
Average absolute percentage 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	174.7	113.2		

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>; series: TOTAL.NGNPUS.A; projections: Annual Energy Outlook, Reference case projections from various editions
 Notes: shading indicates overestimation (blue) or underestimation (green).

Table 12a-12b. Coal prices to electric generating plants, projected versus actual

Table 12a. Coal prices to electric generating plants, projected versus actual																														
Projected price in constant dollars																														
(constant dollars per million British thermal units in dollar year specific to each AEO)																														
AEO dollar 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	2020	2021	
AEO1994	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											
AEO1995	1993		1.39	1.39	1.38	1.40	1.40	1.39	1.39	1.42	1.41	1.43	1.44	1.45	1.46	1.46	1.46	1.47	1.50											
AEO1996	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	1.28	1.30	1.28	1.28						
AEO1997	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						
AEO1998	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	0.97	
AEO1999	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	0.93	
AEO2000	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	0.98	
AEO2001	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	0.98	
AEO2002	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	0.97	
AEO2003	2001										1.22	1.22	1.22	1.21	1.20	1.19	1.18	1.17	1.17	1.17	1.16	1.16	1.15	1.15	1.14	1.13	1.13	1.12	1.11	
AEO2004	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	1.21	1.21	1.20	1.19	1.20	1.20	
AEO2005	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	1.25	1.26
AEO2006	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	1.40	
AEO2007	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	1.59	
AEO2008	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	1.72	1.72
AEO2009	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	1.96	1.96
AEO2010	2008																	2.15	1.99	1.98	1.99	1.99	1.99	2.01	1.99	2.00	1.99	1.99	1.98	1.98
AEO2011	2009																		2.26	2.22	2.16	2.12	2.10	2.11	2.13	2.14	2.13	2.14	2.15	2.17
AEO2012	2010																			2.34	2.38	2.37	2.38	2.35	2.34	2.37	2.38	2.39	2.41	2.44
AEO2013	2011																				2.41	2.34	2.40	2.40	2.46	2.47	2.48	2.48	2.52	2.55
AEO2014	2012																					2.37	2.33	2.40	2.42	2.49	2.55	2.59	2.61	2.64
AEO2015	2013																						2.35	2.34	2.33	2.35	2.38	2.42	2.47	2.50
AEO2016	2014																							2.19	2.10	2.09	2.20	2.23	2.26	2.27
AEO2017	2016																								2.14	2.18	2.23	2.28	2.31	2.31
AEO2018	2017																									2.15	2.16	2.21	2.24	2.24
AEO2019	2018																										2.11	2.10	2.09	2.19
AEO2020	2019																											2.05	2.06	2.03
AEO2021	2020																												1.96	1.99
AEO2022	2021																													2.06
Actual in nominal dollars		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	1.92	1.98
Average absolute difference		0.12	0.12	0.15	0.17	0.16	0.16	0.18	0.19	0.17	0.15	0.14	0.14	0.18	0.23	0.24	0.40	0.47	0.49	0.56	0.50	0.56	0.54	0.43	0.42	0.50	0.49	0.49	0.50	0.65

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

Projected versus actual (percentage 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	2020	2021		
AEO1994	8.6	14.2	23.9	32.4	37.2	40.2	50.1	57.5	61.7	62.8	63.1	59.5	43.6	39.6	39.2	22.7	20.1	20.9													
AEO1995		4.8	10.0	13.7	18.8	22.1	26.6	31.2	33.5	32.7	34.0	30.4	19.6	13.1	10.9	-3.3	-8.2	-7.7													
AEO1996			2.2	4.2	6.3	8.4	12.5	16.3	15.2	16.6	16.7	12.7	3.4	-3.5	-5.0	-17.7	-21.8	-24.0	-25.1	-22.7	-19.9	-20.2	-14.2								
AEO1997				4.8	7.2	9.4	14.4	17.1	17.2	16.0	13.0	8.1	-2.3	-6.8	-9.6	-22.5	-27.6	-29.4	-33.3	-32.1	-30.8	-31.7	-26.9								
AEO1998					-0.1	1.1	4.6	6.6	5.1	4.1	2.3	-2.3	-11.7	-18.1	-20.5	-31.3	-35.5	-37.1	-39.7	-39.2	-37.8	-38.0	-33.9	-30.6	-29.1	-27.4	-25.3	-21.2			
AEO1999						-0.7	2.3	4.4	3.1	2.1	0.8	-3.8	-13.1	-19.6	-22.0	-33.3	-38.0	-39.5	-42.4	-41.9	-40.7	-41.1	-37.3	-34.2	-32.8	-31.2	-29.5	-25.9			
AEO2000							5.1	7.1	2.1	0.1	-2.5	-6.9	-16.1	-21.8	-23.7	-33.9	-39.2	-39.7	-41.9	-41.2	-39.6	-39.8	-35.5	-32.2	-30.5	-28.9	-27.1	-22.8			
AEO2001								2.0	0.6	0.1	-1.6	-6.1	-15.5	-21.7	-24.7	-35.5	-40.2	-41.5	-43.9	-42.9	-41.3	-41.5	-37.3	-33.7	-31.8	-30.0	-27.9	-23.7			
AEO2002									-0.7	-3.8	-4.8	-8.0	-17.9	-24.7	-27.0	-37.2	-41.5	-42.9	-44.7	-44.0	-42.6	-42.7	-38.7	-35.3	-33.9	-32.4	-30.6	-26.8			
AEO2003										-1.2	-1.2	-5.0	-12.8	-18.9	-21.3	-32.1	-36.6	-37.9	-39.9	-38.9	-36.9	-36.8	-32.1	-28.2	-26.2	-24.0	-21.4	-17.0	-16.6		
AEO2004											-1.2	-4.9	-13.5	-19.2	-21.0	-30.9	-34.9	-36.0	-38.0	-36.6	-34.3	-34.4	-29.2	-25.0	-22.6	-20.5	-18.2	-12.3	-11.1		
AEO2005												-3.1	-11.3	-16.5	-18.9	-29.5	-34.1	-35.8	-38.2	-37.0	-35.0	-34.6	-29.6	-25.3	-22.6	-19.7	-16.4	-10.7	-9.2		
AEO2006													0.1	-3.8	-6.6	-19.4	-25.4	-26.0	-29.8	-28.7	-26.8	-27.2	-22.0	-17.5	-15.2	-12.4	-9.2	-2.7	-1.6		
AEO2007														2.0	1.2	-11.2	-16.5	-17.4	-21.8	-21.4	-19.5	-19.4	-13.8	-8.8	-5.9	-3.5	0.3	6.9	8.6		
AEO2008															0.5	-10.6	-13.4	-13.7	-17.4	-17.1	-15.2	-15.3	-9.2	-4.2	-1.0	1.7	5.6	12.8	13.9		
AEO2009																	-4.9	-8.0	-14.8	-16.9	-15.8	-11.7	-10.1	-2.9	3.7	7.7	12.2	16.8	25.0	26.6	
AEO2010																		-2.0	-10.6	-13.8	-11.5	-8.1	-7.6	0.3	5.8	9.6	12.9	16.9	24.3	25.5	
AEO2011																			0.9	-3.8	-4.4	-2.8	-3.5	4.8	12.1	16.4	20.2	25.2	34.1	36.2	
AEO2012																				0.1	4.1	7.1	8.4	15.1	21.7	27.5	32.6	38.2	48.2	51.7	
AEO2013																					3.0	3.5	6.7	15.1	25.5	30.5	35.3	40.7	51.7	55.1	
AEO2014																						3.2	1.9	13.4	21.4	28.8	36.6	43.9	54.6	58.0	
AEO2015																							1.0	8.6	14.7	19.8	25.5	32.4	43.4	46.9	
AEO2016																								-0.6	1.6	4.3	13.8	19.6	29.3	30.7	
AEO2017																										1.3	6.9	13.0	19.7	29.3	30.8
AEO2018																											3.2	7.4	13.8	22.8	24.3
AEO2019																												2.2	5.6	12.4	18.5
AEO2020																													1.4	8.5	7.8
AEO2021																														2.3	4.7
AEO2022																															3.9
Average absolute percentage difference	8.6	9.5	12.0	13.8	13.9	13.6	16.5	17.8	15.5	14.0	12.8	12.6	13.9	16.4	16.8	23.5	26.0	26.4	28.9	26.8	24.0	23.1	20.0	19.1	19.3	20.2	21.1	23.7	24.1		

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.CLERDUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/national/xls/gdplev.xlsx>

Notes: shading indicates overestimation (blue) or underestimation (green).

*Dollar year refers to the year that GDP is reported in constant dollars in a respective AEO.

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

Projected price in nominal dollars (nominal dollars per million British thermal units)																														
	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	2020	2021	
AEO1994	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												
AEO1995		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												
AEO1996			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							
AEO1997				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							
AEO1998					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	2.00		
AEO1999						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	1.77		
AEO2000							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	1.62		
AEO2001								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	1.58			
AEO2002									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	1.65		
AEO2003										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	1.75	1.79	
AEO2004											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	1.92	2.00	
AEO2005												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	1.84	1.91	
AEO2006													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	2.04	2.10	
AEO2007														1.72	1.78	1.83	1.86	1.89	1.89	1.89	1.89	1.90	1.92	1.94	1.96	1.99	2.01	2.05	2.10	2.15
AEO2008															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	2.24	2.29	
AEO2009																1.97	2.05	1.93	1.97	1.97	2.04	2.10	2.15	2.22	2.28	2.35	2.41	2.48	2.56	
AEO2010																	2.18	2.05	2.07	2.10	2.15	2.19	2.24	2.26	2.31	2.34	2.38	2.42	2.47	
AEO2011																		2.28	2.27	2.23	2.23	2.24	2.31	2.37	2.43	2.47	2.53	2.60	2.67	
AEO2012																			2.39	2.46	2.47	2.52	2.53	2.56	2.64	2.70	2.76	2.83	2.92	
AEO2013																				2.45	2.42	2.51	2.55	2.66	2.72	2.77	2.82	2.90	2.99	
AEO2014																					2.41	2.41	2.52	2.58	2.69	2.80	2.89	2.96	3.04	
AEO2015																						2.39	2.43	2.46	2.53	2.61	2.70	2.80	2.88	
AEO2016																							2.21	2.16	2.19	2.36	2.44	2.53	2.59	
AEO2017																								2.17	2.26	2.36	2.46	2.55	2.61	
AEO2018																									2.18	2.25	2.35	2.44	2.51	
AEO2019																										2.05	2.10	2.15	2.31	
AEO2020																											2.05	2.11	2.13	
AEO2021																												1.96	2.04	
AEO2022																													2.06	
Actual in nominal dollars	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	1.92	1.98	
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	0.45	0.36	

Projected versus actual (percentage 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	2020	2021		
AEO1994	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													
AEO1995		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													
AEO1996			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								
AEO1997				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								
AEO1998					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	4.1			
AEO1999						-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	-7.6			
AEO2000							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	-15.8			
AEO2001								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	-17.7			
AEO2002									-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	-14.2			
AEO2003										-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	-9.0	-9.7		
AEO2004											-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	0.2	1.0		
AEO2005												-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	-4.3	-3.8		
AEO2006													-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	6.3	6.1		
AEO2007														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	9.2	8.4		
AEO2008															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	16.7	15.5		
AEO2009																-4.7	-7.4	-14.9	-17.7	-17.0	-13.0	-11.2	-2.9	5.0	9.5	14.0	19.4	29.4	29.0		
AEO2010																		-1.2	-9.6	-13.5	-11.6	-8.2	-7.8	0.8	7.1	10.9	13.7	17.8	26.2	25.0	
AEO2011																			0.5	-4.8	-6.1	-4.6	-5.4	3.8	12.2	16.7	20.1	25.4	35.5	34.7	
AEO2012																				0.1	3.5	5.5	6.5	13.9	21.4	27.0	31.3	36.7	47.4	47.2	
AEO2013																					2.9	3.4	6.1	15.0	26.1	30.6	34.4	39.5	51.1	50.9	
AEO2014																						3.0	1.6	13.6	22.3	29.2	35.9	42.9	54.0	53.7	
AEO2015																							0.8	9.3	16.4	21.5	26.6	33.7	45.6	45.7	
AEO2016																								-0.5	2.5	5.4	14.5	20.7	31.7	30.8	
AEO2017																									2.8	8.7	14.4	21.6	32.7	31.7	
AEO2018																										5.0	9.1	16.3	27.2	26.7	
AEO2019																												-0.3	3.7	12.1	16.6
AEO2020																												1.4	9.8	7.4	
AEO2021																													2.3	3.0	
AEO2022																														3.9	
Average absolute percentage 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	19.6	22.5		

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>, series: TOTAL CLERDUS A; projections: Annual Energy Outlook, Reference case projections from various editions
GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/national/xls/gdp/lev.xlsx>
Notes: shading indicates overestimation (blue) or underestimation (green).
Projected prices are calculated from real values.

