

Appendixes

Appendix A

Reference Case

Table A1. Total Energy Supply and Disposition Summary
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Production								
Crude Oil and Lease Condensate	12.05	11.47	12.45	12.37	11.75	10.56	9.68	-0.7%
Natural Gas Plant Liquids	2.34	2.46	2.39	2.57	2.67	2.62	2.57	0.2%
Dry Natural Gas	19.63	19.02	19.13	20.97	22.09	21.80	21.45	0.5%
Coal	22.12	22.86	25.78	25.73	27.30	30.61	34.10	1.6%
Nuclear Power	7.96	8.23	8.44	8.66	9.09	9.09	9.09	0.4%
Renewable Energy ¹	5.69	5.74	7.08	7.43	8.00	8.61	9.02	1.8%
Other ²	0.72	0.64	2.16	2.85	3.16	3.32	3.44	6.7%
Total	70.52	70.42	77.42	80.58	84.05	86.59	89.36	0.9%
Imports								
Crude Oil ³	21.06	22.02	22.01	22.91	24.63	26.96	29.54	1.1%
Petroleum Products ⁴	5.16	5.93	6.36	7.29	8.01	8.41	9.27	1.7%
Natural Gas	4.10	4.36	5.01	5.81	5.83	6.37	6.72	1.7%
Other Imports ⁵	0.67	0.83	0.45	0.74	1.36	2.02	2.42	4.2%
Total	30.98	33.14	33.83	36.75	39.83	43.76	47.95	1.4%
Exports								
Petroleum ⁶	2.03	2.07	2.15	2.18	2.24	2.26	2.31	0.4%
Natural Gas	0.71	0.86	0.55	0.58	0.68	0.86	1.01	0.6%
Coal	1.12	1.25	1.03	0.54	0.46	0.48	0.40	-4.3%
Total	3.86	4.18	3.74	3.30	3.39	3.61	3.72	-0.5%
Discrepancy⁷	-0.40	-0.31	-0.36	-0.16	-0.15	-0.25	-0.30	N/A
Consumption								
Petroleum Products ⁸	38.96	40.08	43.14	45.69	48.14	50.57	53.58	1.1%
Natural Gas	23.04	23.07	24.04	26.67	27.70	27.78	27.66	0.7%
Coal	22.38	22.53	25.09	25.66	27.65	30.89	34.49	1.7%
Nuclear Power	7.96	8.23	8.44	8.66	9.09	9.09	9.09	0.4%
Renewable Energy ¹	5.70	5.74	7.08	7.43	8.00	8.61	9.02	1.8%
Other ⁹	0.02	0.04	0.07	0.08	0.05	0.05	0.05	0.9%
Total	98.05	99.68	107.87	114.18	120.63	126.99	133.88	1.1%
Net Imports - Petroleum	24.19	25.88	26.22	28.02	30.39	33.11	36.49	1.3%
Prices (2004 dollars per unit)								
Imported Low Sulfur Light Crude Oil Price (dollars per barrel) ¹⁰	31.72	40.49	47.29	47.79	50.70	54.08	56.97	1.3%
Imported Crude Oil Price (dollars per barrel) ¹⁰ ..	28.46	35.99	43.99	43.00	44.99	47.99	49.99	1.3%
Natural Gas Wellhead Price (dollars per thousand cubic feet) ¹¹	5.08	5.49	5.03	4.52	4.90	5.43	5.92	0.3%
Coal Minemouth Price (dollars per ton)	18.40	20.07	22.23	20.39	20.20	20.63	21.73	0.3%
Average Electricity Price (cents per kilowatthour)	7.6	7.6	7.3	7.1	7.2	7.4	7.5	-0.0%

¹Includes grid-connected electricity from conventional hydroelectric; wood and wood waste; landfill gas; municipal solid waste; other biomass; wind; photovoltaic and solar thermal sources; non-electric energy from renewable sources, such as active and passive solar systems, and wood; and both the ethanol and gasoline components of E85, but not the ethanol components of blends less than 85 percent. Excludes electricity imports using renewable sources and nonmarketed renewable energy. See Table A17 for selected nonmarketed residential and commercial renewable energy.

