

Annual Energy Outlook Forecast Evaluation

by
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In this paper, the Office of Integrated Analysis and Forecasting (OIAF) of the Energy Information Administration (EIA) evaluates the projections published in the Annual Energy Outlook (AEO),¹ by comparing the projections from the Annual Energy Outlook 1982 through the Annual Energy Outlook 2000 with actual historical values. A set of major consumption, production, net import, price, economic, and emissions variables are included in the evaluation, updating similar papers from previous years. These evaluations also present the reasons and rationales for significant differences.

OIAF has been providing an evaluation of the forecasts in the *Annual Energy Outlook (AEO)* annually since 1996. Each year, the forecast evaluation expands on that of the prior year by adding the most recent *AEO* and the most recent historical year of data. However, the underlying reasons for deviations between the projections and realized history tend to be the same from one evaluation to the next. The most significant conclusions are:

- Natural gas has generally been the fuel with the least accurate forecasts of consumption, production, and prices. Natural gas was the last fossil fuel to be deregulated following the strong regulation of energy markets in the 1970s and early 1980s. Even after deregulation, the behavior of natural gas in competitive markets has been difficult to predict.
- Energy prices have been far more difficult to predict than consumption, production, and net imports, and prices have been more typically overestimated than underestimated. More rapid technological improvements, the erosion of the market power of the Organization of Petroleum Exporting Countries in the mid-1980s, excess productive capacity, and market competitiveness are all factors that led to lower energy prices than projected. In the 1980s and 1990s, productivity and technology improvements and the effects of gradual deregulation and changes in industry structure have more than offset the factors that have tended to raise energy prices, such as resource depletion and increasing energy demand.
- Over the last two decades, there have been many significant changes in laws, policies, and regulations that could not have been anticipated or assumed in the projections. These include the National Appliance and Energy Conservation Act of 1987, the Natural Gas Wellhead Decontrol Act of 1989, the Clean Air Act Amendments of 1990, the ozone transport rule, the Energy Policy Act of 1992, the repeal of the Power Plant and Industrial Fuel Use Act of 1978, the North American Free Trade Agreement, the Omnibus Budget Reconciliation Act of 1993, the Outer Continental Shelf Deep Water Royalty Relief Act of 1995, the Tax Payer Relief Act of 1997, the Climate Change Action Plan developed by

¹Energy Information Administration, *Annual Energy Outlook 2000*, DOE/EIA-0383(2000)(Washington, DC, December 1999), www.eia.doe.gov/oiaf/aeo/index.html, is the most recent *AEO*.

the Clinton Administration in 1993 to achieve stabilization of greenhouse gas emissions, various orders issued by the Federal Energy Regulatory Commission on natural gas restructuring and open access to interstate electricity transmission lines, and various state initiatives for the restructuring of electricity markets. These actions have had significant impacts on energy supply, demand, and prices; however, the impacts were not incorporated in the *AEO* projections until their enactment or effective dates in accordance with the mandate that EIA remain policy neutral and the practice that *AEO* projections include only current laws and regulations.

- External factors such as severe weather, economic cycles, and strikes have also had an impact on energy markets; however, these events cannot be anticipated in the mid to long-term period and are not captured in the models underlying the *AEO* projections.
- Technological improvements in both the production and use of energy have had a significant impact on the price, supply, and consumption of energy. For the most part, earlier *AEOs* assumed much slower technology development than actually occurred, accounting for some of the deviation between the forecasts and history. This trend was recognized, in part, by this type of forecast evaluation exercise. Beginning with the *Annual Energy Outlook 1994*, the projections in the *AEO* were produced using the National Energy Modeling System (NEMS). Because NEMS was designed with methodologies to represent technology in a more detailed fashion, there has been an improvement in the capability to represent technological change throughout energy markets. Additional studies on technological improvement have led to more optimistic assumptions in the more recent projections, along with modeling innovations, such as learning-by-doing, in which experience gained with new generation technologies leads to cost reductions in the model. These enhancements have significantly improved the projection capability within NEMS.

Because the underlying reasons for differences between the projections and realized history do not generally change from one year to the next, the text of last year's analysis was not updated this year. The 1999 forecast evaluation with the complete narrative is available at www.eia.doe.gov/oiaf/issues/forecast.html.

The last column of Table 1 provides a summary of the average absolute forecast errors for each of the major variables included in this analysis, which are shown in more detail in Tables 2 through 18. The average absolute forecast error is computed as the mean, or average, of all the absolute values of the percentage errors, expressed as percentage differences of the reference case projection from actual, shown for each *AEO*, for each year in the forecast, for a given variable. Table 1 also shows the same summary of forecast errors from the four previous evaluations. As indicated in Table 1, the forecasts of consumption, carbon dioxide emissions, production, and gross domestic product have generally been the most accurate, and the forecasts of prices the least accurate. The percent errors change from one year's evaluation to the next as an additional year of data and projections is added.

Table 1. Average Absolute Percent Errors from AEO Forecast Evaluations: 1996 to 2000

	Average Absolute Percent Error	Average Absolute Percent Error	Average Absolute Percent Error	Average Absolute Percent Error	Average Absolute Percent Error
Variable	1996 Evaluation: AEO82 to AEO93	1997 Evaluation: AEO82 to AEO97	1998 Evaluation: AEO82 to AEO98	1999 Evaluation: AEO82 to AEO99	2000 Evaluation: AEO82 to AEO2000
Consumption					
Total Energy Consumption	1.8	1.6	1.7	1.7	1.8
Total Petroleum Consumption	3.2	2.8	2.9	2.8	2.9
Total Natural Gas Consumption	6.0	5.8	5.7	5.6	5.6
Total Coal Consumption	2.9	2.7	3.0	3.2	3.3
Total Electricity Sales	1.8	1.6	1.7	1.8	2.0
Production					
Crude Oil Production	5.1	4.2	4.3	4.5	4.5
Natural Gas Production	5.4	5.0	4.8	4.7	4.6
Coal Production	3.8	3.7	3.6	3.6	3.5
Imports and Exports					
Net Petroleum Imports	12.0	10.1	9.5	8.8	8.4
Net Natural Gas Imports	20.0	17.4	16.7	16.0	15.9
Net Coal Exports	17.1	22.1	22.8	24.5	31.9
Prices, Economic Growth, and Emissions					
World Oil Prices	82.2	53.1	51.3	56.7	55.7
Natural Gas Wellhead Prices	120.4	76.0	72.1	70.2	68.2
Coal Prices to Electric Utilities	47.1	34.8	35.3	35.9	36.6
Average Electricity Prices	11.0	11.0	11.0	11.1	11.8
Gross Domestic Product	5.4	5.0	5.0	5.0	5.7
Carbon Dioxide Emissions					1.8

AEO = Annual Energy Outlook.

Source: Tables 2 through 18

Notes: Since total electricity sales for 1999 are not available at the time of publication, the evaluation of electricity sales extends only through 1998 and the *Annual Energy Outlook 1999*. Projections of carbon dioxide emissions began in the *Annual Energy Outlook 1993* and are first evaluated this year.

For the most part, the percent errors remain similar or improve over time; however, the errors for net coal exports have increased significantly. Between 1998 and 1999, a sharp decline in coal exports coupled with a slight increase in imports resulted in a decline in net coal exports from 69 to 49 million short tons. Gross coal exports declined by 25 percent in 1999, due in part to lower world coal prices, reflecting lower mine costs at U.S. competitors, including productivity improvements in Australia, and favorable exchange rates that enabled them to lower their prices in U.S. dollars. In addition, there are increased competitive pressures on coal from natural gas in Europe. U.S. coal imports increased by 4 percent in 1999 as result of low prices for offshore coal and increased demand for low-sulfur coal to prepare for the stricter sulfur emission requirements of Phase II of the Clean Air Act Amendments of 1990.

The gross domestic product (GDP), shown in Table 17, has just undergone a change in definition by the Bureau of Economic Analysis. In the revised GDP series, computer software is now included as a component of investment, rather than an intermediate input to production. In addition, there have been statistical changes that update the national product and income accounts to reflect new and improved methodologies and newly available and revised source data. These changes are reflected in the revised set of actual values in Table 17 and cause the percent error in Table 1 to be larger in the 2000 forecast evaluation than in previous evaluations.

This year, the forecast evaluation includes carbon dioxide emissions for the first time, which are shown in Table 18. The series of carbon dioxide emissions projections begins with the *Annual Energy Outlook 1993*. Although carbon dioxide emissions and total energy consumption are evaluated over a different time period, the average absolute percent errors for both variables are 1.8 percent. The general pattern of errors in the carbon dioxide emissions estimates is similar to that for the energy consumption estimates. Carbon dioxide emissions and consumption were generally underestimated in the *Annual Energy Outlook 1996* and earlier. Total energy consumption grew very slowly in both 1997 and 1998, resulting in more recent overestimations of both energy consumption and carbon dioxide emissions. In the case of emissions, the largest percent error is the 3-percent overestimate of 1999 emissions in the *Annual Energy Outlook 1998*.