Table 13. Total coal consumption, projected versus 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	2020	2021		
AEO1994	920	928	933	938	943	948	953	958	962	967	978	990	987	992	1,006	1,035	1,061	1,079													
AEO1995		935	940	941	947	948	951	954	958	963	971	984	992	996	1,002	1,013	1,025	1,039													
AEO1996			937	942	954	962	983	990	1,004	1,017	1,027	1,033	1,046	1,067	1,070	1,071	1,074	1,082	1,087	1,094	1,103	1,113	1,120								
AEO1997				948	970	987	1,003	1,017	1,020	1,025	1,034	1,041	1,054	1,075	1,086	1,092	1,092	1,099	1,104	1,114	1,122	1,139	1,156								
AEO1998					1,009	1,051	1,044	1,058	1,087	1,084	1,090	1,097	1,112	1,130	1,142	1,148	1,160	1,162	1,180	1,184	1,188	1,203	1,215	1,221	1,225	1,239	1,250	1,257			
AEO1999						1,040	1,075	1,092	1,109	1,113	1,118	1,120	1,120	1,133	1,139	1,150	1,155	1,156	1,173	1,177	1,191	1,198	1,211	1,222	1,237	1,247	1,259	1,275			
AEO2000							1,053	1,086	1,103	1,124	1,142	1,164	1,175	1,184	1,189	1,194	1,199	1,195	1,200	1,206	1,213	1,219	1,232	1,237	1,249	1,259	1,269	1,279			
AEO2001								1,078	1,112	1,135	1,153	1,165	1,183	1,191	1,220	1,228	1,228	1,235	1,240	1,244	1,251	1,254	1,261	1,269	1,279	1,280	1,286	1,297			
AEO2002									1,088	1,092	1,126	1,147	1,176	1,199	1,227	1,235	1,243	1,251	1,256	1,265	1,275	1,282	1,294	1,307	1,322	1,334	1,350	1,365			
AEO2003										1,040	1,059	1,082	1,106	1,138	1,172	1,185	1,200	1,218	1,231	1,239	1,250	1,261	1,282	1,297	1,316	1,328	1,345	1,358	1,366		
AEO2004											1,100	1,098	1,126	1,156	1,183	1,193	1,216	1,229	1,240	1,254	1,266	1,277	1,291	1,311	1,327	1,339	1,363	1,391	1,420		
AEO2005												1,102	1,137	1,159	1,189	1,210	1,224	1,229	1,237	1,248	1,255	1,264	1,273	1,284	1,298	1,313	1,331	1,352	1,377		
AEO2006													1,144	1,150	1,172	1,196	1,224	1,233	1,245	1,264	1,268	1,272	1,276	1,290	1,308	1,327	1,347	1,390	1,432		
AEO2007														1,135	1,147	1,152	1,169	1,195	1,222	1,233	1,245	1,272	1,282	1,299	1,315	1,331	1,350	1,377	1,409		
AEO2008															1,127	1,126	1,135	1,145	1,181	1,199	1,203	1,214	1,225	1,240	1,262	1,295	1,312	1,327	1,348		
AEO2009																1,109	1,077	1,117	1,152	1,178	1,192	1,205	1,202	1,214	1,223	1,232	1,235	1,240	1,243		
AEO2010																	1,015	1,035	1,094	1,122	1,137	1,163	1,141	1,153	1,155	1,167	1,179	1,183	1,202		
AEO2011																		1,055	1,026	1,024	1,017	1,007	1,013	1,025	1,031	1,043	1,055	1,076	1,101		
AEO2012																			1,039	984	961	938	914	927	936	950	963	982	996		
AEO2013																				905	934	945	937	880	907	929	953	966	972		
AEO2014																					942	965	964	917	938	957	965	965	970		
AEO2015																						933	921	906	924	933	966	987	992		
AEO2016																							801	801	810	823	824	813	793		
AEO2017																								716	730	739	773	791	779		
AEO2018																									728	725	695	688	670		
AEO2019																										677	651	616	595		
AEO2020																											592	533	493		
AEO2021																												466	553		
AEO2022																													554		
Actual	944	951	962	1,006	1,030	1,037	1,039	1,084	1,060	1,066	1,095	1,107	1,126	1,112	1,128	1,121	997	1,049	1,003	889	924	917	802	731	717	688	587	477	546		
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	606	473		

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

Projected versus actual (percentage 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	2020	2021
AEO1994	-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											
AEO1995		-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											
AEO1996			-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						
AEO1997				-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						
AEO1998					-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	163.7	
AEO1999						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	167.4	
AEO2000							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	168.3	
AEO2001								-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	172.0	
AEO2002									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	186.5	
AEO2003										-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	184.9	150.2
AEO2004											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	191.9	160.1
AEO2005												-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	183.7	152.2
AEO2006													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	191.5	162.3
AEO2007														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	188.8	158.1
AEO2008															-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	178.3	147.0
AEO2009																-1.0	7.9	6.5	14.9	32.5	28.9	31.4	49.9	66.1	70.6	79.1	110.3	160.1	127.6
AEO2010																	1.8	-1.3	9.1	26.2	23.0	26.8	42.3	57.8	61.1	69.6	100.7	148.1	120.2
AEO2011																		0.6	2.3	15.2	10.0	9.8	26.4	40.2	43.9	51.6	79.6	125.6	101.7
AEO2012																			3.6	10.7	4.0	2.3	14.1	26.8	30.5	38.0	63.9	106.1	82.5
AEO2013																				1.8	1.0	3.1	16.9	20.4	26.4	35.0	62.3	102.6	78.0
AEO2014																					1.9	5.3	20.3	25.4	30.8	39.0	64.2	102.4	77.7
AEO2015																						1.7	14.9	23.9	28.8	35.6	64.5	107.0	81.6
AEO2016																							-0.1	9.6	12.9	19.6	40.3	70.5	45.2
AEO2017																								-2.0	1.9	7.3	31.6	66.0	42.6
AEO2018																									1.5	5.3	18.3	44.3	22.8
AEO2019																										-1.7	10.8	29.1	9.0
AEO2020																											0.8	11.8	-9.7
AEO2021																												-2.2	1.2
AEO2022																													1.5
Average absolute percentage 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	54.2	56.2	61.8	87.4	127.2	86.6

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>, series: TOTAL.CLTCPLUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 14. Coal production excluding waste coal, projected versus 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	2020	2021	
AEO1994	991	1,013	1,032	1,042	1,048	1,057	1,064	1,072	1,077	1,089	1,097	1,111	1,108	1,114	1,129	1,159	1,187	1,209												
AEO1995		998	1,001	1,002	1,008	1,008	1,012	1,018	1,023	1,031	1,041	1,055	1,063	1,069	1,076	1,094	1,108	1,123												
AEO1996			1,028	1,035	1,033	1,036	1,052	1,061	1,076	1,091	1,102	1,110	1,122	1,142	1,147	1,153	1,159	1,170	1,177	1,192	1,204	1,218	1,230							
AEO1997				1,019	1,044	1,063	1,079	1,096	1,100	1,106	1,113	1,122	1,133	1,157	1,168	1,176	1,179	1,187	1,196	1,212	1,220	1,238	1,258							
AEO1998					1,080	1,113	1,119	1,136	1,166	1,167	1,173	1,180	1,194	1,215	1,225	1,234	1,247	1,252	1,271	1,279	1,284	1,299	1,316	1,324	1,330	1,345	1,358	1,369		
AEO1999						1,116	1,145	1,159	1,177	1,184	1,188	1,188	1,187	1,199	1,206	1,218	1,222	1,222	1,239	1,248	1,257	1,270	1,284	1,296	1,313	1,320	1,339	1,350		
AEO2000							1,111	1,127	1,143	1,165	1,180	1,201	1,208	1,216	1,222	1,228	1,232	1,228	1,232	1,238	1,243	1,245	1,259	1,264	1,278	1,286	1,296	1,308		
AEO2001								1,102	1,126	1,172	1,188	1,198	1,213	1,219	1,247	1,255	1,254	1,259	1,264	1,271	1,276	1,280	1,284	1,293	1,304	1,305	1,312	1,323		
AEO2002									1,158	1,132	1,152	1,172	1,198	1,220	1,248	1,257	1,265	1,271	1,279	1,289	1,294	1,301	1,315	1,328	1,345	1,355	1,372	1,389		
AEO2003										1,076	1,089	1,091	1,111	1,141	1,174	1,186	1,200	1,217	1,226	1,235	1,246	1,256	1,276	1,289	1,309	1,319	1,337	1,351	1,356	
AEO2004											1,090	1,110	1,128	1,154	1,178	1,185	1,206	1,217	1,226	1,238	1,249	1,259	1,275	1,294	1,310	1,320	1,343	1,369	1,395	
AEO2005												1,114	1,165	1,164	1,193	1,211	1,223	1,225	1,228	1,238	1,243	1,249	1,260	1,270	1,283	1,296	1,315	1,337	1,356	
AEO2006													1,132	1,151	1,190	1,209	1,239	1,247	1,253	1,266	1,265	1,262	1,262	1,271	1,286	1,289	1,301	1,347	1,380	
AEO2007														1,134	1,129	1,130	1,145	1,175	1,201	1,214	1,226	1,248	1,256	1,262	1,270	1,269	1,287	1,315	1,349	
AEO2008															1,141	1,138	1,139	1,152	1,186	1,200	1,197	1,200	1,205	1,220	1,227	1,233	1,248	1,262	1,282	
AEO2009																1,144	1,096	1,131	1,169	1,194	1,205	1,213	1,203	1,202	1,205	1,202	1,211	1,215	1,222	
AEO2010																	1,068	1,049	1,107	1,138	1,148	1,168	1,145	1,157	1,159	1,172	1,179	1,176	1,199	
AEO2011																		1,087	1,050	1,045	1,034	1,019	1,030	1,041	1,051	1,059	1,070	1,092	1,104	
AEO2012																			1,080	1,037	1,024	1,006	983	993	996	1,004	1,015	1,026	1,048	
AEO2013																					1,021	1,022	1,035	1,042	988	1,018	1,039	1,066	1,083	1,090
AEO2014																						1,010	1,035	1,052	1,012	1,035	1,055	1,065	1,069	1,076
AEO2015																							975	976	968	990	1,001	1,036	1,063	1,069
AEO2016																								863	838	844	867	872	864	846
AEO2017																									730	754	766	803	827	817
AEO2018																										775	759	730	723	708
AEO2019																											752	726	684	654
AEO2020																												671	590	559
AEO2021																													512	607
AEO2022																													585	
Actual	945	1,034	1,033	1,064	1,090	1,118	1,100	1,074	1,128	1,094	1,072	1,112	1,131	1,163	1,147	1,172	1,075	1,084	1,096	1,016	985	1,000	896	728	774	756	706	535	578	
Average absolute difference	45	28	12	39	47	52	38	40	41	45	62	40	39	36	46	41	112	110	111	181	207	191	287	424	375	381	425	459	192	

Table 14. Coal production excluding waste coal, projected versus actual (continued)

Projected versus actual (percentage 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	2020	2021		
AEO1994																															
AEO1995	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													
AEO1996		-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													
AEO1997			-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	22.2	21.8	37.3								
AEO1998				-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	23.8	23.8	40.4								
AEO1999					-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	30.4	29.9	46.9	81.7	71.8	77.9	92.3	155.6			
AEO2000						-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	27.6	27.0	43.4	78.0	69.6	74.6	89.6	152.1			
AEO2001							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	26.2	24.5	40.5	73.6	65.1	70.0	83.5	144.3			
AEO2002								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	29.6	28.0	43.3	77.5	68.5	72.5	85.7	147.1			
AEO2003									2.7	3.5	7.5	5.4	5.9	4.9	8.9	7.3	17.7	17.2	16.7	26.8	31.4	30.1	46.8	82.3	73.7	79.2	94.3	159.5			
AEO2004										-1.7	1.6	-1.9	-1.8	-1.9	2.4	1.2	11.7	12.2	11.9	21.5	26.6	25.5	42.4	76.9	69.1	74.5	89.2	152.3	134.6		
AEO2005											1.7	-0.2	-0.3	-0.8	2.8	1.2	12.2	12.2	11.9	21.8	26.8	25.9	42.3	77.7	69.3	74.6	90.2	155.6	141.4		
AEO2006												0.2	3.0	0.1	4.0	3.3	13.8	12.9	12.1	21.8	26.2	24.9	40.6	74.3	65.8	71.4	86.1	149.8	134.6		
AEO2007													0.0	-1.0	3.8	3.1	15.2	15.0	14.3	24.5	28.5	26.2	40.9	74.5	66.1	70.4	84.3	151.7	138.7		
AEO2008														-2.5	-1.5	-3.5	6.5	8.4	9.6	19.5	24.5	24.8	40.2	73.2	64.1	67.9	82.2	145.7	133.4		
AEO2009															-0.5	-2.9	6.0	6.2	8.2	18.1	21.6	20.0	34.5	67.5	58.5	63.1	76.7	135.7	121.8		
AEO2010																-2.3	1.9	4.3	6.7	17.5	22.4	21.3	34.2	65.0	56.7	59.0	71.5	127.0	111.5		
AEO2011																	-0.6	-3.3	1.0	11.9	16.5	16.8	27.8	58.8	49.7	55.1	67.0	119.6	107.4		
AEO2012																			0.2	-4.2	2.8	5.0	1.9	15.0	42.9	35.7	40.1	51.5	104.0	90.9	
AEO2013																				-1.4	2.0	4.0	0.6	9.8	36.4	28.6	32.8	43.7	91.7	81.3	
AEO2014																					0.5	3.8	3.5	16.3	35.6	31.4	37.5	51.0	102.3	88.6	
AEO2015																						2.6	3.5	17.5	38.9	33.8	39.6	50.8	99.7	86.1	
AEO2016																							-2.5	8.9	32.9	27.9	32.3	46.7	98.5	85.0	
AEO2017																									-3.7	15.1	9.1	14.7	23.4	61.4	46.4
AEO2018																									0.3	-2.6	1.3	13.8	54.4	41.3	
AEO2019																										0.1	0.4	3.3	35.0	22.4	
AEO2020																											-0.5	2.8	27.8	13.2	
AEO2021																												-5.0	10.2	-3.3	
AEO2022																													-4.4	5.0	
AEO 2022																														1.3	
Average absolute percentage 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	21.0	19.1	32.0	58.2	48.4	50.4	60.2	107.7	79.4		