²Includes liquid hydrogen, methanol, supplemental natural gas, and some domestic inputs to refineries.

³Includes imports of crude oil for the Strategic Petroleum Reserve.

⁴Includes imports of finished petroleum products, unfinished oils, alcohols, ethers, and blending components.

⁵Includes coal, coal coke (net), and electricity (net).

⁶Includes crude oil and petroleum products.

⁷Balancing item. Includes unaccounted for supply, losses, gains, net storage withdrawals, heat loss when natural gas is converted to liquid fuel, and heat loss when coal is converted to liquid fuel.

⁸Includes natural gas plant liquids, crude oil consumed as a fuel, and nonpetroleum-based liquids for blending, such as ethanol.

⁹Includes net electricity imports, methanol, and liquid hydrogen.

¹⁰Weighted average price delivered to U.S. refiners.

¹¹Represents lower 48 onshore and offshore supplies.

Btu = British thermal unit.

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 natural gas supply values: Energy Information Administration (EIA), *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004). 2004 natural gas supply values and natural gas wellhead price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005), subtracting 1 billion cubic feet per day to account for carbon dioxide included in production in Texas. 2003 natural gas wellhead price: Mineral Management Service and EIA, *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004). 2003 coal minemouth prices: EIA, *Annual Coal Report 2004*, DOE/EIA-0584(2004) (Washington, DC, November 2005). 2004 petroleum supply values and 2003 crude oil and lease condensate production: EIA, *Petroleum Supply Annual 2004*, DOE/EIA-0340(2004)/1 (Washington, DC, June 2005). Other 2003 petroleum supply values: EIA, *Petroleum Supply Annual 2003*, DOE/EIA-0340(2003)/1 (Washington, DC, July 2004). 2003 and 2004 low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2003 and 2004 coal values: *Quarterly Coal Report, October-December 2004*, DOE/EIA-0121(2004/4Q) (Washington, DC, March 2005). Other 2003 and 2004 values: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Reference Case