Table 2. Total Energy Consumption: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
	(Quadrillion Btu)															
AEO82	79.1	79.6	79.9	80.8	82.0	83.3										1.8
AEO83	78.0	79.5	81.0	82.4	83.8	84.6					89.5					1.2
AEO84	78.5	79.4	81.2	83.1	85.0	86.4					93.5					1.5
AEO85	77.6	78.5	79.8	81.2	82.6	83.3	84.2	85.2	85.9	86.7	87.7					1.3
AEO86		77.0	78.8	79.8	80.6	81.5	82.9	84.0	84.8	85.7	86.5	87.9	88.4	87.8	88.7	3.6
AEO87			78.9	80.0	81.9	82.8	83.9	85.3	86.4	87.5	88.4					1.5
AEO89				82.2	83.7	84.5	85.4	86.4	87.3	88.2	89.2	90.8	91.4	90.9	91.7	1.8
AEO90					84.2	85.4					91.9					0.9
AEO91						84.4	85.0	86.0	87.0	87.9	89.0	90.4	91.8	93.1	94.3	1.5
AEO92							84.7	87.0	88.0	89.2	90.5	91.4	92.4	93.4	94.5	1.2
AEO93								87.0	88.3	89.8	91.4	92.7	94.0	95.3	96.3	0.8
AEO94									88.0	89.5	90.7	91.7	92.7	93.6	94.6	1.1
AEO95										89.2	90.0	90.6	91.9	93.0	93.8	1.8
AEO96											90.6	91.3	92.5	93.5	94.3	1.6
AEO97												92.6	93.6	95.1	96.6	0.6
AEO98													94.7	96.7	98.6	1.5
AEO99														94.6	97.0	0.2
AEO00															96.4	0.2
Actual Value	76.8	77.1	79.6	83.1	84.6	84.2	84.1	85.5	87.3	89.2	90.9	93.9	94.3	94.6	96.6	
Average Absolute Error	1.5	1.8	0.8	1.7	1.7	1.1	0.7	0.9	0.9	1.2	1.6	2.9	2.0	1.8	2.3	1.6
	(Percent Error)															
AEO82	3.0	3.3	0.3	-2.7	-3.1	-1.1										2.2
AEO83	1.5	3.2	1.7	-0.8	-0.9	0.5					-1.6					1.5
AEO84	2.2	3.0	2.0	0.0	0.5	2.6					2.8					1.9
AEO85	1.0	1.9	0.2	-2.3	-2.4	-1.1	0.2	-0.4	-1.6	-2.8	-3.6					1.6
AEO86		-0.1	-1.0	-3.9	-4.7	-3.2	-1.4	-1.8	-2.9	-4.0	-4.9	-6.4	-6.3	-7.2	-8.2	4.0
AEO87			-0.9	-3.7	-3.2	-1.7	-0.2	-0.2	-1.0	-1.9	-2.8					1.7
AEO89				-1.0	-1.1	0.4	1.6	1.0	-0.0	-1.2	-1.9	-3.3	-3.1	-3.9	-5.1	2.0
AEO90					-0.5	1.4					1.1					1.0
AEO91						0.2	1.1	0.6	-0.4	-1.5	-2.1	-3.7	-2.7	-1.6	-2.4	1.6
AEO92							0.8	1.8	0.7	-0.1	-0.5	-2.6	-2.0	-1.2	-2.2	1.3
AEO93								1.8	1.1	0.7	0.5	-1.3	-0.3	0.7	-0.3	0.8
AEO94									0.8	0.3	-0.2	-2.3	-1.7	-1.0	-2.1	1.2
AEO95										-0.0	-1.1	-3.6	-2.6	-1.7	-2.9	2.0
AEO96											-0.4	-2.8	-1.9	-1.2	-2.4	1.7
AEO97												-1.4	-0.8	0.6	-0.0	0.7
AEO98													0.4	2.3	2.1	1.6
AEO99														0.1	0.4	0.2
AEO00															-0.2	0.2
Average Absolute Percent Error	1.9	2.3	1.0	2.1	2.0	1.3	0.9	1.1	1.1	1.4	1.8	3.0	2.2	1.9	2.4	1.8

AEO = Annual Energy Outlook.

Btu = British thermal unit.

Note: Includes nonelectric renewables.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 3. Total Petroleum Consumption: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Million Barrels per Day)																
AEO82	18.00	17.89	17.55	17.24	16.98	16.99										0.86
AEO83	15.82	16.13	16.37	16.50	16.56	16.63					17.37					0.40
AEO84	15.77	15.76	16.01	16.27	16.48	16.74					18.00					0.52
AEO85	15.72	15.74	15.97	16.01	16.06	16.08	16.18	16.23	16.32	16.36	16.53					0.86
AEO86		16.07	16.29	16.05	16.07	16.15	16.31	16.37	16.42	16.44	16.46	16.50	16.64	16.80	17.21	1.17
AEO87			16.52	16.66	16.96	17.06	17.29	17.56	17.73	17.76	17.72					0.32
AEO89				17.01	17.20	17.44	17.57	17.72	17.76	17.78	17.82	18.05	18.12	18.19	18.40	0.46
AEO90					17.24	17.41					18.21					0.33
AEO91						16.95	16.65	16.83	17.01	17.17	17.34	17.53	17.83	18.09	18.33	0.49
AEO92							16.74	17.07	17.37	17.59	17.80	17.86	17.99	18.14	18.26	0.38
AEO93								17.07	17.45	17.79	18.15	18.26	18.60	18.88	19.07	0.15
AEO94									17.67	17.99	18.20	18.42	18.66	18.85	19.06	0.25
AEO95										17.53	17.93	17.96	18.29	18.48	18.69	0.37
AEO96											17.78	17.88	18.10	18.38	18.58	0.47
AEO97												18.18	18.34	18.70	19.05	0.24
AEO98													18.89	18.92	19.36	0.10
AEO99														18.86	19.2	0.13
AEO00															19.33	0.06
Actual Value	15.73	16.28	16.67	17.28	17.33	16.99	16.71	17.03	17.24	17.72	17.72	18.31	18.62	18.92	19.39	
Average Absolute Error	0.60	0.61	0.51	0.75	0.64	0.37	0.41	0.42	0.47	0.44	0.41	0.49	0.54	0.53	0.68	0.52
(Percent Error)																
AEO82	14.4	9.9	5.3	-0.2	-2.0	0.0										5.3
AEO83	0.6	-0.9	-1.8	-4.5	-4.4	-2.1					-2.0					2.3
AEO84	0.3	-3.2	-4.0	-5.8	-4.9	-1.5					1.6					3.0
AEO85	-0.1	-3.3	-4.2	-7.3	-7.3	-5.4	-3.2	-4.7	-5.3	-7.7	-6.7					5.0
AEO86		-1.3	-2.3	-7.1	-7.3	-4.9	-2.4	-3.9	-4.8	-7.2	-7.1	-9.9	-10.6	-11.2	-11.2	6.5
AEO87			-0.9	-3.6	-2.1	0.4	3.5	3.1	2.8	0.2	0.0					1.9
AEO89				-1.6	-0.8	2.6	5.1	4.1	3.0	0.3	0.6	-1.4	-2.7	-3.9	-5.1	2.6
AEO90					-0.5	2.5					2.8					1.9
AEO91						-0.2	-0.4	-1.2	-1.3	-3.1	-2.1	-4.3	-4.2	-4.4	-5.5	2.7
AEO92							0.2	0.2	0.8	-0.7	0.5	-2.5	-3.4	-4.1	-5.8	2.0
AEO93								0.2	1.2	0.4	2.4	-0.3	-0.1	-0.2	-1.7	0.8
AEO94									2.5	1.5	2.7	0.6	0.2	-0.4	-1.7	1.4
AEO95										-1.1	1.2	-1.9	-1.8	-2.3	-3.6	2.0
AEO96											0.3	-2.3	-2.8	-2.9	-4.2	2.5
AEO97												-0.7	-1.5	-1.2	-1.8	1.3
AEO98													1.5	0.0	-0.2	0.5
AEO99														-0.3	-1.0	0.6
AEO00															-0.3	0.3
Average Absolute Percent Error	3.8	3.7	3.1	4.3	3.7	2.2	2.5	2.5	2.7	2.5	2.3	2.7	2.9	2.8	3.5	2.9