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>; series: TOTAL.CLPRPUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 15a-15b. Average electricity prices, projected versus actual (constant dollars)

Table 15a. Average electricity prices, projected versus actual																														
Projected price in constant dollars																														
(constant dollars, cents per kilowatthour in dollar year specific to each AEO)																														
AEO dollar 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	2020	2021	
AEO1994	1992	6.80	6.80	6.90	6.90	6.90	7.00	7.00	7.10	7.10	7.20	7.20	7.20	7.30	7.30	7.40	7.50	7.60												
AEO1995	1993	6.80	6.80	6.70	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												
AEO1996	1994		7.09	6.99	6.94	6.93	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							
AEO1997	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							
AEO1998	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	5.46		
AEO1999	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	5.63		
AEO2000	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	5.83	5.82		
AEO2001	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	6.00		
AEO2002	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	6.47		
AEO2003	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	6.64	6.62	
AEO2004	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	6.86	6.90	
AEO2005	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	7.20	7.25	
AEO2006	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	7.25	7.29	
AEO2007	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	7.90	7.92	
AEO2008	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	8.61	8.56	
AEO2009	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	9.27	9.39	
AEO2010	2008																9.58	9.14	8.60	8.90	8.93	8.86	8.86	8.94	8.99	9.00	8.98	9.04	9.11	
AEO2011	2009																	9.57	9.03	9.01	8.94	8.89	8.89	8.84	8.84	8.83	8.81	8.84	8.83	
AEO2012	2010																		9.73	9.59	9.63	9.60	9.68	9.70	9.65	9.61	9.55	9.59	9.61	
AEO2013	2011																				9.41	9.19	9.24	9.18	9.33	9.41	9.43	9.39	9.38	9.41
AEO2014	2012																					9.79	9.80	9.91	9.93	9.99	10.10	10.19	10.14	10.10
AEO2015	2013																						10.46	10.45	10.66	10.70	10.62	10.70	10.88	11.06
AEO2016	2014																							10.27	10.16	10.10	10.19	10.42	10.52	10.55
AEO2017	2016																								10.28	10.35	10.24	10.35	10.52	10.58
AEO2018	2017																									10.55	10.59	10.69	10.92	10.91
AEO2019	2018																										10.56	10.45	10.24	10.11
AEO2020	2019																											10.39	10.21	10.14
AEO2021	2020																												10.42	10.60
AEO2022	2021																													11.08
Actual in nominal dollars		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	10.59	11.18
Average absolute difference		0.03	0.11	0.33	0.36	0.37	0.43	0.54	0.44	0.40	0.44	0.51	0.49	0.63	0.85	0.87	1.12	1.11	1.10	1.11	0.91	1.44	1.57	1.40	1.27	1.28	1.54	1.43	1.95	2.19

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

Projected versus actual (percentage 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	2020	2021
AEO1994	0.4	2.9	6.9	9.3	11.4	14.5	19.5	19.2	15.5	18.8	18.8	19.3	15.0	10.0	10.1	6.6	7.9	10.5											
AEO1995		0.5	2.9	3.7	5.7	8.6	11.8	11.5	8.0	11.1	11.3	11.7	7.7	3.0	3.1	-0.1	-0.3	2.3											
AEO1996			5.0	5.9	7.2	10.0	13.6	13.3	8.3	11.5	10.2	10.5	6.7	0.1	0.2	-4.3	-4.2	-3.3	-2.6	-0.8	-1.8	-2.9	-0.2						
AEO1997				3.0	4.2	7.2	10.6	9.4	4.2	6.2	4.1	3.3	-1.3	-7.1	-7.6	-12.4	-12.6	-12.2	-12.3	-11.3	-13.0	-14.6	-12.5						
AEO1998					1.0	0.7	3.2	1.2	-4.8	-3.2	-4.9	-5.7	-10.0	-16.2	-16.6	-20.9	-21.4	-21.0	-21.3	-20.6	-21.4	-23.3	-23.3	-21.8	-22.8	-21.4	-20.9	-19.9	
AEO1999						0.5	3.0	1.3	-4.6	-3.6	-4.4	-3.9	-8.2	-13.9	-14.6	-19.2	-19.7	-19.2	-19.4	-18.5	-19.7	-21.6	-21.2	-19.7	-20.8	-19.2	-19.1	-18.8	
AEO2000							0.8	0.0	-6.1	-5.6	-7.8	-8.2	-13.0	-18.0	-18.1	-22.3	-23.5	-22.4	-22.3	-20.8	-21.4	-22.6	-21.4	-19.7	-20.4	-18.4	-17.9	-17.0	
AEO2001								2.1	-3.2	-3.7	-6.3	-6.7	-12.7	-18.6	-20.4	-24.9	-25.5	-24.8	-24.1	-22.5	-22.8	-23.6	-22.3	-20.0	-20.1	-17.9	-17.1	-15.6	
AEO2002									-1.0	-3.2	-7.2	-7.1	-11.5	-17.5	-17.8	-21.4	-21.7	-20.5	-19.1	-17.5	-17.9	-19.6	-18.6	-16.0	-16.2	-13.6	-12.4	-11.0	
AEO2003										-2.7	-7.8	-8.4	-12.4	-19.0	-19.5	-23.2	-22.6	-22.0	-20.6	-18.7	-18.7	-19.8	-18.6	-15.8	-16.5	-13.9	-13.0	-10.7	-12.2
AEO2004											-2.3	-4.2	-9.3	-15.8	-17.0	-20.7	-20.3	-19.8	-18.8	-15.8	-16.3	-17.2	-15.4	-12.8	-13.7	-11.2	-10.6	-9.2	-9.9
AEO2005												0.0	-3.9	-12.7	-16.4	-21.9	-22.2	-21.8	-20.8	-17.9	-17.3	-17.3	-15.6	-13.3	-13.5	-10.5	-8.3	-6.5	-7.1
AEO2006													5.7	-1.9	-6.5	-13.7	-15.3	-15.7	-16.0	-14.5	-14.1	-16.0	-15.7	-13.5	-14.0	-11.3	-9.5	-8.4	-9.0
AEO2007														-3.6	-3.8	-8.2	-9.4	-9.7	-10.7	-9.6	-10.7	-12.8	-11.7	-8.9	-8.5	-5.5	-4.6	-3.1	-4.2
AEO2008															0.1	-2.6	0.3	-0.5	-1.8	-0.6	-2.9	-5.8	-5.0	-2.5	-2.8	-0.1	1.4	2.4	0.5
AEO2009																-0.7	-4.9	-12.5	-8.4	-6.2	-6.6	-7.4	-5.8	-2.3	-1.7	2.2	4.3	7.4	7.4
AEO2010																	-1.8	-5.3	-9.7	-4.2	-4.5	-6.9	-5.8	-2.5	-2.6	-0.2	0.7	2.8	2.2
AEO2011																		-1.5	-5.8	-3.7	-4.9	-7.2	-6.0	-4.2	-4.9	-2.6	-1.7	-0.2	-1.6
AEO2012																			0.3	1.3	1.1	-1.0	1.2	3.8	2.5	4.7	5.2	7.0	5.8
AEO2013																				-2.6	-5.4	-6.7	-6.1	-2.1	-2.0	0.7	1.4	2.6	1.5
AEO2014																					-1.1	-2.8	-0.4	2.2	2.2	5.8	8.0	8.8	6.9
AEO2015																						2.0	3.2	7.9	7.5	9.3	11.4	14.8	15.1
AEO2016																							-0.4	0.9	-0.4	3.0	6.5	8.9	7.8
AEO2017																								0.1	0.0	1.4	3.7	6.8	6.0
AEO2018																									0.1	2.9	5.1	8.8	7.2
AEO2019																										0.2	0.4	-0.4	-2.9
AEO2020																											-2.0	-2.4	-4.3
AEO2021																												-1.6	-1.2
AEO2022																													-0.9
Average absolute percentage difference	0.4	1.7	4.9	5.5	5.9	6.9	8.9	7.2	6.2	7.0	7.7	7.4	9.0	11.3	11.5	13.9	13.7	13.6	13.8	11.5	11.7	12.6	11.0	9.5	9.2	8.0	8.1	8.1	5.7

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>; series: TOTAL_ESTCUUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/national/xls/gdplev.xlsx>

Notes: shading indicates overestimation (blue) or underestimation (green).

*Dollar year refers to the year that GDP is reported in constant dollars in a respective AEO.

Table 15b. Average electricity prices, projected versus actual

Projected price in nominal dollars (nominal dollars, cents per kilowatthour)																													
	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	2020	2021
AEO1994	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											
AEO1995		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											
AEO1996			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						
AEO1997				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						
AEO1998					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	11.21	
AEO1999						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	10.72	
AEO2000							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	9.59	
AEO2001								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	9.65	
AEO2002									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	11.05	
AEO2003										6.99	6.90	7.01	7.10	7.10	7.18	7.30	7.51	7.64	7.84	8.02	8.27	8.53	8.78	9.10	9.34	9.67	9.94	10.36	10.62
AEO2004											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	10.99	11.45
AEO2005												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	10.62	11.01
AEO2006													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	10.60	10.97
AEO2007														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	10.47	10.70
AEO2008															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	11.23	11.40
AEO2009																9.69	9.40	8.60	8.99	9.09	9.27	9.55	9.81	10.16	10.53	10.93	11.30	11.77	12.23
AEO2010																	9.72	9.41	8.97	9.43	9.62	9.71	9.87	10.14	10.39	10.59	10.76	11.05	11.37
AEO2011																		9.65	9.23	9.31	9.40	9.52	9.70	9.84	10.05	10.25	10.44	10.68	10.88
AEO2012																			9.93	9.92	10.03	10.16	10.43	10.63	10.76	10.92	11.04	11.26	11.49
AEO2013																				9.58	9.52	9.70	9.78	10.10	10.34	10.53	10.65	10.82	11.04
AEO2014																					9.94	10.13	10.41	10.58	10.80	11.09	11.36	11.49	11.63
AEO2015																						10.63	10.82	11.25	11.49	11.61	11.92	12.34	12.76
AEO2016																							10.38	10.46	10.61	10.92	11.39	11.74	12.06
AEO2017																								10.43	10.72	10.81	11.17	11.60	11.92
AEO2018																									10.55	10.82	11.18	11.72	12.00
AEO2019																										10.30	10.45	10.52	10.67
AEO2020																											10.39	10.46	10.65
AEO2021																												10.42	10.87
AEO2022																													11.08
Actual in nominal dollars	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	10.59	11.18
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	0.49	0.76

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

Projected versus actual (percentage 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	2020	2021				
AEO1994	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															
AEO1995		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															
AEO1996			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										
AEO1997				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										
AEO1998					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	5.9					
AEO1999						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	1.3					
AEO2000							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	-9.5					
AEO2001								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	-8.9					
AEO2002									-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	4.3					
AEO2003										-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	-2.2	-5.0				
AEO2004											-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	3.8	2.4				
AEO2005												-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	0.3	-1.5				
AEO2006													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	0.1	-1.9				
AEO2007														-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	-1.1	-4.3				
AEO2008															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	6.0	1.9				
AEO2009																	-0.5	-4.3	-12.6	-9.2	-7.7	-8.0	-8.6	-5.8	-1.1	-0.1	3.8	6.6	11.1	9.4			
AEO2010																		-1.0	-4.3	-9.4	-4.2	-4.5	-7.1	-5.3	-1.2	-1.4	0.5	1.5	4.4	1.7			
AEO2011																			-1.8	-6.8	-5.4	-6.7	-8.9	-6.9	-4.2	-4.7	-2.7	-1.5	0.9	-2.7			
AEO2012																				0.3	0.8	-0.4	-2.8	0.1	3.5	2.1	3.7	4.1	6.4	2.8			
AEO2013																					-2.7	-5.5	-7.2	-6.1	-1.6	-1.9	0.0	0.5	2.2	-1.2			
AEO2014																						-1.3	-3.0	-0.1	3.0	2.5	5.3	7.2	8.5	4.0			
AEO2015																							1.7	3.9	9.5	9.0	10.3	12.5	16.5	14.1			
AEO2016																								-0.4	1.8	0.7	3.7	7.4	10.9	7.9			
AEO2017																									1.5	1.7	2.7	5.4	9.6	6.6			
AEO2018																											0.1	2.8	5.5	10.7	7.4		
AEO2019																														-2.2	-1.4	-0.6	-4.5
AEO2020																														-2.0	-1.2	-4.8	
AEO2021																															-1.6	-2.8	
AEO2022																																-0.9	
Average absolute percentage 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	5.3	4.4				

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL_ESTCIOUS.A; projections: Annual Energy Outlook, Reference case projections from various editions
 GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/national/xls/gdplev.xlsx>
 Notes: shading indicates overestimation (blue) or underestimation (green).
 Projected prices are calculated from real values.