Table A2. Energy Consumption by Sector and Source
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Energy Consumption								
Residential								
Distillate Fuel	0.91	0.94	0.84	0.79	0.73	0.67	0.61	-1.7%
Kerosene	0.08	0.09	0.09	0.09	0.08	0.07	0.07	-1.0%
Liquefied Petroleum Gas	0.52	0.54	0.56	0.59	0.61	0.63	0.65	0.7%
Petroleum Subtotal	1.50	1.57	1.48	1.47	1.43	1.37	1.32	-0.7%
Natural Gas	5.25	5.03	5.33	5.52	5.68	5.74	5.82	0.6%
Coal	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-0.5%
Renewable Energy ¹	0.40	0.41	0.44	0.43	0.43	0.42	0.41	0.1%
Electricity	4.34	4.41	4.99	5.38	5.77	6.10	6.47	1.5%
Delivered Energy	11.51	11.44	12.25	12.81	13.31	13.64	14.04	0.8%
Electricity Related Losses	9.51	9.60	10.74	11.26	11.85	12.24	12.60	1.1%
Total	21.02	21.04	22.99	24.07	25.17	25.88	26.64	0.9%
Commercial								
Distillate Fuel	0.48	0.50	0.48	0.49	0.50	0.51	0.52	0.1%
Residual Fuel	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.1%
Kerosene	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.3%
Liquefied Petroleum Gas	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.2%
Motor Gasoline ²	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.3%
Petroleum Subtotal	0.75	0.79	0.77	0.78	0.79	0.80	0.82	0.1%
Natural Gas	3.32	3.09	3.18	3.46	3.68	3.89	4.11	1.1%
Coal	0.08	0.09	0.09	0.09	0.09	0.09	0.09	-0.0%
Renewable Energy ³	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.0%
Electricity	4.09	4.19	4.88	5.43	6.01	6.63	7.24	2.2%
Delivered Energy	8.34	8.24	9.00	9.85	10.66	11.50	12.44	1.6%
Electricity Related Losses	8.96	9.13	10.51	11.37	12.35	13.32	14.29	1.7%
Total	17.30	17.37	19.51	21.23	23.02	24.82	26.73	1.7%
Industrial⁴								
Distillate Fuel	1.14	1.19	1.20	1.20	1.23	1.26	1.32	0.4%
Liquefied Petroleum Gas	2.12	2.19	2.21	2.26	2.34	2.44	2.54	0.6%
Petrochemical Feedstock	1.37	1.49	1.48	1.49	1.51	1.53	1.55	0.2%
Residual Fuel	0.22	0.24	0.20	0.19	0.20	0.21	0.21	-0.4%
Motor Gasoline ²	0.31	0.32	0.32	0.32	0.32	0.33	0.34	0.2%
Other Petroleum ⁵	4.12	4.16	4.60	4.83	5.05	5.34	5.69	1.2%
Petroleum Subtotal	9.28	9.58	10.01	10.29	10.65	11.10	11.66	0.8%
Natural Gas	7.38	7.64	8.07	8.33	8.52	8.77	9.08	0.7%
Lease and Plant Fuel ⁶	1.16	1.14	1.12	1.22	1.28	1.24	1.21	0.2%
Natural Gas Subtotal	8.54	8.78	9.19	9.55	9.80	10.02	10.29	0.6%
Metallurgical Coal	0.67	0.65	0.62	0.61	0.59	0.58	0.58	-0.4%
Other Industrial Coal	1.38	1.38	1.43	1.43	1.43	1.43	1.45	0.2%
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.16	0.49	1.22	1.61	33.8%
Net Coal Coke Imports	0.05	0.14	0.02	0.02	0.02	0.01	0.02	-8.1%
Coal Subtotal	2.09	2.16	2.07	2.21	2.53	3.25	3.65	2.0%
Renewable Energy ⁷	1.59	1.68	1.79	1.90	2.01	2.14	2.29	1.2%
Electricity	3.44	3.48	3.62	3.76	3.91	4.08	4.31	0.8%
Delivered Energy	24.94	25.68	26.67	27.72	28.91	30.58	32.19	0.9%
Electricity Related Losses	7.53	7.58	7.79	7.88	8.04	8.19	8.39	0.4%
Total	32.46	33.27	34.46	35.60	36.95	38.77	40.58	0.8%