AEO = Annual Energy Outlook.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 4. Total Natural Gas Consumption: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Trillion Cubic Feet)																
AEO82	15.93	15.72	15.72	16.08	16.59	17.08										1.52
AEO83	17.75	17.63	17.57	17.75	17.76	17.77					16.95					1.31
AEO84	18.22	18.07	18.33	18.61	18.73	18.76					18.75					1.06
AEO85	17.79	17.80	17.89	18.30	18.58	18.71	18.79	18.88	18.82	18.82	18.81					0.94
AEO86		16.52	16.83	17.35	17.27	17.50	17.77	17.77	17.90	18.01	18.04	18.03	18.26	18.34	18.04	2.12
AEO87			16.85	16.93	17.24	17.27	17.34	17.43	17.66	18.02	18.31					1.87
AEO89				17.75	17.95	17.94	18.08	18.10	18.34	18.68	18.94	19.17	19.55	19.86	19.98	1.58
AEO90					18.34	18.66					20.69					0.47
AEO91						18.53	19.21	19.34	19.56	19.76	20.01	20.21	20.66	20.93	21.23	0.74
AEO92							18.79	19.36	19.84	20.08	20.53	20.68	21.12	21.42	21.66	0.56
AEO93								20.27	20.17	20.54	20.97	21.54	21.83	22.20	22.57	0.53
AEO94									19.87	20.21	20.64	20.99	21.20	21.42	21.60	0.56
AEO95										20.82	20.66	20.85	21.21	21.65	21.95	0.63
AEO96											21.32	21.64	22.11	22.21	22.26	0.50
AEO97												22.15	22.75	23.24	23.64	1.29
AEO98													21.84	23.03	23.84	1.43
AEO99														21.35	22.36	0.51
AEO00															21.46	0.03
Actual Value	17.28	16.22	17.21	18.03	18.80	18.72	19.04	19.54	20.28	20.71	21.58	21.97	21.96	21.26	21.43	
Average Absolute Error	0.82	1.13	0.73	0.73	0.99	0.70	0.77	1.01	1.26	1.30	1.99	1.43	1.10	1.01	1.13	1.13
(Percent Error)																
AEO82	-7.8	-3.1	-8.7	-10.8	-11.8	-8.8										8.5
AEO83	2.7	8.7	2.1	-1.6	-5.5	-5.1					-21.5					6.7
AEO84	5.4	11.4	6.5	3.2	-0.4	0.2					-13.1					5.8
AEO85	3.0	9.7	4.0	1.5	-1.2	-0.1	-1.3	-3.4	-7.2	-9.1	-12.8					4.8
AEO86		1.8	-2.2	-3.8	-8.1	-6.5	-6.7	-9.1	-11.7	-13.0	-16.4	-17.9	-16.8	-13.7	-15.8	10.3
AEO87			-2.1	-6.1	-8.3	-7.7	-8.9	-10.8	-12.9	-13.0	-15.2					9.4
AEO89				-1.6	-4.5	-4.2	-5.0	-7.4	-9.6	-9.8	-12.2	-12.7	-11.0	-6.6	-6.8	7.6
AEO90					-2.4	-0.3					-4.1					2.3
AEO91						-1.0	0.9	-1.0	-3.6	-4.6	-7.3	-8.0	-5.9	-1.6	-0.9	3.5
AEO92							-1.3	-0.9	-2.2	-3.0	-4.9	-5.9	-3.8	0.8	1.1	2.6
AEO93								3.7	-0.5	-0.8	-2.8	-2.0	-0.6	4.4	5.3	2.5
AEO94									-2.0	-2.4	-4.4	-4.5	-3.5	0.8	0.8	2.6
AEO95										0.5	-4.3	-5.1	-3.4	1.8	2.4	2.9
AEO96											-1.2	-1.5	0.7	4.5	3.9	2.3
AEO97												0.8	3.6	9.3	10.3	6.0
AEO98													-0.5	8.3	11.2	6.7
AEO99														0.4	4.3	2.4
AEO00															0.1	0.1
Average Absolute Percent	4.7	7.0	4.3	4.1	5.3	3.8	4.0	5.2	6.2	6.3	9.2	6.5	5.0	4.7	5.3	5.6

AEO = Annual Energy Outlook.

Note: AEO82 projections given in Btu were converted to trillion cubic feet using a conversion factor of 1.03.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 5. Total Coal Consumption: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Million Short Tons)																
AEO82	805	825	843	868	896	936										17
AEO83	807	831	848	870	899	928					1061					29
AEO84	843	848	866	889	919	958					1110					49
AEO85	818	833	842	853	867	891	918	943	970	989	1008					24
AEO86		813	831	860	870	888	919	945	972	995	1021	1038	1051	1069	1083	28
AEO87			837	837	854	879	896	912	932	954	975					15
AEO89				872	882	894	903	927	947	965	987	990	1006	1026	1045	12
AEO90					884	893					984					10
AEO91						893	902	918	932	943	948	962	973	984	991	27
AEO92							905	934	919	925	934	944	953	961	971	46
AEO93								929	931	940	947	958	965	970	972	40
AEO94									920	928	933	938	943	948	953	59
AEO95										935	940	941	947	948	951	62
AEO96											937	942	954	962	983	61
AEO97												948	970	987	1003	53
AEO98													1009	1051	1044	11
AEO99														1040	1075	15
AEO00															1053	8
Actual Value	818	804	837	884	890	896	888	908	944	952	962	1006	1029	1040	1045	
Average Absolute Error	12	26	10	21	17	19	19	22	18	20	42	51	56	52	47	32
(Percent Error)																
AEO82	-1.6	2.6	0.7	-1.8	0.7	4.5										2.0
AEO83	-1.3	3.4	1.3	-1.6	1.0	3.6					10.3					3.2
AEO84	3.1	5.5	3.5	0.6	3.3	6.9					15.4					5.4
AEO85	0.0	3.6	0.6	-3.5	-2.6	-0.6	3.4	3.9	2.8	3.9	4.8					2.7
AEO86		1.1	-0.7	-2.7	-2.2	-0.9	3.5	4.1	3.0	4.5	6.1	3.2	2.1	2.8	3.6	2.9
AEO87			0.0	-5.3	-4.0	-1.9	0.9	0.4	-1.3	0.2	1.4					1.7
AEO89				-1.4	-0.9	-0.2	1.7	2.1	0.3	1.4	2.6	-1.6	-2.2	-1.3	0.0	1.3
AEO90					-0.7	-0.3					2.3					1.1
AEO91						-0.3	1.6	1.1	-1.3	-0.9	-1.5	-4.4	-5.4	-5.4	-5.2	2.7
AEO92							1.9	2.9	-2.6	-2.8	-2.9	-6.2	-7.4	-7.6	-7.1	4.6
AEO93								2.3	-1.4	-1.3	-1.6	-4.8	-6.2	-6.7	-7.0	3.9
AEO94									-2.5	-2.5	-3.0	-6.8	-8.4	-8.8	-8.8	5.8
AEO95										-1.8	-2.3	-6.5	-8.0	-8.8	-9.0	6.1
AEO96											-2.6	-6.4	-7.3	-7.5	-5.9	5.9
AEO97												-5.8	-5.7	-5.1	-4.0	5.2
AEO98													-1.9	1.1	-0.1	1.0
AEO99														0.0	2.9	1.4
AEO00															0.8	0.8
Average Absolute Percent	1.5	3.2	1.1	2.4	1.9	2.1	2.2	2.4	1.9	2.1	4.4	5.0	5.5	5.0	4.5	3.3

AEO = Annual Energy Outlook.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 6. Total Electricity Sales: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1998

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Average Absolute Error
(Billion Kilowatthours)															
AEO82	2364	2454	2534	2626	2708	2811									62
AEO83	2318	2395	2476	2565	2650	2739					3153				30
AEO84	2321	2376	2461	2551	2637	2738					3182				32
AEO85	2317	2360	2427	2491	2570	2651	2730	2808	2879	2949	3026				36
AEO86		2363	2416	2479	2533	2608	2706	2798	2883	2966	3048	3116	3185	3255	44
AEO87			2460	2494	2555	2622	2683	2748	2823	2902	2977				65
AEO89				2556	2619	2689	2760	2835	2917	2994	3072	3156	3236	3313	44
AEO90					2612	2689					3083				50
AEO91						2700	2762	2806	2855	2904	2959	3022	3088	3151	55
AEO92							2746	2845	2858	2913	2975	3030	3087	3146	60
AEO93								2803	2840	2893	2946	2998	3052	3104	84
AEO94									2843	2891	2928	2962	3004	3039	121
AEO95										2951	2967	2983	3026	3058	107
AEO96											2973	2998	3039	3074	120
AEO97												3075	3115	3168	59
AEO98													3106	3204	57
AEO99														3205	61
Actual Value	2324	2369	2457	2578	2665	2733	2773	2774	2877	2953	3029	3112	3158	3266	
Average Absolute Error	14	27	29	54	65	59	42	40	27	36	67	85	85	118	59
(Percent Error)															
AEO82	1.7	3.6	3.1	1.9	1.6	2.9									2.5
AEO83	-0.3	1.1	0.8	-0.5	-0.6	0.2					4.1				1.1
AEO84	-0.1	0.3	0.2	-1.0	-1.1	0.2					5.1				1.1
AEO85	-0.3	-0.4	-1.2	-3.4	-3.6	-3.0	-1.6	1.2	0.1	-0.1	-0.1				1.4
AEO86		-0.3	-1.7	-3.8	-5.0	-4.6	-2.4	0.9	0.2	0.4	0.6	0.1	0.9	-0.3	1.6
AEO87			0.1	-3.3	-4.1	-4.1	-3.2	-0.9	-1.9	-1.7	-1.7				2.3
AEO89				-0.9	-1.7	-1.6	-0.5	2.2	1.4	1.4	1.4	1.4	2.5	1.4	1.5
AEO90					-2.0	-1.6					1.8				1.8
AEO91						-1.2	-0.4	1.2	-0.8	-1.7	-2.3	-2.9	-2.2	-3.5	1.8
AEO92							-1.0	2.6	-0.7	-1.4	-1.8	-2.6	-2.2	-3.7	2.0
AEO93								1.0	-1.3	-2.0	-2.7	-3.7	-3.4	-5.0	2.7
AEO94									-1.2	-2.1	-3.3	-4.8	-4.9	-7.0	3.9
AEO95										-0.1	-2.0	-4.1	-4.2	-6.4	3.4
AEO96											-1.8	-3.7	-3.8	-5.9	3.8
AEO97												-1.2	-1.4	-3.0	1.9
AEO98													-1.6	-1.9	1.8
AEO99														-1.9	1.9
Average Absolute Percent	0.6	1.1	1.2	2.1	2.4	2.1	1.5	1.4	0.9	1.2	2.2	2.7	2.7	3.6	2.0

AEO = Annual Energy Outlook.