Table 16. Total electricity sales excluding direct use, projected versus actual

Projected (billion kilow atthours)	Projected																					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	2020	2021		
AEO1994	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													
AEO1995		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													
AEO1996			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								
AEO1997				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								
AEO1998					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	4,308			
AEO1999						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	4,345			
AEO2000							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	4,350			
AEO2001								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	4,804			
AEO2002									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	4,916			
AEO2003										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	4,850	4,921		
AEO2004											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	4,811	4,879		
AEO2005												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	4,811	4,880		
AEO2006													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	4,629	4,688		
AEO2007														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	4,528	4,580		
AEO2008															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	4,261	4,298		
AEO2009																3,725	3,658	3,737	3,796	3,847	3,869	3,894	3,921	3,957	3,998	4,043	4,085	4,127	4,160		
AEO2010																	3,589	3,617	3,728	3,800	3,809	3,836	3,870	3,908	3,944	3,989	4,040	4,083	4,116		
AEO2011																			3,749	3,692	3,734	3,770	3,777	3,811	3,843	3,872	3,906	3,941	3,976	4,008	
AEO2012																				3,763	3,729	3,710	3,735	3,753	3,773	3,799	3,833	3,874	3,907	3,945	
AEO2013																					3,712	3,665	3,704	3,757	3,797	3,846	3,888	3,940	3,969	4,003	
AEO2014																						3,686	3,702	3,772	3,828	3,888	3,933	3,964	3,986	4,021	
AEO2015																							3,739	3,750	3,796	3,831	3,884	3,926	3,941	3,958	
AEO2016																								3,729	3,740	3,766	3,797	3,834	3,841	3,863	
AEO2017																									3,727	3,719	3,774	3,804	3,806	3,822	
AEO2018																										3,681	3,730	3,806	3,824	3,836	
AEO2019																											3,796	3,776	3,832	3,863	
AEO2020																												3,762	3,729	3,806	
AEO2021																													3,661	3,680	
AEO2022																														3,803	
Actual	2861	2,935	3,013	3,101	3,146	3,264	3,312	3,421	3,394	3,465	3,494	3,547	3,661	3,670	3,765	3,734	3,597	3,755	3,750	3,695	3,725	3,724	3,725	3,762	3,682	3,859	3,750	3,718	3,795		
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	350	455	508	374		

Table 16. Total electricity sales excluding direct use, projected versus actual (continued)

Projected versus actual (percentage 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	2020	2021
AEO1994	-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											
AEO1995		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											
AEO1996			-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						
AEO1997			-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							
AEO1998				-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	15.9		
AEO1999					-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	16.9		
AEO2000						-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	17.0		
AEO2001							-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	29.2		
AEO2002								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	32.2		
AEO2003									-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	30.5	29.7	
AEO2004										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	29.4	28.6	
AEO2005											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	29.4	28.6	
AEO2006												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	24.5	23.5	
AEO2007													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	21.8	20.7	
AEO2008														-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	14.6	13.3	
AEO2009															-0.3	1.7	-0.5	1.2	4.1	3.9	4.6	5.3	5.2	8.6	4.8	9.0	11.0	9.6	
AEO2010																-0.2	-3.7	-0.6	2.8	2.3	3.0	3.9	3.9	7.1	3.4	7.7	9.8	8.5	
AEO2011																	-0.2	-1.5	1.1	1.2	1.4	2.3	2.1	5.2	1.2	5.1	7.0	5.6	
AEO2012																			0.4	0.9	-0.4	0.3	0.8	0.3	3.2	-0.7	3.3	5.1	4.0
AEO2013																				0.5	-1.6	-0.5	0.9	0.9	4.4	0.8	5.1	6.8	5.5
AEO2014																					-1.0	-0.6	1.3	1.7	5.6	1.9	5.7	7.2	6.0
AEO2015																						0.4	0.7	0.9	4.1	0.6	4.7	6.0	4.3
AEO2016																							0.1	-0.6	2.3	-1.6	2.2	3.3	1.8
AEO2017																								-0.9	1.0	-2.2	1.5	2.4	0.7
AEO2018																									0.0	-3.3	1.5	2.9	1.1
AEO2019																										-1.6	0.7	3.1	1.8
AEO2020																											0.3	0.3	0.3
AEO2021																												-1.5	-3.0
AEO2022																													0.2
Average absolute percentage 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	13.7	9.8

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.ESTCUPUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 17. Solar net generation (all sectors), projected versus actual

Projected* (billion kilowatthours)																	
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
AEO2007	1.2	1.6	2.0	2.3	2.5	2.6	2.7	2.7	2.8	2.9	3.0	3.0	3.1	3.2	3.3	3.5	
AEO2008		1.7	2.2	2.2	2.4	2.4	2.8	3.1	3.4	3.5	3.7	3.8	4.0	4.2	4.4	4.6	
AEO2009			2.0	2.8	3.9	4.9	6.1	7.8	9.7	13.7	17.9	18.0	18.1	18.2	18.4	18.6	
AEO2010				3.2	4.4	6.0	8.1	10.4	12.8	15.3	18.0	18.1	18.3	18.4	18.5	18.7	
AEO2011					4.8	6.8	8.9	11.2	12.9	14.8	16.9	17.0	17.1	17.2	17.3	17.5	
AEO2012						6.8	10.0	13.9	17.2	20.3	23.5	23.5	23.6	23.7	23.9	24.1	
AEO2013							13.7	20.7	26.7	31.7	35.3	36.2	36.4	36.7	37.1	37.6	
AEO2014								16.8	25.7	31.1	35.9	36.8	37.1	37.4	38.0	38.6	
AEO2015									28.9	36.0	43.3	48.9	49.8	50.4	51.3	52.4	
AEO2016										37.6	51.2	72.5	81.0	86.7	92.5	115.1	
AEO2017											53.7	71.5	82.0	88.9	96.1	102.2	
AEO2018												75.1	88.6	118.7	142.4	159.0	
AEO2019													100.2	115.2	134.0	156.4	
AEO2020														113.4	140.7	181.1	
AEO2021															132.4	167.6	
AEO2022																164.3	
Actual*	1.0	1.3	2.0	2.4	3.6	5.6	10.5	17.2	28.9	39.0	54.9	77.3	93.4	106.9	130.7	163.7	
Average absolute difference	0.2	0.3	0.1	0.4	0.9	1.6	3.9	7.2	13.4	18.3	27.4	41.9	51.4	58.4	70.9	87.6	

Projected versus actual*																
(percentage difference)																
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AEO2007	20.8	23.4	1.7	-6.9	-29.7	-53.7	-74.5	-84.0	-90.3	-92.6	-94.6	-96.1	-96.7	-97.0	-97.4	-97.9
AEO2008		29.7	8.0	-7.4	-34.2	-56.7	-73.7	-82.1	-88.2	-90.9	-93.3	-95.0	-95.7	-96.1	-96.6	-97.2
AEO2009			2.1	15.0	8.0	-13.8	-41.9	-54.3	-66.6	-65.0	-67.4	-76.7	-80.6	-82.9	-85.9	-88.7
AEO2010				31.6	22.1	5.6	-23.0	-39.3	-55.8	-60.9	-67.1	-76.5	-80.4	-82.8	-85.8	-88.6
AEO2011					32.9	20.4	-14.7	-34.8	-55.3	-62.0	-69.2	-78.0	-81.7	-83.9	-86.7	-89.3
AEO2012						19.8	-4.3	-19.1	-40.5	-47.9	-57.2	-69.5	-74.7	-77.8	-81.7	-85.3
AEO2013							30.4	20.6	-7.7	-18.7	-35.7	-53.1	-61.0	-65.7	-71.6	-77.0
AEO2014								-2.1	-11.1	-20.3	-34.6	-52.4	-60.3	-65.0	-70.9	-76.4
AEO2015									-0.2	-7.7	-21.1	-36.7	-46.7	-52.9	-60.8	-68.0
AEO2016										-3.6	-6.6	-6.2	-13.2	-18.9	-29.2	-29.7
AEO2017											-2.2	-7.4	-12.2	-16.8	-26.5	-37.5
AEO2018												-2.8	-5.1	11.0	8.9	-2.9
AEO2019													7.3	7.7	2.5	-4.4
AEO2020														6.1	7.7	10.6
AEO2021															1.3	2.4
AEO2022																0.4
Average absolute percentage difference	20.8	26.5	3.9	15.2	25.4	28.3	37.5	42.0	46.2	47.0	49.9	54.2	55.1	54.6	54.3	53.5

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.SOTEPUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

*Does not include off-grid photovoltaics. Differences in data availability prior to 2014 for small-scale solar (systems less than 1 MW each) also contributed to the variances between projections and actuals.

Table 18. Wind net generation (all sectors), projected versus actual

Projected (billion kilowatthours)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	AEO2007	28.92	46.21	47.06	47.7	48.3	48.8	49.3	49.8	50.3	50.8	50.9	51.1	51.4	51.4	51.4
AEO2008		38.17	49.97	56.9	74.2	79.4	81.1	83.5	85.3	87.3	88.7	91.0	92.3	94.3	101.4	102.7
AEO2009			53.10	78.6	80.6	81.1	84.2	84.2	84.5	85.3	89.4	89.5	89.5	89.6	93.3	98.1
AEO2010				72.7	110.1	141.5	177.2	196.5	197.1	198.0	198.5	198.5	198.6	198.6	198.9	198.9
AEO2011					91.8	110.2	143.0	143.2	143.7	144.5	144.8	144.8	144.8	144.8	145.2	145.2
AEO2012						116.6	131.8	151.2	152.9	153.9	154.3	154.3	154.4	154.4	154.4	154.9
AEO2013							136.9	160.6	162.0	162.9	163.2	163.2	163.2	163.2	164.7	166.3
AEO2014								164.8	167.5	199.1	218.4	218.5	218.5	218.5	218.5	218.5
AEO2015									178.4	192.9	219.6	228.6	230.7	231.3	231.5	231.9
AEO2016										189.6	216.4	234.3	254.5	307.1	367.6	433.8
AEO2017											224.9	242.7	261.1	271.9	318.3	379.0
AEO2018												249.9	261.2	289.7	350.9	384.2
AEO2019													273.4	289.6	322.0	355.6
AEO2020														296.3	337.0	370.0
AEO2021															342.9	402.7
AEO2022																377.7
Actual	26.6	34.4	55.4	73.9	94.7	120.2	140.8	167.8	181.7	190.7	227.0	254.3	272.7	295.9	337.9	379.8
Average absolute difference	2.3	7.7	5.3	12.3	19.9	31.0	37.0	45.8	49.3	47.9	66.2	82.1	88.7	97.5	117.8	135.5

Projected versus actual																
(percentage difference)																
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AEO2007	8.8	34.1	-15.0	-35.5	-49.0	-59.4	-65.0	-70.3	-72.3	-73.3	-77.6	-79.9	-81.2	-82.6	-84.8	-86.5
AEO2008		10.8	-9.7	-23.0	-21.6	-33.9	-42.4	-50.2	-53.1	-54.2	-60.9	-64.2	-66.2	-68.1	-70.0	-73.0
AEO2009			-4.1	6.4	-14.9	-32.5	-40.2	-49.8	-53.5	-55.3	-60.6	-64.8	-67.2	-69.7	-72.4	-74.2
AEO2010				-1.6	16.3	17.7	25.8	17.1	8.5	3.8	-12.5	-21.9	-27.2	-32.9	-41.1	-47.6
AEO2011					-3.1	-8.3	1.5	-14.7	-20.9	-24.2	-36.2	-43.0	-46.9	-51.0	-57.0	-61.8
AEO2012						-3.0	-6.4	-9.9	-15.8	-19.3	-32.0	-39.3	-43.4	-47.8	-54.3	-59.2
AEO2013							-2.8	-4.3	-10.8	-14.6	-28.1	-35.8	-40.1	-44.8	-51.3	-56.2
AEO2014								-1.8	-7.8	4.4	-3.8	-14.1	-19.9	-26.2	-35.3	-42.5
AEO2015									-1.8	1.1	-3.2	-10.1	-15.4	-21.8	-31.5	-38.9
AEO2016										-0.6	-4.7	-7.9	-6.7	3.8	8.8	14.2
AEO2017											-0.9	-4.6	-4.3	-8.1	-5.8	-0.2
AEO2018												-1.7	-4.2	-2.1	3.8	1.2
AEO2019													0.3	-2.1	-4.7	-6.4
AEO2020														0.1	-0.3	-2.6
AEO2021															1.5	6.0
AEO2022																-0.6
Average absolute percentage difference	8.8	22.5	9.6	16.6	21.0	25.8	26.3	27.3	27.2	25.1	29.1	32.3	32.5	33.0	34.8	35.7