Table A2. Energy Consumption by Sector and Source (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Transportation								
Distillate Fuel ⁸	5.67	5.91	6.82	7.48	8.13	8.95	9.98	2.0%
Jet Fuel ⁹	3.26	3.35	3.89	4.27	4.53	4.61	4.79	1.4%
Motor Gasoline ²	16.62	16.93	18.33	19.54	20.73	21.81	22.99	1.2%
Residual Fuel	0.57	0.61	0.62	0.63	0.64	0.65	0.65	0.3%
Liquefied Petroleum Gas	0.02	0.03	0.06	0.07	0.09	0.10	0.11	5.0%
Other Petroleum ¹⁰	0.15	0.18	0.18	0.18	0.18	0.19	0.19	0.3%
Petroleum Subtotal	26.30	27.02	29.91	32.18	34.30	36.30	38.71	1.4%
Pipeline Fuel Natural Gas	0.69	0.69	0.65	0.74	0.80	0.79	0.78	0.5%
Compressed Natural Gas	0.02	0.03	0.05	0.08	0.09	0.11	0.12	6.0%
Renewable Energy (E85) ¹¹	0.00	0.00	0.00	0.00	0.00	0.01	0.01	6.4%
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Electricity	0.08	0.08	0.09	0.09	0.10	0.10	0.11	0.9%
Delivered Energy	27.09	27.82	30.70	33.09	35.30	37.31	39.72	1.4%
Electricity Related Losses	0.18	0.18	0.19	0.20	0.20	0.21	0.21	0.5%
Total	27.27	28.00	30.90	33.29	35.50	37.52	39.93	1.4%
Delivered Energy Consumption for All Sectors								
Distillate Fuel	8.19	8.55	9.34	9.96	10.59	11.38	12.43	1.5%
Kerosene	0.11	0.13	0.14	0.13	0.13	0.12	0.11	-0.6%
Jet Fuel ⁹	3.26	3.35	3.89	4.27	4.53	4.61	4.79	1.4%
Liquefied Petroleum Gas	2.76	2.85	2.92	3.02	3.14	3.27	3.40	0.7%
Motor Gasoline ²	16.98	17.30	18.70	19.91	21.10	22.19	23.38	1.2%
Petrochemical Feedstock	1.37	1.49	1.48	1.49	1.51	1.53	1.55	0.2%
Residual Fuel	0.90	0.97	0.94	0.94	0.96	0.98	0.99	0.1%
Other Petroleum ¹²	4.26	4.32	4.75	4.99	5.21	5.50	5.86	1.2%
Petroleum Subtotal	37.83	38.96	42.17	44.72	47.17	49.57	52.51	1.2%
Natural Gas	15.96	15.79	16.63	17.39	17.97	18.51	19.13	0.7%
Lease and Plant Fuel ⁶	1.16	1.14	1.12	1.22	1.28	1.24	1.21	0.2%
Pipeline Natural Gas	0.69	0.69	0.65	0.74	0.80	0.79	0.78	0.5%
Natural Gas Subtotal	17.81	17.62	18.40	19.35	20.06	20.55	21.11	0.7%
Metallurgical Coal	0.67	0.65	0.62	0.61	0.59	0.58	0.58	-0.4%
Other Coal	1.47	1.47	1.53	1.52	1.53	1.53	1.54	0.2%
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.16	0.49	1.22	1.61	33.8%
Net Coal Coke Imports	0.05	0.14	0.02	0.02	0.02	0.01	0.02	-8.1%
Coal Subtotal	2.19	2.26	2.17	2.31	2.63	3.35	3.74	2.0%
Renewable Energy ¹³	2.08	2.17	2.32	2.41	2.53	2.66	2.80	1.0%
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Electricity	11.96	12.17	13.57	14.67	15.79	16.91	18.22	1.6%
Delivered Energy	71.87	73.18	78.62	83.46	88.19	93.04	98.40	1.1%
Electricity Related Losses	26.18	26.50	29.24	30.71	32.45	33.95	35.48	1.1%
Total	98.05	99.68	107.87	114.18	120.63	126.99	133.88	1.1%
Electric Power¹⁴								
Distillate Fuel	0.29	0.17	0.23	0.23	0.24	0.26	0.27	1.8%
Residual Fuel	0.84	0.95	0.74	0.73	0.73	0.74	0.80	-0.6%
Petroleum Subtotal	1.13	1.12	0.97	0.96	0.97	1.00	1.07	-0.2%
Natural Gas	5.23	5.45	5.65	7.32	7.65	7.23	6.54	0.7%
Steam Coal	20.19	20.26	22.92	23.35	25.02	27.54	30.74	1.6%
Nuclear Power	7.96	8.23	8.44	8.66	9.09	9.09	9.09	0.4%
Renewable Energy ¹⁵	3.62	3.57	4.76	5.01	5.47	5.95	6.22	2.2%
Electricity Imports	0.02	0.04	0.07	0.08	0.05	0.05	0.05	0.9%
Total	38.14	38.67	42.82	45.38	48.24	50.86	53.71	1.3%