Note: Since total electricity sales for 1999 are not available at the time of publication, this table extends only through 1998.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-99) (Washington, DC, April 1983 - December 1998).

Table 7. Crude Oil Production: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Million Barrels per Day)																
AEO82	8.79	8.85	8.84	8.80	8.66	8.21										0.57
AEO83	8.67	8.71	8.66	8.72	8.80	8.63					8.11					0.75
AEO84	8.86	8.70	8.59	8.45	8.28	8.25					7.19					0.41
AEO85	8.92	8.96	9.01	8.78	8.38	8.05	7.64	7.27	6.89	6.68	6.53					0.32
AEO86		8.80	8.63	8.30	7.90	7.43	6.95	6.60	6.36	6.20	5.99	5.80	5.66	5.54	5.45	0.44
AEO87			8.31	8.18	8.00	7.63	7.34	7.09	6.86	6.64	6.54					0.11
AEO89				8.18	7.97	7.64	7.25	6.87	6.59	6.37	6.17	6.05	6.00	5.94	5.90	0.27
AEO90					7.67	7.37					6.40					0.08
AEO91						7.23	6.98	7.10	7.11	7.01	6.79	6.48	6.22	5.92	5.64	0.23
AEO92							7.37	7.17	6.99	6.89	6.68	6.45	6.28	6.16	6.06	0.10
AEO93								7.20	6.94	6.79	6.52	6.22	6.00	5.84	5.72	0.20
AEO94									6.87	6.50	6.18	5.92	5.72	5.54	5.35	0.45
AEO95										6.58	6.32	6.04	5.74	5.58	5.39	0.44
AEO96											6.54	6.33	6.16	5.95	5.79	0.18
AEO97												6.47	6.32	6.15	6.02	0.08
AEO98													6.41	6.39	6.28	0.18
AEO99														6.41	6.33	0.28
AEO00															6.01	0.08
Actual Value	8.97	8.68	8.35	8.14	7.61	7.36	7.42	7.17	6.85	6.66	6.56	6.46	6.45	6.25	5.93	
Average Absolute Error	0.16	0.12	0.34	0.35	0.59	0.50	0.24	0.16	0.17	0.19	0.34	0.27	0.40	0.36	0.28	0.31
(Percent Error)																
AEO82	-2.0	2.0	5.9	8.1	13.8	11.6										7.2
AEO83	-3.4	0.3	3.7	7.1	15.6	17.3					23.6					10.2
AEO84	-1.2	0.2	2.9	3.8	8.8	12.2					9.6					5.5
AEO85	-0.6	3.2	7.9	7.9	10.1	9.4	3.0	1.4	0.6	0.3	-0.5					4.1
AEO86		1.4	3.4	2.0	3.8	1.0	-6.3	-8.0	-7.1	-6.9	-8.7	-10.2	-12.2	-11.4	-8.1	6.5
AEO87			-0.5	0.5	5.1	3.7	-1.0	-1.1	0.2	-0.3	-0.3					1.4
AEO89				0.5	4.7	3.9	-2.3	-4.2	-3.8	-4.4	-5.9	-6.3	-7.0	-5.0	-0.5	4.0
AEO90					0.7	0.2					-2.4					1.1
AEO91						-1.7	-5.9	-1.0	3.8	5.2	3.5	0.3	-3.6	-5.3	-4.9	3.5
AEO92							-0.6	-0.0	2.1	3.4	1.8	-0.2	-2.6	-1.4	2.2	1.6
AEO93								0.4	1.4	1.9	-0.6	-3.7	-7.0	-6.6	-3.5	3.1
AEO94									0.3	-2.4	-5.8	-8.4	-11.3	-11.4	-9.8	7.1
AEO95										-1.2	-3.7	-6.5	-11.0	-10.7	-9.1	7.0
AEO96											-0.3	-2.0	-4.5	-4.8	-2.4	2.8
AEO97												0.2	-2.0	-1.6	1.5	1.3
AEO98													-0.6	2.2	5.9	2.9
AEO99														2.6	6.7	4.7
AEO00															1.3	1.3
Average Absolute Percent	1.8	1.4	4.0	4.3	7.8	6.8	3.2	2.3	2.4	2.9	5.1	4.2	6.2	5.7	4.7	4.5

AEO = Annual Energy Outlook.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 8. Natural Gas Production: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Trillion Cubic Feet)																
AEO82	14.74	14.26	14.33	14.89	15.39	15.88										1.98
AEO83	16.48	16.27	16.20	16.31	16.27	16.29					14.89					1.10
AEO84	17.48	17.10	17.44	17.58	17.52	17.32					16.39					0.90
AEO85	16.95	17.08	17.11	17.29	17.40	17.33	17.32	17.27	17.05	16.80	16.50					0.81
AEO86		16.30	16.27	17.15	16.68	16.90	16.97	16.87	16.93	16.86	16.62	16.40	16.33	16.57	16.23	1.33
AEO87			16.21	16.09	16.38	16.32	16.30	16.30	16.44	16.62	16.81					1.38
AEO89				16.71	16.71	16.94	17.01	16.83	17.09	17.35	17.54	17.67	17.98	18.20	18.25	0.85
AEO90					16.91	17.25				18.84						0.40
AEO91						17.40	17.48	18.11	18.22	18.15	18.22	18.39	18.82	19.03	19.28	0.35
AEO92							17.43	17.69	17.95	18.00	18.29	18.27	18.51	18.75	18.97	0.33
AEO93								18.47	18.05	18.16	18.45	18.90	19.07	19.30	19.60	0.40
AEO94									17.71	17.68	17.84	18.12	18.25	18.43	18.58	0.58
AEO95										18.28	17.98	17.92	18.21	18.63	18.92	0.51
AEO96											18.90	19.15	19.52	19.59	19.59	0.60
AEO97												19.10	19.70	20.17	20.32	1.03
AEO98													18.85	19.06	20.35	0.68
AEO99														18.8	19.13	0.25
AEO00															18.36	0.35
Actual Value	16.45	16.06	16.62	17.10	17.31	17.81	17.70	17.84	18.10	18.82	18.60	18.85	18.90	18.71	18.71	
Average Absolute Error	0.82	0.86	0.80	0.73	0.73	0.96	0.61	0.73	0.70	1.28	1.20	0.77	0.69	0.61	0.83	0.84
(Percent Error)																
AEO82	-10.4	-11.2	-13.8	-12.9	-11.1	-10.8										11.7
AEO83	0.2	1.3	-2.5	-4.6	-6.0	-8.5					-19.9					6.2
AEO84	6.3	6.5	4.9	2.8	1.2	-2.8					-11.9					5.2
AEO85	3.0	6.4	2.9	1.1	0.5	-2.7	-2.1	-3.2	-5.8	-10.7	-11.3					4.5
AEO86		1.5	-2.1	0.3	-3.6	-5.1	-4.1	-5.4	-6.5	-10.4	-10.6	-13.0	-13.6	-11.4	-13.3	7.2
AEO87			-2.5	-5.9	-5.4	-8.4	-7.9	-8.6	-9.2	-11.7	-9.6					7.7
AEO89				-2.3	-3.5	-4.9	-3.9	-5.7	-5.6	-7.8	-5.7	-6.3	-4.9	-2.7	-2.5	4.6
AEO90					-2.3	-3.1				1.3						2.2
AEO91						-2.3	-1.2	1.5	0.7	-3.6	-2.0	-2.4	-0.4	1.7	3.0	1.9
AEO92							-1.5	-0.8	-0.8	-4.4	-1.7	-3.1	-2.1	0.2	1.4	1.8
AEO93								3.5	-0.3	-3.5	-0.8	0.3	0.9	3.2	4.8	2.1
AEO94									-2.2	-6.1	-4.1	-3.9	-3.4	-1.5	-0.7	3.1
AEO95										-2.9	-3.3	-4.9	-3.7	-0.4	1.1	2.7
AEO96											1.6	1.6	3.3	4.7	4.7	3.2
AEO97												1.3	4.2	7.8	8.6	5.5
AEO98													-0.3	1.9	8.8	3.6
AEO99														0.5	2.2	1.4
AEO00															-1.9	1.9
Average Absolute Percent	5.0	5.4	4.8	4.3	4.2	5.4	3.5	4.1	3.9	6.8	6.5	4.1	3.7	3.3	4.4	4.6

AEO = Annual Energy Outlook.