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.WYETPUS.A ; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 19. Conventional hydroelectric power net generation (all sectors), projected versus actual

Projected (billion kilowatthours)																
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AEO2007	283.0	280.9	287.7	294.1	300.7	305.9	305.9	306.0	306.0	306.0	306.9	307.0	307.0	307.0	307.0	307.1
AEO2008		261.8	271.2	286.1	292.7	299.5	299.5	300.4	300.4	300.5	300.5	300.5	301.2	301.2	301.2	301.3
AEO2009			262.2	260.1	270.5	279.6	284.9	289.2	293.4	297.8	298.1	298.7	298.7	298.7	298.7	299.5
AEO2010				260.5	270.8	279.8	284.1	291.3	295.5	299.9	299.9	299.9	299.9	300.0	300.0	300.0
AEO2011					243.5	261.8	270.4	277.8	288.0	296.7	304.1	304.1	304.1	304.6	304.7	305.2
AEO2012						314.2	273.5	285.0	290.1	297.2	299.5	299.7	300.3	300.6	302.3	302.6
AEO2013							281.3	271.6	277.3	282.5	290.4	289.9	290.1	290.2	290.4	290.7
AEO2014								266.4	272.9	278.8	284.0	289.6	289.0	289.0	289.0	290.4
AEO2015									256.4	268.6	271.8	279.8	291.7	292.3	292.3	292.3
AEO2016										246.8	256.3	272.8	282.0	294.3	294.1	294.1
AEO2017											263.9	265.1	286.0	306.9	310.2	310.3
AEO2018												296.2	266.3	281.8	296.4	296.4
AEO2019													283.3	277.7	294.0	310.0
AEO2020														288.3	292.3	292.7
AEO2021															283.2	281.5
AEO2022																259.7
Actual	289.2	247.5	254.8	273.4	260.2	319.4	276.2	268.6	259.4	249.1	267.8	300.3	292.5	287.9	285.3	260.2
Average absolute difference	6.3	23.8	18.9	14.9	22.1	29.2	11.9	17.9	28.0	38.9	23.7	10.2	8.9	9.6	12.1	35.7

Table 19. Conventional hydroelectric power net generation (all sectors), projected versus actual (continued)																
Projected versus actual																
(percentage difference)																
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AEO2007	-2.2	13.5	12.9	7.6	15.6	-4.2	10.8	13.9	18.0	22.9	14.6	2.2	4.9	6.6	7.6	18.0
AEO2008		5.8	6.4	4.6	12.5	-6.2	8.4	11.9	15.8	20.6	12.2	0.1	3.0	4.6	5.6	15.8
AEO2009			2.9	-4.9	4.0	-12.5	3.1	7.7	13.1	19.6	11.3	-0.5	2.1	3.8	4.7	15.1
AEO2010				-4.7	4.1	-12.4	2.8	8.5	13.9	20.4	12.0	-0.1	2.5	4.2	5.2	15.3
AEO2011					-6.4	-18.0	-2.1	3.4	11.0	19.1	13.5	1.3	4.0	5.8	6.8	17.3
AEO2012						-1.6	-1.0	6.1	11.8	19.3	11.8	-0.2	2.7	4.4	6.0	16.3
AEO2013							1.8	1.1	6.9	13.4	8.4	-3.5	-0.8	0.8	1.8	11.7
AEO2014								-0.8	5.2	11.9	6.0	-3.6	-1.2	0.4	1.3	11.6
AEO2015									-1.1	7.8	1.5	-6.8	-0.3	1.5	2.5	12.3
AEO2016										-0.9	-4.3	-9.2	-3.6	2.2	3.1	13.0
AEO2017											-1.5	-11.7	-2.2	6.6	8.8	19.2
AEO2018												-1.4	-9.0	-2.1	3.9	13.9
AEO2019													-3.2	-3.5	3.1	19.1
AEO2020														0.1	2.5	12.5
AEO2021															-0.7	8.2
AEO2022																-0.2
Average absolute percentage difference	2.2	9.6	7.4	5.5	8.5	9.1	4.3	6.7	10.8	15.6	8.8	3.4	3.0	3.3	4.2	13.7

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>, series: TOTAL.HVETPUS.A ; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 20. Coal net generation (all sectors), projected versus actual

Projected (billion kilowatthours)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	AEO2007	2,025.0	2,044.0	2,047.6	2,081.4	2,142.3	2,178.4	2,202.5	2,228.3	2,274.0	2,295.4	2,328.3	2,361.4	2,388.5	2,431.9	2,488.5
AEO2008		2,024.4	2,014.3	2,035.1	2,055.4	2,102.9	2,130.0	2,142.7	2,166.3	2,181.7	2,204.5	2,240.1	2,289.5	2,324.9	2,357.3	2,402.4
AEO2009			2,019.2	1,999.1	2,056.9	2,085.1	2,102.0	2,110.1	2,114.3	2,121.5	2,126.9	2,138.1	2,144.2	2,152.6	2,155.8	2,151.1
AEO2010				1,813.2	1,828.9	1,940.0	2,003.3	2,045.6	2,075.6	2,037.5	2,054.8	2,054.3	2,071.2	2,088.4	2,093.1	2,117.0
AEO2011					1,863.7	1,819.5	1,823.6	1,820.3	1,799.9	1,798.8	1,822.8	1,832.5	1,847.2	1,865.9	1,906.9	1,951.0
AEO2012						1,797.4	1,709.3	1,697.5	1,641.2	1,581.5	1,588.6	1,605.1	1,624.8	1,644.7	1,671.5	1,696.3
AEO2013							1,546.7	1,609.9	1,616.0	1,613.6	1,520.2	1,566.6	1,599.6	1,635.6	1,655.6	1,663.0
AEO2014								1,629.2	1,663.8	1,636.9	1,553.3	1,599.0	1,634.3	1,647.6	1,645.7	1,654.6
AEO2015									1,616.3	1,593.8	1,562.7	1,595.0	1,613.5	1,674.4	1,709.1	1,713.7
AEO2016										1,354.9	1,356.8	1,365.2	1,386.1	1,387.0	1,388.0	1,346.8
AEO2017											1,232.9	1,250.2	1,260.5	1,331.3	1,372.0	1,342.7
AEO2018												1,268.3	1,253.7	1,197.1	1,194.0	1,158.1
AEO2019													1,164.6	1,109.0	1,050.2	1,014.6
AEO2020														984.9	898.8	851.6
AEO2021															773.9	941.7
AEO2022																954.1
Actual	1,990.5	2,016.5	1,985.8	1,755.9	1,847.3	1,733.4	1,514.0	1,581.1	1,581.7	1,352.4	1,239.1	1,205.8	1,149.5	965.0	773.4	898.7
Average absolute difference	34.5	17.8	41.2	226.3	149.5	253.8	417.0	329.3	303.5	469.2	521.2	533.8	564.2	711.9	850.6	701.7

Projected versus actual (percentage difference)																
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AEO2007	1.7	1.4	3.1	18.5	16.0	25.7	45.5	40.9	43.8	69.7	87.9	95.8	107.8	152.0	221.8	184.1
AEO2008		0.4	1.4	15.9	11.3	21.3	40.7	35.5	37.0	61.3	77.9	85.8	99.2	140.9	204.8	167.3
AEO2009			1.7	13.8	11.3	20.3	38.8	33.5	33.7	56.9	71.6	77.3	86.5	123.1	178.7	139.4
AEO2010				3.3	-1.0	11.9	32.3	29.4	31.2	50.7	65.8	70.4	80.2	116.4	170.6	135.6
AEO2011					0.9	5.0	20.4	15.1	13.8	33.0	47.1	52.0	60.7	93.4	146.6	117.1
AEO2012						3.7	12.9	7.4	3.8	16.9	28.2	33.1	41.4	70.4	116.1	88.8
AEO2013							2.2	1.8	2.2	19.3	22.7	29.9	39.2	69.5	114.1	85.1
AEO2014								3.0	5.2	21.0	25.4	32.6	42.2	70.7	112.8	84.1
AEO2015									2.2	17.9	26.1	32.3	40.4	73.5	121.0	90.7
AEO2016										0.2	9.5	13.2	20.6	43.7	79.5	49.9
AEO2017											-0.5	3.7	9.7	38.0	77.4	49.4
AEO2018												5.2	9.1	24.1	54.4	28.9
AEO2019													1.3	14.9	35.8	12.9
AEO2020														2.1	16.2	-5.2
AEO2021															0.1	4.8
AEO2022																6.2
Average absolute percentage difference	1.7	0.9	2.1	12.9	8.1	14.6	27.5	20.8	19.2	34.7	42.1	44.3	49.1	73.8	110.0	78.1

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.CLETPUS.A ; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 21. Natural gas net generation (all sectors), projected versus actual

Projected (billion kilowatthours)																	
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
AEO2007	798.0	814.1	886.2	906.1	892.3	916.0	946.0	969.4	980.2	1,017.9	1,034.8	1,027.5	1,038.3	1,045.2	1,059.4	1,053.1	
AEO2008		881.5	897.1	901.4	907.8	907.1	914.5	881.1	882.0	904.6	921.0	912.4	886.9	861.4	832.4	813.9	
AEO2009			887.1	863.9	814.5	802.2	826.8	813.5	805.7	815.4	838.8	860.5	881.0	891.1	897.9	923.8	
AEO2010				905.1	856.1	804.5	753.4	665.8	638.6	690.3	699.4	722.5	735.3	751.9	766.9	761.9	
AEO2011					1,009.6	971.3	958.5	974.7	980.6	1,000.1	993.1	1,004.3	1,015.1	1,020.8	1,001.7	984.7	
AEO2012						1,008.2	1,065.6	1,006.6	1,066.8	1,129.7	1,119.8	1,113.4	1,116.4	1,126.5	1,112.8	1,113.2	
AEO2013							1,217.7	1,094.1	1,113.0	1,131.8	1,226.2	1,201.9	1,187.6	1,186.7	1,184.5	1,188.9	
AEO2014								1,116.5	1,082.0	1,127.2	1,222.4	1,212.0	1,220.9	1,238.1	1,267.9	1,285.0	
AEO2015									1,133.1	1,146.6	1,179.5	1,147.6	1,164.8	1,144.3	1,116.5	1,116.4	
AEO2016										1,348.3	1,330.3	1,322.6	1,288.8	1,265.6	1,201.2	1,163.6	
AEO2017											1,414.5	1,384.8	1,386.7	1,322.5	1,235.1	1,202.6	
AEO2018												1,252.0	1,329.3	1,417.4	1,371.9	1,379.1	
AEO2019													1,440.1	1,464.0	1,537.6	1,564.5	
AEO2020														1,558.5	1,552.8	1,638.7	
AEO2021															1,636.4	1,428.2	
AEO2022																1,564.1	
Actual	816.4	896.6	883.0	921.0	987.7	1,013.7	1,225.9	1,124.8	1,126.6	1,333.5	1,378.3	1,296.4	1,469.1	1,585.8	1,624.2	1,575.2	
Average absolute difference	18.4	48.8	7.2	26.9	100.4	112.1	271.2	184.6	163.4	305.2	295.8	218.7	339.0	422.0	440.8	384.3	