Reference Case

Table A2. Energy Consumption by Sector and Source (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Total Energy Consumption								
Distillate Fuel	8.48	8.72	9.57	10.19	10.83	11.64	12.70	1.5%
Kerosene	0.11	0.13	0.14	0.13	0.13	0.12	0.11	-0.6%
Jet Fuel ⁹	3.26	3.35	3.89	4.27	4.53	4.61	4.79	1.4%
Liquefied Petroleum Gas	2.76	2.85	2.92	3.02	3.14	3.27	3.40	0.7%
Motor Gasoline ²	16.98	17.30	18.70	19.91	21.10	22.19	23.38	1.2%
Petrochemical Feedstock	1.37	1.49	1.48	1.49	1.51	1.53	1.55	0.2%
Residual Fuel	1.74	1.91	1.68	1.67	1.69	1.72	1.79	-0.3%
Other Petroleum ¹²	4.26	4.32	4.75	4.99	5.21	5.50	5.86	1.2%
Petroleum Subtotal	38.96	40.08	43.14	45.69	48.14	50.57	53.58	1.1%
Natural Gas	21.19	21.24	22.28	24.71	25.62	25.75	25.67	0.7%
Lease and Plant Fuel ⁶	1.16	1.14	1.12	1.22	1.28	1.24	1.21	0.2%
Pipeline Natural Gas	0.69	0.69	0.65	0.74	0.80	0.79	0.78	0.5%
Natural Gas Subtotal	23.04	23.07	24.04	26.67	27.70	27.78	27.66	0.7%
Metallurgical Coal	0.67	0.65	0.62	0.61	0.59	0.58	0.58	-0.4%
Other Coal	21.66	21.74	24.45	24.88	26.55	29.07	32.29	1.5%
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.16	0.49	1.22	1.61	33.8%
Net Coal Coke Imports	0.05	0.14	0.02	0.02	0.02	0.01	0.02	-8.1%
Coal Subtotal	22.38	22.53	25.09	25.66	27.65	30.89	34.49	1.7%
Nuclear Power	7.96	8.23	8.44	8.66	9.09	9.09	9.09	0.4%
Renewable Energy ¹⁶	5.70	5.74	7.08	7.43	8.00	8.61	9.02	1.8%
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Electricity Imports	0.02	0.04	0.07	0.08	0.05	0.05	0.05	0.9%
Total	98.05	99.68	107.87	114.18	120.63	126.99	133.88	1.1%
Energy Use and Related Statistics								
Delivered Energy Use	71.87	73.18	78.62	83.46	88.19	93.04	98.40	1.1%
Total Energy Use	98.05	99.68	107.87	114.18	120.63	126.99	133.88	1.1%
Population (millions)	291.39	294.10	310.12	323.55	336.99	350.64	364.79	0.8%
Gross Domestic Product (billion 2000 dollars)	10321	10756	13043	15082	17541	20123	23112	3.0%
Carbon Dioxide Emissions (million metric tons)	5795.5	5899.9	6364.9	6717.6	7119.0	7586.7	8114.5	1.2%

¹Includes wood used for residential heating. See Table A4 and/or Table A17 for estimates of nonmarketed renewable energy consumption for geothermal heat pumps, solar thermal hot water heating, and solar photovoltaic electricity generation.

²Includes ethanol (blends of 10 percent or less) and ethers blended into gasoline.

³Includes commercial sector consumption of wood and wood waste, landfill gas, municipal solid waste, and other biomass for combined heat and power. See Table A17 for estimates of nonmarketed renewable energy consumption for solar thermal hot water heating and solar photovoltaic electricity generation.

⁴Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

⁵Includes petroleum coke, asphalt, road oil, lubricants, still gas, and miscellaneous petroleum products.

⁶Represents natural gas used in the field gathering and processing plant machinery.

⁷Includes consumption of energy from hydroelectric, wood and wood waste, municipal solid waste, and other biomass.

⁸Diesel fuel for on- and off- road use.

⁹Includes only kerosene type.

¹⁰Includes aviation gasoline and lubricants.

¹¹E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol actually varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

¹²Includes unfinished oils, natural gasoline, motor gasoline blending components, aviation gasoline, lubricants, still gas, asphalt, road oil, petroleum coke, and miscellaneous petroleum products.

¹³Includes electricity generated for sale to the grid and for own use from renewable sources, and non-electric energy from renewable sources. Excludes nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

¹⁴Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

¹⁵Includes conventional hydroelectric, geothermal, wood and wood waste, municipal solid waste, other biomass, petroleum coke, wind, photovoltaic and solar thermal sources. Excludes net electricity imports.

¹⁶Includes hydroelectric, geothermal, wood and wood waste, municipal solid waste, other biomass, wind, photovoltaic and solar thermal sources. Includes ethanol components of E85; excludes ethanol blends (10 percent or less) in motor gasoline. Excludes net electricity imports and nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

Btu = British thermal unit.