Note: AEO82 projections given in Btu were converted to trillion cubic feet using a conversion factor of 1.03.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 9. Coal Production: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error	
	(Million Short Tons)																
AEO82	914	939	963	995	1031	1080										45	
AEO83	900	926	947	974	1010	1045					1191					44	
AEO84	899	921	948	974	1010	1057					1221					49	
AEO85	886	909	930	940	958	985	1015	1041	1072	1094	1116					40	
AEO86		890	920	954	962	983	1017	1044	1073	1097	1126	1142	1156	1176	1191	51	
AEO87			917	914	932	962	978	996	1020	1043	1068					33	
AEO89				941	946	977	990	1018	1039	1058	1082	1084	1107	1130	1152	33	
AEO90					973	987					1085					34	
AEO91						1035	1002	1016	1031	1043	1054	1065	1079	1096	1111	19	
AEO92							1004	1040	1019	1034	1052	1064	1074	1087	1102	21	
AEO93								1039	1043	1054	1065	1076	1086	1094	1102	29	
AEO94									999	1021	1041	1051	1056	1066	1073	29	
AEO95										1006	1010	1011	1016	1017	1021	60	
AEO96											1037	1044	1041	1045	1061	37	
AEO97												1028	1052	1072	1088	33	
AEO98													1088	1122	1128	12	
AEO99														1125	1154	31	
AEO00															1120	21	
Actual Value	884	890	919	950	981	1029	996	998	945	1034	1033	1064	1090	1118	1099		
Average Absolute Error	16	27	19	22	30	39	13	30	92	25	59	26	31	39	35	36	
	(Percent Error)																
AEO82	3.4	5.5	4.8	4.7	5.1	5.0										4.7	
AEO83	1.8	4.0	3.0	2.5	3.0	1.6					15.3					4.5	
AEO84	1.7	3.5	3.2	2.5	3.0	2.7					18.2					5.0	
AEO85	0.2	2.1	1.2	-1.1	-2.3	-4.3	1.9	4.3	13.4	5.8	8.0					4.1	
AEO86		0.0	0.1	0.4	-1.9	-4.5	2.1	4.6	13.5	6.1	9.0	7.3	6.1	5.2	8.4	4.9	
AEO87				-0.2	-3.8	-5.0	-6.5	-1.8	-0.2	7.9	0.9	3.4				3.3	
AEO89					-0.9	-3.6	-5.1	-0.6	2.0	9.9	2.3	4.7	1.9	1.6	1.1	4.8	3.2
AEO90						-0.8	-4.1				5.0					3.3	
AEO91							0.6	0.6	1.8	9.1	0.9	2.0	0.1	-1.0	-2.0	1.1	1.9
AEO92								0.8	4.2	7.8	0.0	1.8	0.0	-1.5	-2.8	0.3	2.1
AEO93									4.1	10.4	1.9	3.1	1.1	-0.4	-2.1	0.3	2.9
AEO94										5.7	-1.3	0.8	-1.2	-3.1	-4.7	-2.4	2.7
AEO95											-2.7	-2.2	-5.0	-6.8	-9.0	-7.1	5.5
AEO96												0.4	-1.9	-4.5	-6.5	-3.5	3.3
AEO97													-3.4	-3.5	-4.1	-1.0	3.0
AEO98														-0.2	0.4	2.6	1.1
AEO99															0.6	5.0	2.8
AEO00																1.9	1.9
Average Absolute Percent	1.8	3.0	2.1	2.3	3.1	3.8	1.3	3.0	9.7	2.4	5.7	2.4	2.9	3.5	3.2	3.5	

AEO = Annual Energy Outlook.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 10. Net Petroleum Imports: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Million Barrels per Day)																
AE082	7.58	7.45	7.12	6.82	6.66	7.09										1.23
AE083	5.15	5.44	5.73	5.79	5.72	5.95					6.96					0.78
AE084	4.85	5.11	5.53	5.95	6.31	6.59					8.65					0.59
AE085	4.17	4.38	4.73	4.93	5.36	5.72	6.23	6.66	7.14	7.39	7.74					0.84
AE086		5.15	5.38	5.46	5.92	6.46	7.09	7.50	7.78	7.96	8.20	8.47	8.74	9.04	9.57	0.48
AE087			5.81	6.04	6.81	7.28	7.82	8.34	8.71	8.94	8.98					0.76
AE089				6.28	6.84	7.49	7.96	8.53	8.83	9.04	9.28	9.60	9.64	9.75	10.02	0.79
AE090					7.20	7.61					9.13					0.56
AE091						7.28	7.25	7.34	7.48	7.72	8.10	8.57	9.09	9.61	10.07	0.26
AE092							6.86	7.42	7.88	8.16	8.55	8.80	9.06	9.32	9.50	0.30
AE093								7.25	8.01	8.49	9.06	9.38	9.92	10.29	10.53	0.68
AE094									8.04	8.77	9.21	9.60	10.02	10.24	10.63	0.85
AE095										8.09	8.65	8.99	9.56	9.89	10.25	0.41
AE096											8.25	8.51	8.82	9.31	9.64	0.24
AE097												8.49	8.89	9.58	10.04	0.22
AE098													9.05	9.29	10.01	0.33
AE099														9.26	9.43	0.34
AE000															9.86	0.25
Actual Value	4.29	5.44	5.91	6.59	7.20	7.16	6.63	6.94	7.62	8.05	7.89	8.50	9.16	9.76	9.61	
Average Absolute Error	1.21	0.74	0.60	0.76	0.85	0.56	0.70	0.72	0.52	0.47	0.80	0.44	0.38	0.37	0.41	0.60
(Percent Error)																
AE082	76.7	36.9	20.5	3.5	-7.5	-1.0										24.3
AE083	20.0	0.0	-3.0	-12.1	-20.6	-16.9					-11.8					12.1
AE084	13.1	-6.1	-6.4	-9.7	-12.4	-8.0					9.6					9.3
AE085	-2.8	-19.5	-20.0	-25.2	-25.6	-20.1	-6.0	-4.0	-6.3	-8.2	-1.9					12.7
AE086		-5.3	-9.0	-17.1	-17.8	-9.8	6.9	8.1	2.1	-1.1	3.9	-0.4	-4.6	-7.4	-0.4	6.7
AE087			-1.7	-8.3	-5.4	1.7	17.9	20.2	14.3	11.1	13.8					10.5
AE089				-4.7	-5.0	4.6	20.1	22.9	15.9	12.3	17.6	12.9	5.2	-0.1	4.3	10.5
AE090					0.0	6.3					15.7					7.3
AE091						1.7	9.4	5.8	-1.8	-4.1	2.7	0.8	-0.8	-1.5	4.8	3.3
AE092							3.5	6.9	3.4	1.4	8.4	3.5	-1.1	-4.5	-1.1	3.8
AE093								4.5	5.1	5.5	14.8	10.4	8.3	5.4	9.6	7.9
AE094									5.5	8.9	16.7	12.9	9.4	4.9	10.6	9.9
AE095										0.5	9.6	5.8	4.4	1.3	6.7	4.7
AE096											4.6	0.1	-3.7	-4.6	0.3	2.7
AE097												-0.1	-2.9	-1.8	4.5	2.3
AE098													-1.2	-4.8	4.2	3.4
AE099														-5.1	-1.9	3.5
AE000															2.6	2.6
Average Absolute Percent	28.1	13.6	10.1	11.5	11.8	7.8	10.6	10.3	6.8	5.9	10.1	5.2	4.2	3.8	4.2	8.4