Table 21. Natural gas net generation (all sectors), projected versus actual (continued)																	
Projected versus actual																	
(percentage difference)																	
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
AEO2007	-2.3	-9.2	0.4	-1.6	-9.7	-9.6	-22.8	-13.8	-13.0	-23.7	-24.9	-20.7	-29.3	-34.1	-34.8	-33.1	
AEO2008		-1.7	1.6	-2.1	-8.1	-10.5	-25.4	-21.7	-21.7	-32.2	-33.2	-29.6	-39.6	-45.7	-48.8	-48.3	
AEO2009			0.5	-6.2	-17.5	-20.9	-32.6	-27.7	-28.5	-38.8	-39.1	-33.6	-40.0	-43.8	-44.7	-41.4	
AEO2010				-1.7	-13.3	-20.6	-38.5	-40.8	-43.3	-48.2	-49.3	-44.3	-49.9	-52.6	-52.8	-51.6	
AEO2011					2.2	-4.2	-21.8	-13.3	-13.0	-25.0	-27.9	-22.5	-30.9	-35.6	-38.3	-37.5	
AEO2012						-0.5	-13.1	-10.5	-5.3	-15.3	-18.8	-14.1	-24.0	-29.0	-31.5	-29.3	
AEO2013							-0.7	-2.7	-1.2	-15.1	-11.0	-7.3	-19.2	-25.2	-27.1	-24.5	
AEO2014								-0.7	-4.0	-15.5	-11.3	-6.5	-16.9	-21.9	-21.9	-18.4	
AEO2015									0.6	-14.0	-14.4	-11.5	-20.7	-27.8	-31.3	-29.1	
AEO2016										1.1	-3.5	2.0	-12.3	-20.2	-26.0	-26.1	
AEO2017											2.6	6.8	-5.6	-16.6	-24.0	-23.7	
AEO2018												-3.4	-9.5	-10.6	-15.5	-12.4	
AEO2019													-2.0	-7.7	-5.3	-0.7	
AEO2020														-1.7	-4.4	4.0	
AEO2021															0.8	-9.3	
AEO2022																	-0.7
Average absolute percentage difference	2.3	5.4	0.8	2.9	10.2	11.1	22.1	16.4	14.5	22.9	21.5	16.9	23.1	26.6	27.1	24.4	

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.NGETPUS.A ; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 22. Nuclear net generation (all sectors), projected versus actual

Projected (billion kilowatthours)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	AEO2007	787	795	792	788	789	792	804	806	808	812	826	846	867	881	885
AEO2008		800	800	795	797	799	802	803	806	807	809	816	829	846	868	874
AEO2009			799	807	809	812	815	818	827	831	832	835	837	848	862	866
AEO2010				809	813	814	816	819	830	834	839	849	861	872	883	885
AEO2011					803	803	813	827	833	839	841	852	862	872	877	877
AEO2012						786	813	817	826	830	846	860	867	879	887	893
AEO2013							770	775	789	820	840	859	876	885	885	889
AEO2014								758	759	774	784	797	793	791	779	779
AEO2015									784	774	781	795	798	801	804	807
AEO2016										798	781	786	771	770	777	787
AEO2017											798	792	779	770	762	772
AEO2018												792	797	788	765	761
AEO2019													809	797	785	762
AEO2020														807	793	780
AEO2021															785	761
AEO2022																778
Actual	787	806	806	799	807	790	769	789	797	797	806	805	807	809	790	778
Average absolute difference	0.0	9.3	9.3	8.3	8.0	12.3	35.3	25.2	22.9	24.2	24.7	28.8	34.4	39.9	48.0	51.3

Table 22. Nuclear net generation (all sectors), projected versus actual (continued)

Projected versus actual (percentage difference)																	
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
AEO2007	0.0	-1.5	-1.8	-1.4	-2.2	0.2	4.5	2.1	1.4	1.9	2.6	5.1	7.4	8.9	12.1	13.9	
AEO2008		-0.8	-0.8	-0.5	-1.3	1.2	4.2	1.8	1.1	1.2	0.4	1.4	2.7	4.6	9.9	12.3	
AEO2009			-0.9	1.0	0.3	2.7	5.9	3.6	3.7	4.3	3.3	3.7	3.8	4.8	9.1	11.3	
AEO2010				1.3	0.7	3.0	6.1	3.8	4.1	4.7	4.1	5.5	6.6	7.7	11.7	13.8	
AEO2011					-0.5	1.7	5.6	4.8	4.4	5.3	4.4	5.8	6.8	7.7	11.1	12.7	
AEO2012						-0.5	5.6	3.6	3.6	4.2	5.0	6.8	7.5	8.6	12.3	14.8	
AEO2013							0.1	-1.8	-1.1	2.9	4.2	6.7	8.5	9.4	12.0	14.2	
AEO2014								-3.9	-4.8	-2.9	-2.7	-1.0	-1.7	-2.2	-1.3	0.1	
AEO2015									-1.7	-2.9	-3.0	-1.3	-1.2	-1.1	1.7	3.7	
AEO2016										0.1	-3.0	-2.3	-4.4	-4.8	-1.6	1.2	
AEO2017											-1.0	-1.6	-3.4	-4.9	-3.6	-0.8	
AEO2018												-1.6	-1.2	-2.6	-3.2	-2.2	
AEO2019													0.2	-1.5	-0.6	-2.1	
AEO2020														-0.3	0.4	0.3	
AEO2021															-0.6	-2.3	
AEO2022																-0.1	
Average absolute percentage difference	0.0	1.1	1.2	1.0	1.0	1.6	4.6	3.2	2.9	3.0	3.1	3.6	4.3	4.9	6.1	6.6	

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.NUETPUS.A ; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 23. Total energy consumption (all sectors), projected versus 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	2020	2021		
AEO1994	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													
AEO1995		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													
AEO1996			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								
AEO1997				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								
AEO1998					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	118.2			
AEO1999						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	119.5			
AEO2000							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	120.6			
AEO2001								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	126.7			
AEO2002									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	130.5			
AEO2003										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	129.8	131.3		
AEO2004											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	127.6	128.9		
AEO2005												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	125.2	126.5		
AEO2006													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	120.3	121.4		
AEO2007														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	117.8	118.9		
AEO2008															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	110.5	111.4		
AEO2009																100.2	97.6	98.6	100.0	101.1	101.8	101.8	101.7	102.0	102.4	102.9	103.5	104.3	104.8		
AEO2010																		95.2	96.1	98.0	99.5	100.2	100.9	101.2	101.8	102.4	103.0	103.9	104.6	105.2	
AEO2011																				97.3	97.8	98.9	100.4	100.7	101.7	102.2	102.7	103.2	103.8	104.6	105.1
AEO2012																					97.8	97.4	96.3	96.8	97.1	97.5	97.7	98.0	98.5	99.0	99.4
AEO2013																						95.5	95.9	96.2	97.4	98.0	98.8	99.5	100.3	100.7	100.9
AEO2014																							96.1	96.3	97.4	98.1	99.0	99.6	100.1	100.4	100.8
AEO2015																								98.5	97.8	98.7	99.0	99.7	100.5	100.8	101.0
AEO2016																									96.7	97.6	98.7	99.4	100.2	100.5	100.8
AEO2017																										96.5	97.3	98.6	99.5	99.7	100.0
AEO2018																											97.3	99.0	99.9	100.3	100.2
AEO2019																												100.1	100.3	100.2	100.1
AEO2020																													100.0	99.6	100.2
AEO2021																														92.9	95.1
AEO2022																															97.0
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	93.0	97.3		
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	10.4	6.9		

Table 23. Total energy consumption (all sectors), projected versus actual (continued)

Projected versus actual (percentage 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	2020	2021	
AEO1994	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												
AEO1995		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												
AEO1996			-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							
AEO1997				-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							
AEO1998					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	27.2		
AEO1999						-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	28.6		
AEO2000							-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	29.7		
AEO2001								-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	36.3		
AEO2002									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	40.4		
AEO2003										-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	39.6	35.0	
AEO2004											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	37.2	32.5	
AEO2005												-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	34.7	30.0	
AEO2006													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	29.4	24.8	
AEO2007														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	26.7	22.2	
AEO2008															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	18.9	14.5	
AEO2009																1.3	3.7	1.1	3.2	7.0	4.7	3.4	4.3	4.6	4.8	1.8	3.2	12.2	7.7	
AEO2010																	1.1	-1.4	1.2	5.4	3.1	2.5	3.8	4.3	4.8	1.9	3.5	12.6	8.1	
AEO2011																		-0.2	0.9	4.7	3.3	2.3	4.2	4.8	5.1	2.1	3.5	12.5	8.0	
AEO2012																			1.0	3.1	-1.0	-1.6	-0.5	-0.1	-0.1	-3.1	-1.8	6.5	2.2	
AEO2013																				1.1	-1.4	-2.3	-0.2	0.4	1.1	-1.5	0.0	8.3	3.7	
AEO2014																					-1.1	-2.2	-0.2	0.6	1.3	-1.5	-0.3	8.0	3.6	
AEO2015																							0.0	0.3	1.2	1.3	-1.4	0.1	8.5	3.8
AEO2016																								-0.8	0.0	1.0	-1.7	-0.1	8.2	3.6
AEO2017																									-1.1	-0.4	-2.5	-0.8	7.2	2.7
AEO2018																										-0.4	-2.1	-0.4	7.9	3.0
AEO2019																										-1.0	-0.1	7.8	2.8	
AEO2020																											-0.3	7.1	3.0	
AEO2021																												0.0	-2.3	
AEO2022																														-0.3
Average absolute percentage 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	19.0	10.7	

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.TETCBUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 24. Total delivered residential energy consumption, projected versus 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	2020	2021
AEO1994	10.3																												
AEO1995		11.0																											
AEO1996			10.4																										
AEO1997				11.1																									
AEO1998					10.7																								
AEO1999						10.5																							
AEO2000							10.7																						
AEO2001								10.8																					
AEO2002									11.3																				
AEO2003										11.1																			
AEO2004											11.5																		
AEO2005												11.5																	
AEO2006													11.7																
AEO2007														11.3															
AEO2008															11.5														
AEO2009																11.6													
AEO2010																	11.2												
AEO2011																		11.4											
AEO2012																			11.6										
AEO2013																				10.7									
AEO2014																					11.3								
AEO2015																						11.7							
AEO2016																							10.9						
AEO2017																								10.6					
AEO2018																									10.5				
AEO2019																										11.4			
AEO2020																											11.4		
AEO2021																												11.4	
AEO2022																													11.5
Actual	10.5	10.4	10.5	11.2	10.7	10.3	10.7	11.2	11.0	11.2	11.6	11.4	11.5	10.8	11.4	11.6	11.3	11.5	11.3	10.5	11.6	11.9	11.3	10.7	10.7	12.0	11.9	11.6	11.7
Average absolute difference	0.2	0.3	0.2	0.4	0.1	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.8	0.5	0.4	0.7	0.6	0.8	1.6	0.7	0.7	1.0	1.3	1.3	1.0	1.0	0.9	0.7

Table 24. Total delivered residential energy consumption, projected versus actual (continued)

Projected versus actual
(percentage 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	2020	2021	
AEO1994		-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											
AEO1995			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											
AEO1996				-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						
AEO1997					-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						
AEO1998					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	14.1	
AEO1999						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	12.7	
AEO2000							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	10.4	
AEO2001								-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	18.9	
AEO2002									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	16.7	
AEO2003										-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	16.3	16.5
AEO2004											-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	17.7	17.6
AEO2005												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	18.9	18.7
AEO2006													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	14.7	14.5
AEO2007															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	13.5	13.3
AEO2008																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	6.0	5.8
AEO2009																	0.2	2.7	0.8	0.5	9.1	-2.1	-4.4	1.0	6.7	7.0	-3.8	-2.7	0.4	0.1
AEO2010																		-0.9	-2.2	-2.2	6.2	-4.8	-7.1	-1.8	3.7	4.0	-6.4	-5.2	-2.0	-2.1
AEO2011																			-0.7	-2.2	6.1	-4.8	-7.2	-2.3	3.0	3.1	-7.6	-6.7	-3.9	-4.4
AEO2012																				2.2	11.0	-2.5	-5.2	-0.4	4.7	5.0	-5.7	-4.8	-2.2	-2.4
AEO2013																					2.7	-3.0	-7.3	-2.6	2.1	2.1	-8.7	-7.9	-5.7	-6.0
AEO2014																						-2.9	-7.2	-4.1	0.6	0.8	-9.9	-9.5	-7.5	-8.0
AEO2015																							-1.4	-3.3	0.3	0.3	-10.3	-10.0	-8.4	-9.4
AEO2016																								-3.2	1.9	3.4	-7.7	-7.5	-6.1	-7.0
AEO2017																									-1.1	1.7	-8.2	-7.9	-6.2	-7.1
AEO2018																										-1.8	-7.8	-8.3	-6.6	-7.5
AEO2019																											-4.6	-5.1	-4.7	-5.7
AEO2020																												-2.9	-2.5	-3.3
AEO2021																													-2.1	-3.0
AEO2022																														-1.8
Average absolute percentage difference		2.2	2.9	1.7	3.9	1.3	4.8	2.5	2.9	2.5	2.5	2.9	3.1	3.0	7.8	4.6	3.8	6.0	5.1	6.8	15.6	6.5	5.9	8.7	12.3	12.3	8.2	8.4	9.1	7.7

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>; series: TOTAL.TERCBUS.A & TOTAL.LORCBUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

*Projections exclude electricity-related losses.