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports. Consumption values of 0.00 are values that round to 0.00, because they are less than 0.005.

Sources: 2003 and 2004 consumption based on: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2003 and 2004 population and gross domestic product: Global Insight macroeconomic model CTL0805. 2003 and 2004 carbon dioxide emissions: EIA, *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005). Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A3. Energy Prices by Sector and Source
(2004 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Residential	16.25	17.31	16.98	16.65	17.19	17.89	18.51	0.3%
Primary Energy ¹	9.90	11.39	11.28	10.82	11.31	12.01	12.62	0.4%
Petroleum Products ²	11.61	14.63	14.77	14.72	15.94	17.31	18.42	0.9%
Distillate Fuel	9.85	13.62	12.85	12.73	13.55	14.23	14.56	0.3%
Liquefied Petroleum Gas	15.00	17.30	18.17	17.91	19.34	21.19	22.68	1.0%
Natural Gas	9.43	10.40	10.33	9.80	10.16	10.76	11.32	0.3%
Electricity	26.14	26.19	24.78	24.24	24.44	24.76	25.02	-0.2%
Commercial	15.95	16.56	16.27	15.80	16.28	16.95	17.52	0.2%
Primary Energy ¹	8.11	9.20	8.96	8.45	8.74	9.21	9.65	0.2%
Petroleum Products ²	8.17	10.39	10.56	10.65	11.22	11.78	12.28	0.6%
Distillate Fuel	7.24	9.99	10.15	10.39	10.89	11.33	11.77	0.6%
Residual Fuel	5.11	6.37	6.14	6.04	6.31	6.66	6.91	0.3%
Natural Gas	8.26	9.10	8.76	8.12	8.37	8.83	9.29	0.1%
Electricity	23.90	23.52	22.31	21.66	22.00	22.52	22.90	-0.1%
Industrial³	8.03	8.67	8.48	8.15	8.48	8.84	9.27	0.3%
Primary Energy	6.66	7.42	7.19	6.92	7.24	7.62	8.09	0.3%
Petroleum Products ²	8.60	9.65	9.46	9.44	9.94	10.63	11.36	0.6%
Distillate Fuel	7.45	10.29	10.75	11.42	11.84	12.35	12.91	0.9%
Liquefied Petroleum Gas	12.93	14.24	12.03	11.80	12.92	14.06	15.25	0.3%
Residual Fuel	4.72	5.88	6.31	6.32	6.70	6.99	7.27	0.8%
Natural Gas ⁴	5.59	6.10	5.69	5.16	5.49	5.99	6.45	0.2%
Metallurgical Coal ⁵	1.90	2.24	2.36	2.19	2.23	2.28	2.28	0.1%
Other Industrial Coal ⁵	1.62	1.74	1.86	1.80	1.81	1.86	1.92	0.4%
Coal to Liquids	N/A	N/A	N/A	0.86	1.04	1.22	1.26	N/A
Electricity	15.49	15.54	15.65	14.95	15.35	15.76	15.95	0.1%
Transportation	11.83	13.81	14.83	14.82	15.38	15.84	16.32	0.6%
Primary Energy	11.80	13.79	14.82	14.80	15.36	15.83	16.31	0.6%
Petroleum Products ²	11.80	13.79	14.82	14.82	15.38	15.84	16.32	0.7%
Distillate Fuel ⁶	11.24	13.25	14.29	14.56	14.78	15.15	15.65	0.6%
Jet Fuel ⁷	6.65	9.02	9.67	9.87	10.49	10.92	11.53	0.9%
Motor Gasoline ⁸	13.31	15.34	16.52	16.34	17.02	17.49	17.92	0.6%
Residual Fuel	4.63	4.91	6.43	6.31	6.54	7.05	7.59	1.7%
Liquefied Petroleum Gas ⁹	17.14	17.14	16.72	16.33	16.82	18.40	19.25	0.4%
Natural Gas ¹⁰	8.90	9.94	10.09	9.61	9.90	10.32	10.68	0.3%
Ethanol (E85) ¹¹	16.71	20.24	21.19	20.50	21.10	21.74	22.48	0.4%
Electricity	21.74	21.67	20.76	20.25	20.56	20.86	21.00	-0.1%
Average End-Use Energy	11.82	13.00	13.32	13.16	13.66	14.14	14.64	0.5%
Primary Energy	9.58	11.04	11.52	11.40	11.89	12.35	12.86	0.6%
Electricity	22.28	22.19	21.43	20.87	21.23	21.69	22.00	-0.0%
Electric Power¹²	2.35	2.46	2.41	2.41	2.46	2.50	2.49	0.0%
Fossil Fuel Average	2.35	2.46	2.41	2.41	2.46	2.50	2.49	0.0%
Petroleum Products	5.35	5.43	6.50	6.52	6.91	7.37	7.61	1.3%
Distillate Fuel	6.65	9.23	9.04	9.02	9.62	10.05	10.28	0.4%
Residual Fuel	4.90	4.76	5.70	5.72	6.02	6.43	6.73	1.3%
Natural Gas	5.66	5.92	5.46	5.08	5.40	5.87	6.26	0.2%
Steam Coal ⁵	1.33	1.36	1.48	1.40	1.39	1.44	1.51	0.4%