AEO = Annual Energy Outlook.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 11. Net Natural Gas Imports: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Trillion Cubic Feet)																
AE082	1.19	1.19	1.19	1.19	1.19	1.19										0.24
AE083	1.08	1.16	1.23	1.23	1.23	1.23					1.23					0.38
AE084	0.99	1.05	1.16	1.27	1.43	1.57					2.11					0.23
AE085	0.94	1.00	1.19	1.45	1.58	1.86	1.94	2.06	2.17	2.32	2.44					0.22
AE086		0.74	0.88	0.62	1.03	1.05	1.27	1.39	1.47	1.66	1.79	1.96	2.17	2.38	2.42	0.56
AE087			0.84	0.89	1.07	1.16	1.26	1.36	1.46	1.65	1.75					0.49
AE089				1.15	1.32	1.44	1.52	1.61	1.70	1.79	1.87	1.98	2.06	2.15	2.23	0.51
AE090					1.26	1.43					2.07					0.22
AE091						1.36	1.53	1.70	1.82	2.11	2.30	2.33	2.36	2.42	2.49	0.40
AE092							1.48	1.62	1.88	2.08	2.25	2.41	2.56	2.68	2.70	0.36
AE093								1.79	2.08	2.35	2.49	2.61	2.74	2.89	2.95	0.17
AE094									2.02	2.40	2.66	2.74	2.81	2.85	2.89	0.14
AE095										2.46	2.54	2.80	2.87	2.87	2.89	0.14
AE096											2.56	2.75	2.85	2.88	2.93	0.15
AE097												2.82	2.96	3.16	3.43	0.09
AE098													2.95	3.19	3.53	0.15
AE099														2.92	3.16	0.16
AE000															3.42	0.02
Actual Value	0.89	0.69	0.94	1.22	1.28	1.45	1.64	1.92	2.21	2.46	2.69	2.79	2.83	2.99	3.40	
Average Absolute Error	0.16	0.34	0.20	0.19	0.14	0.20	0.24	0.31	0.38	0.37	0.53	0.31	0.26	0.29	0.51	0.32
(Percent Error)																
AE082	33.1	72.7	26.7	-2.5	-7.0	-17.7										26.6
AE083	20.8	68.4	31.0	0.8	-3.9	-14.9					-54.2					27.7
AE084	10.7	52.4	23.5	4.1	11.7	8.6					-21.5					18.9
AE085	5.1	45.1	26.7	18.9	23.4	28.6	18.0	7.2	-1.8	-5.8	-9.2					17.3
AE086		7.4	-6.3	-49.2	-19.5	-27.4	-22.7	-27.6	-33.5	-32.6	-33.4	-29.7	-23.3	-20.4	-28.8	25.9
AE087			-10.5	-27.0	-16.4	-19.8	-23.4	-29.2	-33.9	-33.0	-34.9					25.3
AE089				-5.7	3.1	-0.4	-7.5	-16.2	-23.1	-27.3	-30.4	-29.0	-27.2	-28.1	-34.4	19.4
AE090					-1.6	-1.1					-23.0					8.5
AE091						-5.9	-6.9	-11.5	-17.6	-14.3	-14.4	-16.5	-16.6	-19.1	-26.8	15.0
AE092							-10.0	-15.7	-14.9	-15.5	-16.3	-13.6	-9.5	-10.4	-20.6	14.1
AE093								-6.8	-5.9	-4.5	-7.3	-6.5	-3.2	-3.3	-13.2	6.3
AE094									-8.6	-2.5	-1.0	-1.8	-0.7	-4.7	-15.0	4.9
AE095										-0.1	-5.5	0.4	1.4	-4.0	-15.0	4.4
AE096											-4.7	-1.4	0.7	-3.7	-13.8	4.9
AE097												1.1	4.6	5.7	0.9	3.1
AE098													4.2	6.7	3.8	4.9
AE099														-2.3	-7.1	4.7
AE000															0.6	0.6
Average Absolute Percent	17.4	49.2	20.8	15.5	10.8	13.8	14.8	16.3	17.4	15.1	19.7	11.1	9.2	9.9	16.3	15.9

AEO = Annual Energy Outlook.

Note: AE082 projections given in Btu were converted to trillion cubic feet using a conversion factor of 1.03.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 12. Net Coal Exports: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error	
(Million Short Tons)																	
AEO82	109	114	120	127	135	144										34	
AEO83	83	86	90	94	99	105					116					9	
AEO84	72	74	77	81	86	91					106					13	
AEO85	83	83	83	84	85	87	89	92	95	98	102					15	
AEO86		87	87	88	89	91	92	94	96	98	100	101	102	103	105	20	
AEO87			76	72	73	76	77	79	82	83	86					19	
AEO89				84	80	82	83	85	87	88	90	93	97	99	102	21	
AEO90					95	92					99					11	
AEO91						105	96	96	97	100	104	100	104	111	119	27	
AEO92							98	99	103	109	116	117	120	124	130	38	
AEO93								108	111	113	117	118	120	124	130	45	
AEO94									79	93	108	110	113	117	120	36	
AEO95										57	66	69	70	70	72	10	
AEO96											71	76	77	77	78	10	
AEO97												82	84	86	87	16	
AEO98													80	83	85	18	
AEO99														75	75	16	
AEO00															54	5	
Actual Value	91	83	78	93	98	103	106	99	66	62	79	82	76	69	49		
Average Absolute Error	13	9	12	13	15	16	17	8	66	27	32	23	18	22	28	47	22
(Percent Error)																	
AEO82	19.8	37.3	53.8	36.6	37.8	39.8										37.5	
AEO83	-8.8	3.6	15.4	1.1	1.0	1.9					46.8					11.2	
AEO84	-20.9	-10.8	-1.3	-12.9	-12.2	-11.7					34.2					14.9	
AEO85	-8.8	0.0	6.4	-9.7	-13.3	-15.5	-16.0	-7.1	43.3	56.8	29.1					18.7	
AEO86		4.8	11.5	-5.4	-9.2	-11.7	-13.2	-5.1	44.8	56.8	26.6	22.6	34.2	48.6	112.6	29.1	
AEO87			-2.6	-22.6	-25.5	-26.2	-27.4	-20.2	23.7	32.8	8.9					21.1	
AEO89				-9.7	-18.4	-20.4	-21.7	-14.1	31.2	40.8	13.9	12.9	27.6	42.9	106.5	30.0	
AEO90					-3.1	-10.7					25.3					13.0	
AEO91						1.9	-9.4	-3.0	46.3	60.0	31.6	21.4	36.8	60.2	140.9	41.2	
AEO92							-7.5	0.0	55.4	74.4	46.8	42.0	57.9	78.9	163.2	58.5	
AEO93								9.1	67.4	80.8	48.1	43.2	57.9	78.9	163.2	68.6	
AEO94									19.2	48.8	36.7	33.5	48.7	68.8	142.9	56.9	
AEO95										-8.8	-16.5	-16.3	-7.9	1.0	45.7	16.0	
AEO96											-10.1	-7.8	1.3	11.1	57.9	17.6	
AEO97												-0.5	10.5	24.1	76.1	27.8	
AEO98													5.3	19.8	72.1	32.4	
AEO99														8.2	51.8	30.0	
AEO00															9.3	9.3	
Average Absolute Percent	14.6	11.3	15.2	14.0	15.1	15.5	15.9	8.4	41.4	51.1	28.8	22.2	28.8	40.2	95.2	31.9	

AEO = Annual Energy Outlook.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 13. World Oil Price: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Nominal Dollars per Barrel)																
AE082	28.49	32.47	37.38	41.90	45.66	49.02										20.23
AE083	28.44	28.18	30.67	36.07	41.41	46.93					74.25					22.18
AE084	28.92	28.67	29.56	31.76	34.27	37.00					56.65					16.60
AE085	27.00	25.70	24.38	25.26	28.60	32.23	34.75	36.99	37.95	40.22	41.14					14.09
AE086		14.57	15.89	17.28	18.91	20.72	22.20	24.74	28.25	32.08	35.49	38.41	41.03	42.88	44.83	11.66
AE087			18.11	17.41	19.01	20.06	20.97	21.54	23.17	25.76	28.98					4.47
AE089				14.70	15.00	16.31	17.52	18.47	20.38	23.07	25.72	28.61	31.50	34.03	35.94	7.68
AE090					17.70	17.53					24.45					3.97
AE091						22.00	24.95	25.64	26.31	26.95	27.56	28.08	28.62	29.14	30.38	9.37
AE092							19.13	20.19	20.72	22.23	23.89	25.50	27.30	28.90	30.75	7.16
AE093								18.90	20.09	20.96	21.99	22.85	23.74	24.67	25.82	5.45
AE094									17.12	17.27	18.26	19.34	20.40	21.48	22.71	3.14
AE095										15.26	17.19	18.04	18.98	19.77	20.63	2.41
AE096											17.24	17.69	18.44	19.28	20.22	2.67
AE097												19.88	19.25	19.09	19.36	2.66
AE098													18.51	18.52	19.37	2.88
AE099														12.49	13.56	2.06
AE000															17.36	0.13
Actual Value	26.99	14.00	18.13	14.56	18.08	21.76	18.70	18.20	16.14	15.51	17.14	20.64	18.53	12.04	17.23	
Average Absolute Error	1.22	11.92	8.62	11.78	10.36	10.09	4.95	5.58	8.11	9.41	14.61	5.32	6.27	12.53	8.46	9.12
(Percent Error)																
AE082	5.5	131.9	106.2	187.7	152.5	125.3										118.2
AE083	5.4	101.3	69.2	147.7	129.1	115.7					333.2					128.8
AE084	7.2	104.8	63.1	118.2	89.6	70.0					230.5					97.6
AE085	0.0	83.6	34.5	73.5	58.2	48.1	85.8	103.2	135.1	159.3	140.0					83.8
AE086		4.1	-12.4	18.7	4.6	-4.8	18.7	35.9	75.0	106.8	107.1	86.1	121.4	256.2	160.2	72.3
AE087			-0.1	19.6	5.1	-7.8	12.1	18.4	43.6	66.1	69.1					26.9
AE089				1.0	-17.0	-25.1	-6.3	1.5	26.3	48.7	50.1	38.6	70.0	182.7	108.6	48.0
AE090					-2.1	-19.4					42.6					21.4
AE091						1.1	33.4	40.9	63.0	73.8	60.8	36.0	54.4	142.0	76.3	58.2
AE092							2.3	10.9	28.4	43.3	39.4	23.6	47.3	140.0	78.4	46.0
AE093								3.8	24.5	35.1	28.3	10.7	28.1	104.9	49.9	35.7
AE094									6.1	11.3	6.6	-6.3	10.1	78.4	31.8	21.5
AE095										-1.6	0.3	-12.6	2.4	64.2	19.7	16.8
AE096											0.6	-14.3	-0.5	60.1	17.4	18.6
AE097												-3.7	3.9	58.6	12.3	19.6
AE098													-0.1	53.8	12.4	22.1
AE099														3.8	-21.3	12.5
AE000															0.7	0.7
Average Absolute Percent	4.5	85.1	47.6	80.9	57.3	46.4	26.5	30.7	50.2	60.7	85.3	25.8	33.8	104.1	49.1	55.7