Table 25. Total delivered commercial energy consumption, projected versus 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	2020	2021		
AEO1994	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													
AEO1995		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													
AEO1996			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								
AEO1997				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								
AEO1998					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	9.0	9.0		
AEO1999						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	9.3	9.4		
AEO2000								7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.5	8.7	8.7	8.8	8.9	9.0	9.1	9.1	9.1	9.2	9.2	9.2	9.2		
AEO2001									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	10.5	10.6	10.6		
AEO2002										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	11.6		
AEO2003											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	11.4	11.6	
AEO2004												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	11.3	11.5	
AEO2005													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	11.4	11.6	
AEO2006														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	10.7	10.8	
AEO2007															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	10.7	10.8	
AEO2008																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	10.0	10.2	
AEO2009																	8.6	8.9	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.5	9.6	9.7	9.8	9.8	
AEO2010																		8.4	8.6	8.8	8.9	8.9	9.0	9.0	9.1	9.2	9.3	9.4	9.5	9.6	
AEO2011																			8.5	8.7	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	
AEO2012																				8.7	8.7	8.7	8.7	8.8	8.9	8.9	9.0	9.1	9.2	9.2	
AEO2013																					8.3	8.6	8.7	8.8	8.8	8.8	8.9	8.9	8.9	9.0	
AEO2014																						8.6	8.5	8.5	8.6	8.6	8.7	8.7	8.8	8.8	
AEO2015																							8.9	8.8	8.8	8.8	8.9	8.9	8.9	8.9	
AEO2016																								8.8	9.0	9.1	9.1	9.1	9.0	9.0	
AEO2017																									8.8	8.8	8.8	8.8	8.7	8.7	
AEO2018																										8.9	9.2	9.2	9.2	9.1	
AEO2019																												9.2	9.1	9.1	9.2
AEO2020																													9.3	9.2	9.4
AEO2021																														8.6	8.8
AEO2022																															9.0
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	8.6	8.2	8.7	9.0	8.7	9.0	9.0	9.5	9.4	8.8	9.1	
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	0.6	0.9	0.6	0.6	0.7	0.7	0.7	0.7	1.0	0.8		

Table 25. Total delivered commercial energy consumption, projected versus actual (continued)

Projected versus actual (percentage 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	2020	2021	
AEO1994	-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												
AEO1995		-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												
AEO1996			-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							
AEO1997				-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							
AEO1998					-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	2.6		
AEO1999						-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	6.3		
AEO2000							-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	4.6		
AEO2001								-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	19.8		
AEO2002									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	32.1		
AEO2003										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	29.2	27.5	
AEO2004											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	28.8	26.8	
AEO2005												-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	29.1	27.5	
AEO2006													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	21.0	19.3	
AEO2007														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	20.9	19.2	
AEO2008															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	13.8	12.1	
AEO2009																-1.2	4.2	3.9	4.2	9.6	4.8	2.7	6.8	4.5	5.1	0.5	2.2	10.0	7.7	
AEO2010																	-1.1	0.6	2.2	7.9	2.3	-0.1	3.9	1.7	2.4	-1.9	0.1	7.8	5.7	
AEO2011																	-0.5	0.8	6.0	1.3	-0.6	3.7	1.6	2.4	-1.8	0.2	7.9	5.6		
AEO2012																			1.5	6.1	0.0	-2.4	1.1	-1.2	-0.6	-4.9	-3.1	4.2	1.8	
AEO2013																				1.5	-1.1	-3.4	0.6	-2.0	-2.0	-6.8	-5.3	1.6	-0.8	
AEO2014																					-1.1	-4.9	-2.0	-4.4	-4.0	-8.5	-7.2	-0.3	-2.6	
AEO2015																						-0.2	0.8	-2.2	-2.0	-6.6	-5.4	1.1	-1.8	
AEO2016																							1.2	-0.3	0.6	-4.0	-3.6	2.5	-0.3	
AEO2017																								-2.3	-2.0	-7.1	-6.7	-0.8	-3.8	
AEO2018																									-0.7	-2.6	-1.8	3.9	0.6	
AEO2019																										-3.6	-2.8	3.8	1.1	
AEO2020																											-1.1	4.8	3.3	
AEO2021																												-2.4	-2.9	
AEO2022																													-1.2	
Average absolute percentage 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	7.4	7.6	7.1	7.2	10.8	8.6	
Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), http://www.eia.gov/opendata/ , series: TOTAL.TECCBUS.A & TOTAL.LOCCBUS.A; projections: Annual Energy Outlook, Reference case projections from various editions																														
Notes: shading indicates overestimation (blue) or underestimation (green).																														
*Projections exclude electricity-related losses.																														

Table 26. Total delivered industrial energy consumption, projected versus 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	2020	2021		
AEO1994	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													
AEO1995		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													
AEO1996			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								
AEO1997				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								
AEO1998					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	30.9			
AEO1999						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	32.1			
AEO2000							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	31.5			
AEO2001								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	33.0			
AEO2002									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	33.0			
AEO2003										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	32.6	33.0		
AEO2004											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	31.4	31.6		
AEO2005												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	29.7	29.9		
AEO2006													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	28.9	29.2		
AEO2007														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	27.8	28.0		
AEO2008															25.2	25.8	25.3	25.8	26.2	26.2	26.2	26.2	26.2	26.3	26.4	26.4	26.5	26.5	26.7	27.1	
AEO2009																25.1	23.3	22.8	23.5	23.9	24.3	24.2	23.9	23.9	23.9	24.0	24.2	24.4			
AEO2010																	22.2	22.3	23.0	23.8	24.2	24.6	24.8	24.9	25.0	25.1	25.3	25.4	25.5		
AEO2011																		23.1	24.2	25.0	26.0	26.2	26.7	26.8	26.9	27.0	27.1	27.3	27.5		
AEO2012																			23.8	23.8	23.1	23.7	24.0	24.2	24.2	24.3	24.4	24.6	24.9		
AEO2013																				24.3	23.8	24.0	24.9	25.5	26.0	26.4	26.7	26.9	27.0		
AEO2014																					23.8	24.2	25.3	26.0	26.5	27.0	27.3	27.7	28.0		
AEO2015																							24.7	25.2	25.9	26.2	26.6	27.1	27.4	27.6	
AEO2016																								24.5	24.3	24.7	25.1	25.8	26.5	27.1	
AEO2017																									24.6	25.0	25.8	26.4	26.7	27.1	
AEO2018																										24.8	25.6	26.4	27.3	27.6	
AEO2019																											26.0	26.4	26.9	27.5	
AEO2020																												26.3	26.7	27.2	
AEO2021																													25.5	25.8	
AEO2022																														26.2	
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	25.3	25.9		
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	3.2	2.0		

Table 26. Total delivered industrial energy consumption, projected versus actual (continued)

Projected versus actual
(percentage 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	2020	2021
AEO1994	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											
AEO1995		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											
AEO1996			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						
AEO1997				-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						
AEO1998					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	22.3	
AEO1999						-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	26.7	
AEO2000							-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	24.6	
AEO2001								-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	30.2	
AEO2002									-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	30.4	
AEO2003										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	28.8	27.5
AEO2004											-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	23.9	22.2
AEO2005												-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	17.2	15.3
AEO2006													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	14.2	12.9
AEO2007														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	10.0	8.3
AEO2008															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	5.5	4.5
AEO2009																4.7	6.6	-3.4	-1.4	-0.8	-1.5	-1.9	-2.3	-4.6	-5.1	-8.8	-9.1	-4.2	-5.9
AEO2010																	1.7	-5.5	-3.4	-1.2	-1.6	-0.2	1.1	-0.6	-0.7	-4.3	-4.2	0.5	-1.6
AEO2011																		-2.1	1.6	3.9	5.8	6.4	9.2	7.3	7.1	3.0	2.8	8.0	6.1
AEO2012																			-0.2	-1.3	-6.0	-3.7	-2.2	-3.2	-3.8	-7.4	-7.4	-2.7	-4.0
AEO2013																				0.7	-3.4	-2.6	1.7	1.9	3.2	0.6	1.2	6.2	4.2
AEO2014																					-3.1	-1.7	3.2	3.8	5.5	2.8	3.6	9.5	8.2
AEO2015																						0.4	3.0	3.5	4.0	1.5	2.6	8.3	6.7
AEO2016																							0.0	-2.7	-1.8	-4.2	-2.2	4.9	4.6
AEO2017																								-1.8	-0.8	-1.6	0.2	5.5	4.7
AEO2018																									-1.5	-2.3	0.1	7.7	6.7
AEO2019																										-0.9	0.1	6.3	6.1
AEO2020																											-0.2	5.3	5.0
AEO2021																												0.6	-0.5
AEO2022																													1.2
Average absolute percentage 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	12.6	7.8

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opa/data/>, series: TOTAL.TEICBUS.A & TOTAL.LOICBUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: 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.

*Projections exclude electricity-related losses.

Table 27. Total delivered transportation energy consumption, projected versus 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	2020	2021		
AEO1994	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													
AEO1995		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													
AEO1996			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								
AEO1997				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								
AEO1998					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	35.7			
AEO1999						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	36.1			
AEO2000							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	36.8			
AEO2001								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	37.9			
AEO2002									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	39.1			
AEO2003										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	39.8	40.5		
AEO2004											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	37.7	38.2		
AEO2005												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	37.0	37.5		
AEO2006													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	34.9	35.3		
AEO2007														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	34.0	34.4		
AEO2008															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	30.8	31.0		
AEO2009																27.6	27.1	27.5	28.0	28.1	28.4	28.3	28.2	28.2	28.3	28.4	28.6	28.7	28.7		
AEO2010																		26.5	26.8	27.3	27.6	27.9	28.0	28.1	28.1	28.3	28.4	28.6	28.8	28.9	
AEO2011																				26.9	27.1	27.4	27.9	28.0	28.1	28.3	28.4	28.5	28.6	28.7	
AEO2012																					26.6	26.8	27.0	27.2	27.2	27.2	27.2	27.0	26.9	26.8	
AEO2013																						26.2	26.4	26.6	26.8	26.9	26.9	26.9	26.9	26.8	
AEO2014																							26.4	26.3	26.3	26.4	26.4	26.3	26.2	26.0	25.9
AEO2015																								26.8	27.1	27.3	27.3	27.3	27.2	27.2	27.1
AEO2016																									27.3	26.6	26.9	26.6	26.0	26.5	27.6
AEO2017																										28.2	28.4	28.5	28.4	28.3	
AEO2018																											27.7	27.6	27.7	27.3	27.1
AEO2019																											28.0	28.2	27.9	27.6	
AEO2020																													28.1	28.1	27.9
AEO2021																														24.6	26.3
AEO2022																															26.3
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	24.3	26.9		
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	7.2	3.4		

Projected versus actual (percentage 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	2020	2021	
AEO1994	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												
AEO1995		-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												
AEO1996			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							
AEO1997				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							
AEO1998					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	46.8		
AEO1999						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	48.4		
AEO2000							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	51.6		
AEO2001								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	55.8		
AEO2002									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	60.7		
AEO2003									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	63.9	50.4		
AEO2004										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	55.0	42.1		
AEO2005											-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	52.3	39.4		
AEO2006												-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	43.7	31.3		
AEO2007													-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	39.7	28.0		
AEO2008														-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	26.7	15.1		
AEO2009															0.6	1.6	1.8	5.0	7.6	6.3	4.8	2.2	1.0	0.3	-0.4	0.3	17.5	6.6		
AEO2010																	-0.4	-0.8	2.6	5.5	4.5	3.5	1.5	0.7	0.5	-0.1	0.8	18.3	7.6	
AEO2011																		-0.3	1.7	4.6	4.5	3.5	1.7	1.2	0.9	0.1	0.6	17.7	6.7	
AEO2012																			-0.2	2.3	1.3	0.5	-1.5	-2.5	-3.4	-4.8	-4.8	10.6	-0.2	
AEO2013																				0.1	-1.0	-1.6	-3.2	-3.9	-4.3	-5.2	-4.9	10.5	-0.4	
AEO2014																					-1.1	-2.6	-4.8	-5.5	-6.1	-7.3	-7.6	7.1	-3.7	
AEO2015																						-1.0	-1.9	-2.2	-2.9	-3.9	-3.8	11.8	0.6	
AEO2016																							-1.4	-4.9	-4.3	-6.5	-8.0	8.9	2.5	
AEO2017																									0.9	1.0	0.5	0.7	16.9	5.1
AEO2018																									-1.5	-2.7	-2.4	12.5	0.9	
AEO2019																										-1.4	-0.4	14.7	2.6	
AEO2020																										-0.8	15.7	3.9		
AEO2021																											1.3	-2.4		
AEO2022																													-2.1	
Average absolute percentage 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	29.5	12.6	

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/lopendata/>, series: TOTAL_TEACBUS.A & TOTAL_LOACBUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

*Projections exclude electricity-related losses.

Table 28. Total energy-related carbon dioxide emissions, projected versus actual

Projected (million metric tons)	Projected																					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	2020	2021			
AEO1994	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														
AEO1995		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														
AEO1996			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									
AEO1997				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									
AEO1998					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	7,173				
AEO1999						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	7,241				
AEO2000							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	7,257				
AEO2001								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	7,482				
AEO2002									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	7,655				
AEO2003											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	7,636	7,730		
AEO2004												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	7,536	7,634		
AEO2005													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	7,520	7,610		
AEO2006														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	7,119	7,206		
AEO2007															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	6,944	7,030		
AEO2008																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	6,384	6,416		
AEO2009																	5,849	5,699	5,746	5,803	5,842	5,858	5,852	5,830	5,844	5,857	5,875	5,889	5,905	5,909		
AEO2010																		5,507	5,521	5,643	5,706	5,707	5,741	5,731	5,749	5,761	5,787	5,826	5,851	5,882		
AEO2011																				5,643	5,601	5,622	5,659	5,651	5,680	5,700	5,707	5,724	5,742	5,777	5,825	
AEO2012																						5,632	5,570	5,453	5,438	5,407	5,408	5,402	5,402	5,421	5,434	5,450
AEO2013																							5,361	5,368	5,361	5,381	5,336	5,370	5,404	5,441	5,455	5,456
AEO2014																								5,421	5,426	5,418	5,382	5,418	5,452	5,469	5,476	5,487
AEO2015																									5,488	5,428	5,436	5,405	5,425	5,477	5,499	5,495
AEO2016																										5,273	5,292	5,321	5,329	5,322	5,289	5,229
AEO2017																											5,157	5,183	5,222	5,272	5,272	5,230
AEO2018																												5,151	5,257	5,230	5,187	5,136
AEO2019																												5,250	5,217	5,116	5,050	
AEO2020																													5,123	4,993	4,957	
AEO2021																														4,563	4,725	
AEO2022																															4,825	
Actual	5,185	5,261	5,323	5,510	5,584	5,635	5,688	5,868	5,761	5,804	5,853	5,970	5,993	5,910	6,001	5,809	5,386	5,576	5,439	5,227	5,355	5,406	5,257	5,188	5,140	5,281	5,142	4,576	4,870			
Average absolute difference	125	128	143	273	244	197	164	259	138	149	159	156	144	226	228	406	840	691	889	1,108	976	937	1,072	1,112	1,148	1,022	1,145	1,063	614			

Table 28. Total energy-related carbon dioxide emissions, projected versus actual (continued)

Projected versus actual (percentage 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	2020	2021		
AEO1994	-2.4	-2.5	-2.6	-4.9	-5.3	-5.3	-5.4	-7.3	-4.9	-4.7	-4.3	-5.2	-5.0	-2.9	-3.4	1.1	10.0	7.3													
AEO1995		-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													
AEO1996			-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								
AEO1997				-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								
AEO1998					-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	56.7			
AEO1999						-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	58.2			
AEO2000							-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	58.6			
AEO2001								-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	63.5			
AEO2002									-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	67.3			
AEO2003										-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	66.9	58.7		
AEO2004											-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	64.7	56.8		
AEO2005												-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	64.3	56.3		
AEO2006													-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	55.6	48.0		
AEO2007														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	51.7	44.4		
AEO2008															-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	39.5	31.7		
AEO2009																0.7	5.8	3.0	6.7	11.8	9.4	8.3	10.9	12.6	13.9	11.2	14.5	29.0	21.3		
AEO2010																		2.3	-1.0	3.7	9.2	6.6	6.2	9.0	10.8	12.1	9.6	13.3	27.9	20.8	
AEO2011																			1.2	3.0	7.6	5.7	4.5	8.0	9.9	11.0	8.4	11.7	26.2	19.6	
AEO2012																				3.5	6.6	1.8	0.6	2.9	4.2	5.1	2.3	5.4	18.8	11.9	
AEO2013																					2.6	0.2	-0.8	2.3	2.9	4.5	2.3	5.8	19.2	12.0	
AEO2014																					1.2	0.4	3.1	3.7	5.4	3.2	6.4	19.7	12.7		
AEO2015																							1.5	3.2	4.8	5.1	2.7	6.5	20.2	12.8	
AEO2016																								0.3	2.0	3.5	0.9	3.5	15.6	7.4	
AEO2017																										-0.6	0.8	-1.1	2.5	15.2	7.4
AEO2018																										0.2	-0.5	1.7	13.3	5.5	
AEO2019																											-0.6	1.5	11.8	3.7	
AEO2020																												-0.4	9.1	1.8	
AEO2021																													-0.3	-3.0	
AEO2022																														-0.9	
Average absolute percentage 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	33.6	21.8		

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>, series: TOTAL.TETCEUS.A; projections: Annual Energy Outlook, Reference case projections from various editions

Notes: shading indicates overestimation (blue) or underestimation (green).

Table 29. Energy intensity, projected versus 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	2020	2021
	AEO1994	9.9	9.7	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	8.1	8.1										
AEO1995		9.6	9.5	9.3	9.2	9.0	8.9	8.8	8.7	8.6	8.5	8.4	8.3	8.2	8.1	8.0	7.9	7.9											
AEO1996			9.4	9.3	9.2	9.0	8.9	8.8	8.6	8.5	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						
AEO1997				9.1	9.0	8.9	8.8	8.7	8.6	8.5	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						
AEO1998					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	7.5	7.4	7.4	7.3
AEO1999						8.5	8.5	8.5	8.5	8.4	8.3	8.1	8.0	7.9	7.8	7.7	7.6	7.5	7.4	7.4	7.3	7.3	7.2	7.1	7.1	7.0	6.9	6.9	6.9
AEO2000							8.3	8.3	8.2	8.1	8.0	7.9	7.8	7.7	7.7	7.6	7.5	7.4	7.4	7.3	7.2	7.1	7.0	6.9	6.9	6.9	6.8	6.7	6.7
AEO2001								7.6	7.5	7.4	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	5.6	5.6
AEO2002									7.7	7.8	7.7	7.7	7.5	7.4	7.3	7.2	7.0	6.8	6.7	6.6	6.5	6.4	6.3	6.1	6.0	5.9	5.8	5.8	5.8
AEO2003										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	5.8	5.8	5.7
AEO2004											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	5.8	5.7
AEO2005												7.2	7.1	7.0	6.9	6.8	6.7	6.6	6.5	6.4	6.3	6.2	6.0	5.9	5.8	5.7	5.6	5.5	5.4
AEO2006													7.0	6.9	6.8	6.6	6.5	6.4	6.3	6.2	6.1	6.0	5.9	5.8	5.6	5.5	5.4	5.3	5.3
AEO2007														6.9	6.8	6.7	6.6	6.5	6.3	6.3	6.2	6.1	5.9	5.8	5.7	5.6	5.5	5.4	5.3
AEO2008															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	5.4	5.3
AEO2009																6.7	6.7	6.6	6.5	6.3	6.2	6.0	5.9	5.8	5.6	5.5	5.4	5.3	5.2
AEO2010																	6.6	6.6	6.5	6.3	6.2	6.1	5.9	5.8	5.7	5.5	5.4	5.3	5.2
AEO2011																		6.4	6.3	6.2	6.0	5.9	5.8	5.7	5.6	5.4	5.4	5.3	5.1
AEO2012																			6.4	6.3	6.1	5.9	5.7	5.6	5.5	5.4	5.3	5.2	5.1
AEO2013																				6.2	6.1	5.9	5.8	5.7	5.5	5.4	5.3	5.2	5.1
AEO2014																					6.1	5.9	5.8	5.7	5.6	5.5	5.3	5.2	5.2
AEO2015																						5.8	5.6	5.5	5.4	5.3	5.2	5.1	5.0
AEO2016																							5.6	5.6	5.5	5.3	5.2	5.2	5.1
AEO2017																								5.5	5.4	5.4	5.3	5.2	5.1
AEO2018																									5.4	5.4	5.3	5.2	5.1
AEO2019																										5.4	5.3	5.1	5.1
AEO2020																											5.2	5.1	5.1
AEO2021																												5.1	5.1
AEO2022																													5.0
Actual*	8.8	8.6	8.6	8.5	8.2	7.9	7.7	7.5	7.3	7.2	7.1	7.0	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	5.1	5.0
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	0.5	0.2

Table 29. Energy intensity, projected versus actual (continued)

Projected versus actual (percentage 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	2020	2021
AEO1994	12.8	13.4	12.9	11.8	14.4	17.5	19.4	20.1	23.1	21.8	23.4	24.1	26.8	29.8	28.7	30.3	31.9	29.6											
AEO1995		11.1	10.5	9.5	11.7	14.7	16.5	17.1	19.9	18.6	19.9	20.3	22.9	25.9	25.2	26.8	28.6	26.4											
AEO1996			10.1	9.4	11.9	14.6	16.3	16.6	19.2	18.0	19.8	20.5	23.2	26.2	25.3	27.1	28.8	26.7	28.4	33.9	31.5	31.4	34.9						
AEO1997				6.3	9.7	13.4	15.5	16.0	18.9	18.1	19.8	20.6	23.2	26.2	25.3	26.9	28.6	26.3	27.9	33.1	30.6	30.6	34.2						
AEO1998					8.4	12.5	15.7	16.7	20.2	19.4	21.1	21.6	24.4	27.7	26.9	28.5	30.2	27.9	29.4	34.5	31.8	31.9	35.5	36.6	38.2	36.4	39.5	44.3	
AEO1999						7.4	11.6	13.3	17.1	16.0	17.2	17.2	19.4	21.9	20.7	21.9	23.1	20.4	21.9	26.7	24.5	24.7	27.9	28.9	30.5	28.8	31.6	36.2	
AEO2000							8.1	9.9	12.6	11.9	13.5	13.8	16.2	19.3	18.5	20.0	21.5	19.0	20.5	25.2	22.5	22.1	25.2	25.9	27.2	25.2	27.7	31.8	
AEO2001								1.6	3.9	2.9	4.2	4.4	6.2	8.2	7.0	7.5	8.1	5.3	5.7	8.8	5.9	5.1	7.3	7.3	7.9	5.8	7.7	10.9	
AEO2002									6.4	7.2	9.6	10.1	12.3	14.7	13.2	13.1	13.1	9.8	9.9	13.4	10.5	9.7	11.6	11.4	11.7	9.3	11.0	14.2	
AEO2003										4.4	6.2	6.2	8.2	10.8	9.8	10.4	11.0	8.0	8.6	12.1	9.3	8.6	10.9	11.1	11.6	9.3	11.0	14.1	13.6
AEO2004											5.2	5.2	7.4	9.6	8.3	8.9	9.5	7.2	8.1	11.8	9.0	8.2	10.4	10.6	11.1	8.9	10.9	14.0	13.5
AEO2005												3.4	5.3	7.5	6.4	7.9	8.8	6.0	6.7	10.1	7.0	6.0	7.8	7.7	8.1	5.6	7.0	9.6	8.7
AEO2006													4.5	5.5	4.8	5.0	5.6	3.1	3.6	7.2	4.3	3.2	5.0	4.6	4.5	1.9	3.2	5.8	5.0
AEO2007														5.9	5.3	5.9	6.4	3.8	4.1	7.6	4.8	4.1	5.9	5.7	5.5	3.0	4.2	6.5	5.4
AEO2008															5.6	7.2	6.6	3.4	3.6	6.7	3.6	2.8	4.7	4.6	5.0	2.7	4.0	6.7	6.1
AEO2009																5.9	8.8	6.4	6.5	9.2	5.5	4.0	5.2	4.6	4.4	1.5	2.3	4.5	3.4
AEO2010																	6.2	5.2	5.9	8.8	5.5	4.7	6.0	5.3	5.1	2.1	2.9	4.7	3.5
AEO2011																		3.3	3.9	6.1	2.5	1.6	3.4	2.9	2.8	0.3	1.5	3.9	2.6
AEO2012																			5.4	8.7	3.9	1.9	2.3	1.3	1.0	-1.3	-0.1	2.3	1.3
AEO2013																				5.9	3.6	2.0	3.5	2.7	2.6	0.1	1.3	3.3	2.2
AEO2014																					3.4	1.8	3.4	2.7	2.8	0.3	1.4	3.7	2.9
AEO2015																						0.3	0.1	0.2	0.2	-2.3	-1.0	0.8	-0.5
AEO2016																							0.5	1.0	1.1	-2.1	-0.8	1.9	1.4
AEO2017																								-0.2	0.0	-1.5	0.7	2.7	1.3
AEO2018																									0.2	-1.1	0.5	2.8	1.6
AEO2019																										-0.4	-0.1	1.8	1.0
AEO2020																											-0.5	1.4	1.2
AEO2021																												1.1	1.3
AEO2022																													-0.4
Average absolute percentage difference	12.8	12.2	11.1	9.3	11.2	13.4	14.7	13.9	15.7	13.8	14.5	13.9	15.4	17.1	15.4	15.8	16.3	13.2	11.8	15.0	11.6	10.2	11.7	8.8	8.6	6.8	7.4	9.5	3.8

Data source: Historical data are from the U.S. Energy Information Administration open data API (accessed April 2022), <http://www.eia.gov/opendata/>; series: TOTAL.TETCBUS A; projections: Annual Energy Outlook, Reference case projections from various editions

GDP data from the U.S. Bureau of Economic Analysis (accessed February 2022), <https://apps.bea.gov/national/xls/gdplev.xlsx>

Notes: shading indicates overestimation (blue) or underestimation (green).

* Actual energy intensity is based on BEA data using 2012 chained dollars.