AEO = Annual Energy Outlook.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 14. Natural Gas Wellhead Price: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Nominal Dollars per Thousand Cubic Feet)																
AEO82	4.15	5.10	6.02	6.55	6.83	7.11										4.09
AEO83	2.87	2.98	3.25	3.60	4.10	4.64					9.31					2.57
AEO84	2.76	2.82	3.07	3.39	3.81	4.34					7.15					2.08
AEO85	2.60	2.59	2.61	2.62	2.84	3.20	3.62	4.07	4.51	5.00	5.53					1.74
AEO86		1.73	1.96	2.29	2.55	2.82	3.14	3.64	4.12	4.66	5.24	5.81	6.36	6.81	7.35	2.35
AEO87			1.83	1.96	2.12	2.30	2.49	2.70	2.98	3.29	3.69					0.86
AEO89				1.62	1.71	1.90	2.10	2.49	2.86	3.18	3.49	4.10	4.35	4.65	4.99	1.26
AEO90					1.78	1.89					2.70					0.47
AEO91						1.77	1.91	2.12	2.29	2.38	2.43	2.48	2.56	2.65	2.92	0.45
AEO92							1.69	1.86	2.04	2.14	2.32	2.43	2.61	2.79	3.07	0.41
AEO93								1.85	1.92	2.06	2.25	2.35	2.47	2.63	2.82	0.36
AEO94									1.99	2.13	2.27	2.40	2.56	2.65	2.73	0.41
AEO95										1.90	1.99	1.93	2.03	2.09	2.29	0.23
AEO96											1.64	1.74	1.85	1.95	2.03	0.21
AEO97												2.02	1.81	1.86	1.92	0.22
AEO98													2.29	2.16	2.20	0.13
AEO99														1.98	2.14	0.05
AEO00															2.15	0.08
Actual Value	2.51	1.94	1.67	1.69	1.69	1.71	1.64	1.74	2.04	1.85	1.55	2.17	2.32	1.94	2.07	
Average Absolute Error	0.58	1.19	1.45	1.48	1.53	1.62	0.85	0.93	0.84	1.12	2.30	0.82	0.83	1.00	1.01	1.22
(Percent Error)																
AEO82	65.2	163.1	260.4	287.8	304.0	315.8										232.7
AEO83	14.5	53.5	94.7	113.3	142.5	171.1					500.6					155.7
AEO84	9.9	45.6	83.6	100.7	125.2	153.9					361.4					125.7
AEO85	3.6	33.5	56.1	55.3	67.9	87.1	121.0	133.8	121.3	170.3	256.5					100.6
AEO86		-10.8	17.2	35.3	50.8	65.0	91.4	108.9	102.2	151.6	238.2	168.0	173.9	251.0	255.2	122.8
AEO87			9.6	15.9	25.2	34.4	52.1	54.9	45.9	77.7	137.9					50.4
AEO89				-4.1	1.1	11.3	28.2	42.8	40.1	72.1	125.5	88.7	87.7	139.5	140.9	65.2
AEO90					5.3	10.5					74.0					29.9
AEO91						3.5	16.6	21.6	12.2	28.7	57.1	14.3	10.5	36.5	40.9	24.2
AEO92							3.3	6.8	-0.1	15.9	49.7	12.1	12.5	44.0	48.5	21.4
AEO93								6.3	-5.9	11.5	45.4	8.4	6.3	35.5	36.1	19.4
AEO94									-2.4	15.3	46.3	10.5	10.2	36.5	31.9	21.9
AEO95										2.4	28.4	-11.0	-12.3	7.6	10.8	12.1
AEO96											5.6	-19.8	-20.4	0.6	-1.8	9.6
AEO97												-7.1	-22.1	-4.3	-7.1	10.2
AEO98													-1.2	11.4	6.3	6.3
AEO99														2.0	3.3	2.7
AEO00															3.8	3.8
Average Absolute Percent	23.3	61.3	86.9	87.5	90.2	94.7	52.1	53.6	41.3	60.6	148.2	37.8	35.7	51.7	48.9	68.2

AEO = Annual Energy Outlook.

Note: AEO82 projections given in Btu were converted to trillion cubic feet using a conversion factor of 1.03.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 15. Coal Price to Electric Utilities: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Nominal Dollars per Million Btu)																
AE082	1.95	2.02	2.10	2.20	2.32	2.48										0.66
AE083	1.95	2.02	2.10	2.19	2.31	2.43					3.13					0.82
AE084	1.89	1.96	2.04	2.13	2.25	2.37					2.90					0.73
AE085	1.68	1.75	1.82	1.89	1.98	2.09	2.18	2.27	2.36	2.43	2.51					0.63
AE086		1.61	1.68	1.75	1.84	1.94	2.04	2.13	2.23	2.33	2.43	2.50	2.56	2.61	2.65	0.78
AE087			1.52	1.56	1.66	1.76	1.85	1.94	2.04	2.12	2.21					0.43
AE089				1.50	1.52	1.67	1.75	1.81	1.88	1.95	2.01	2.06	2.13	2.16	2.22	0.53
AE090					1.46	1.53					1.91					0.22
AE091						1.51	1.59	1.67	1.76	1.85	1.91	1.97	2.03	2.07	2.14	0.51
AE092							1.55	1.62	1.67	1.75	1.83	1.91	1.93	1.99	2.05	0.48
AE093								2.00	1.53	1.59	1.67	1.71	1.78	1.81	1.87	0.43
AE094									1.51	1.56	1.64	1.72	1.76	1.77	1.84	0.39
AE095										1.42	1.46	1.47	1.52	1.54	1.55	0.21
AE096											1.35	1.34	1.36	1.36	1.37	0.09
AE097												1.35	1.37	1.37	1.39	0.12
AE098													1.27	1.27	1.27	0.02
AE099														1.24	1.24	0.01
AE000															1.28	0.06
Actual Value	1.65	1.58	1.51	1.47	1.45	1.46	1.45	1.41	1.39	1.36	1.32	1.29	1.27	1.25	1.22	
Average Absolute Error	0.22	0.29	0.37	0.42	0.47	0.52	0.38	0.51	0.48	0.53	0.76	0.49	0.50	0.50	0.52	0.49
(Percent Error)																
AE082	18.1	28.2	39.3	50.0	59.7	70.1										44.2
AE083	18.4	27.8	39.6	49.4	59.1	66.6					137.7					57.0
AE084	14.7	24.4	35.2	45.5	54.9	62.2					120.3					51.0
AE085	1.9	10.7	21.0	28.8	36.5	43.1	51.0	60.8	69.5	78.4	90.4					44.7
AE086		2.0	11.6	19.5	26.6	32.8	41.0	51.1	60.3	71.6	84.2	93.8	101.7	109.2	117.2	58.8
AE087			0.9	6.7	14.6	20.4	27.8	37.2	46.6	56.2	67.8					30.9
AE089				2.3	4.9	14.7	21.1	28.3	35.5	43.6	52.5	59.7	67.4	72.8	81.6	40.4
AE090					0.7	5.1					44.6					16.8
AE091						3.4	9.9	18.0	27.0	36.2	44.6	52.3	59.6	65.7	75.0	39.2
AE092							7.0	15.0	19.9	28.8	38.6	47.8	52.1	58.9	68.0	37.3
AE093								41.8	10.0	16.7	26.6	32.6	40.0	44.6	53.0	33.2
AE094									8.5	14.4	24.8	33.3	38.8	41.6	50.7	30.3
AE095										4.7	10.5	14.2	19.9	23.0	26.8	16.5
AE096											2.4	4.2	7.0	8.9	12.2	7.0
AE097												5.0	7.9	9.9	14.1	9.2
AE098													0.3	1.3	4.3	2.0
AE099														-0.6	1.5	1.1
AE000															4.7	4.7
Average Absolute Percent	13.3	18.6	24.6	28.9	32.1	35.4	26.3	36.0	34.6	39.0	57.3	38.1	39.5	39.7	42.4	36.6

AEO = Annual Energy Outlook.

Btu = British thermal unit.

Sources: **Actual Values:** Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000).

Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 16. Average Electricity Prices: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
	(Nominal Cents per Kilowatthour)															
AEO82	6.13	6.49	6.88	7.18	7.50	7.87										0.68
AEO83	6.72	6.98	7.26	7.54	7.80	8.09					9.59					1.21
AEO84	6.63	6.88	7.14	7.38	7.59	7.84					8.84					0.97
AEO85	6.62	6.89	7.18	7.40	7.60	7.79	7.95	8.07	8.14	8.23	8.32					1.03
AEO86		6.67	6.89	7.05	7.20	7.38	7.50	7.46	7.47	7.64	7.85	8.06	8.26	8.38	8.61	0.92
AEO87			6.63	6.69	6.96	7.17	7.40	7.54	7.67	7.84	8.02					0.65
AEO89				6.50	6.78	7.13	7.39	7.54	7.62	7.78	7.93	8.07	8.26	8.40	8.57	0.93
AEO90					6.49	6.73					7.73					0.35
AEO91						6.94	7.36	7.61	7.78	8.06	8.14	8.14	8.18	8.18	8.31	1.07
AEO92							7.01	7.20	7.34	7.55	7.68	7.79	7.89	7.95	8.09	0.79
AEO93								7.19	7.30	7.44	7.61	7.71	7.85	7.89	8.02	0.80
AEO94									6.98	7.15	7.42	7.56	7.70	7.78	7.99	0.68
AEO95										6.97	7.12	7.15	7.29	7.36	7.46	0.41
AEO96											7.26	7.29	7.33	7.40	7.61	0.58
AEO97												7.03	7.16	7.23	7.33	0.42
AEO98													6.93	6.79	6.88	0.13
AEO99														6.77	6.86	0.13
AEO00															6.69	0.06
Actual Value	6.44	6.44	6.37	6.35	6.45	6.57	6.75	6.82	6.93	6.91	6.89	6.86	6.85	6.74	6.63	
Average Absolute Error	0.24	0.34	0.63	0.75	0.79	0.87	0.68	0.70	0.61	0.72	1.07	0.78	0.83	0.91	1.07	0.79
(Percent Error)																
AEO82	-4.8	0.7	8.0	13.1	16.3	19.8										10.5
AEO83	4.4	8.4	14.0	18.7	21.0	23.2					39.2					18.4
AEO84	3.0	6.8	12.1	16.2	17.7	19.3					28.4					14.8
AEO85	2.8	7.0	12.8	16.5	17.8	18.5	17.8	18.3	17.5	19.2	20.8					15.4
AEO86		3.5	8.1	11.0	11.6	12.4	11.1	9.4	7.9	10.6	14.0	17.4	20.6	24.3	29.9	13.7
AEO87			4.1	5.4	7.9	9.1	9.7	10.5	10.6	13.4	16.4					9.7
AEO89				2.3	5.1	8.5	9.4	10.6	9.9	12.6	15.1	17.6	20.5	24.7	29.3	13.8
AEO90					0.6	2.4					12.2					5.1
AEO91						5.6	9.0	11.5	12.3	16.7	18.2	18.7	19.4	21.3	25.3	15.8
AEO92							3.8	5.6	6.0	9.2	11.5	13.6	15.2	17.9	22.0	11.6
AEO93								5.5	5.3	7.7	10.5	12.4	14.5	17.0	20.9	11.7
AEO94									0.7	3.4	7.7	10.1	12.4	15.4	20.6	10.0
AEO95										0.8	3.4	4.2	6.4	9.2	12.5	6.1
AEO96											5.4	6.3	7.0	9.8	14.7	8.6
AEO97												2.5	4.6	7.3	10.6	6.2
AEO98													1.2	0.8	3.8	1.9
AEO99														0.4	3.4	1.9
AEO00															0.9	0.9
Average Absolute Percent	3.8	5.3	9.8	11.9	12.2	13.2	10.1	10.2	8.8	10.4	15.6	11.4	12.2	13.5	16.2	11.8

AEO = Annual Energy Outlook.

Sources: Actual Values: Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000). Projections: EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 17. Gross Domestic Product: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1985-1999

Publication	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Billion Nominal Dollars)																
AEO82	3939	4306	4733	5201	5712	6288										192
AEO83	3919	4264	4650	5086	5549	6053					9362					410
AEO84	3910	4191	4589	5031	5490	5979					9098					381
AEO85	3882	4103	4436	4793	5207	5658	6158	6702	7252	7836	8486					433
AEO86		4203	4434	4741	5015	5371	5795	6244	6726	7270	7875	8524	9226	9973	10764	516
AEO87			4483	4701	5035	5389	5773	6190	6666	7175	7716					260
AEO89				4857	5182	5575	6013	6483	6987	7525	8106	8756	9400	10103	10863	624
AEO90					5236	5550					7882					329
AEO91						5457	5695	6078	6399	6738	7145	7607	8099	8629	9197	229
AEO92							5648	5992	6346	6710	7114	7530	7968	8456	8991	308
AEO93								5941	6339	6714	7117	7542	7995	8509	9027	295
AEO94									6264	6622	6944	7298	7679	8070	8508	549
AEO95										6761	7090	7418	7837	8244	8676	426
AEO96											7057	7356	7754	8151	8574	528
AEO97												7585	7881	8265	8709	423
AEO98													8060	8439	8830	330
AEO99														8478	8774	382
AEO00															8951	305
Actual Value	4213	4453	4742	5108	5489	5803	5986	6319	6642	7054	7401	7813	8301	8760	9256	
Average Absolute Error	309	240	188	219	257	303	205	242	285	368	666	446	516	559	620	403
(Percent Error)																
AEO82	-6.5	-3.3	-0.2	1.8	4.1	8.4										4.0
AEO83	-7.0	-4.2	-1.9	-0.4	1.1	4.3					26.5					6.5
AEO84	-7.2	-5.9	-3.2	-1.5	0.0	3.0					22.9					6.3
AEO85	-7.9	-7.9	-6.5	-6.2	-5.1	-2.5	2.9	6.1	9.2	11.1	14.7					7.3
AEO86		-5.6	-6.5	-7.2	-8.6	-7.4	-3.2	-1.2	1.3	3.1	6.4	9.1	11.1	13.8	16.3	7.2
AEO87			-5.5	-8.0	-8.3	-7.1	-3.6	-2.0	0.4	1.7	4.3					4.5
AEO89				-4.9	-5.6	-3.9	0.5	2.6	5.2	6.7	9.5	12.1	13.2	15.3	17.4	8.1
AEO90					-4.6	-4.4					6.5					5.2
AEO91						-6.0	-4.9	-3.8	-3.7	-4.5	-3.5	-2.6	-2.4	-1.5	-0.6	3.3
AEO92							-5.6	-5.2	-4.5	-4.9	-3.9	-3.6	-4.0	-3.5	-2.9	4.2
AEO93								-6.0	-4.6	-4.8	-3.8	-3.5	-3.7	-2.9	-2.5	4.0
AEO94									-5.7	-6.1	-6.2	-6.6	-7.5	-7.9	-8.1	6.9
AEO95										-4.2	-4.2	-5.1	-5.6	-5.9	-6.3	5.2
AEO96											-4.7	-5.9	-6.6	-6.9	-7.4	6.3
AEO97												-2.9	-5.1	-5.6	-5.9	4.9
AEO98													-2.9	-3.7	-4.6	3.7
AEO99														-3.2	-5.2	4.2
AEO00															-3.3	3.3
Average Absolute Percent	7.1	5.4	4.0	4.3	4.7	5.2	3.4	3.8	4.3	5.2	9.0	5.7	6.2	6.4	6.7	5.7

AEO = Annual Energy Outlook.

Sources: **Actual Values:** 1985-1998: Council of Economic Advisors, *Economic Report of the President* (Washington, DC, February 2000). 1999: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business* (Washington, DC, July 2000). **Projections:** EIA, *Annual Energy Outlook*, DOE/EIA-0383(82-2000) (Washington, DC, April 1983 - December 1999).

Table 18. Carbon Dioxide Emissions: AEO Forecasts, Actual Values, and Absolute and Percent Errors, 1992-1999

Publication	1992	1993	1994	1995	1996	1997	1998	1999	Average Absolute Error
(Million Metric Tons Carbon Equivalent)									
AEO93	1366	1378	1399	1420	1437	1455	1473	1486	18
AEO94		1380	1399	1414	1429	1442	1455	1467	29
AEO95			1401	1411	1415	1435	1448	1462	38
AEO96				1413	1425	1444	1460	1477	34
AEO97					1444	1467	1497	1524	17
AEO98						1493	1533	1557	28
AEO99							1506	1552	26
AEO00								1520	9
Actual Value	1359	1385	1410	1421	1471	1493	1495	1511	
Average Absolute Error	7	6	10	6	41	37	28	33	27
(Percent Error)									
AEO93	0.5	-0.5	-0.8	-0.1	-2.3	-2.5	-1.5	-1.7	1.2
AEO94		-0.4	-0.8	-0.5	-2.9	-3.4	-2.7	-2.9	1.9
AEO95			-0.6	-0.7	-3.8	-3.9	-3.1	-3.2	2.6
AEO96				-0.6	-3.1	-3.3	-2.3	-2.3	2.3
AEO97					-1.8	-1.7	0.1	0.9	1.1
AEO98						0.0	2.5	3.0	1.9
AEO99							0.7	2.7	1.7
AEO00								0.6	0.6
Average Absolute Percent Error	0.5	0.4	0.7	0.5	2.8	2.5	1.9	2.2	1.8

AEO = Annual Energy Outlook.

Sources: **Actual Values:** Greenhouse Gas Flash Estimate, <http://www.eia.doe.gov/oiat/1605/flash/> **Projections:** EIA, *Annual Energy Outlook*, DOE/EIA-0383(93-2000) (Washington, DC, January 1993 - December 1999).