Reference Case

Table A3. Energy Prices by Sector and Source (Continued)
(2004 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Average Price to All Users¹³								
Petroleum Products ²	10.86	12.61	13.41	13.45	14.05	14.61	15.16	0.7%
Distillate Fuel	10.20	12.62	13.30	13.72	14.07	14.52	15.04	0.7%
Jet Fuel	6.65	9.02	9.67	9.87	10.49	10.92	11.53	0.9%
Liquefied Petroleum Gas	13.40	14.89	13.39	13.19	14.38	15.66	16.90	0.5%
Motor Gasoline ⁸	13.30	15.33	16.52	16.34	17.02	17.49	17.92	0.6%
Residual Fuel	4.80	5.04	6.07	6.03	6.31	6.75	7.12	1.3%
Natural Gas	6.98	7.52	7.19	6.60	6.93	7.47	7.98	0.2%
Metallurgical Coal ⁵	1.90	2.24	2.36	2.19	2.23	2.28	2.28	0.1%
Other Coal ⁵	1.35	1.39	1.51	1.43	1.42	1.46	1.53	0.4%
Coal to Liquids	0.00	0.00	0.00	0.86	1.04	1.22	1.26	N/A
Ethanol (E85) ¹¹	16.71	20.24	21.19	20.50	21.10	21.74	22.48	0.4%
Electricity	22.28	22.19	21.43	20.87	21.23	21.69	22.00	-0.0%
Non-Renewable Energy Expenditures by Sector (billion 2004 dollars)								
Residential	180.52	190.90	200.59	206.16	221.50	236.52	252.12	1.1%
Commercial	131.57	135.07	145.01	154.28	172.19	193.44	216.48	1.8%
Industrial	153.18	170.01	169.60	167.05	179.83	197.21	216.86	0.9%
Transportation	312.29	374.67	445.81	479.43	530.44	578.48	635.46	2.1%
Total Non-Renewable Expenditures	777.56	870.65	961.01	1006.92	1103.97	1205.65	1320.94	1.6%
Transportation Renewable Expenditures	0.02	0.02	0.05	0.08	0.10	0.12	0.13	6.9%
Total Expenditures	777.58	870.67	961.06	1007.00	1104.07	1205.76	1321.07	1.6%

¹Weighted average price includes fuels below as well as coal.

²This quantity is the weighted average for all petroleum products, not just those listed below.

³Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

⁴Excludes use for lease and plant fuel.

⁵Excludes imported coal.

⁶Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

⁷Kerosene-type jet fuel. Includes Federal and State taxes while excluding county and local taxes.

⁸Sales weighted-average price for all grades. Includes Federal, State and local taxes.

⁹Includes Federal and State taxes while excluding county and local taxes.

¹⁰Compressed natural gas used as a vehicle fuel. Includes estimated motor vehicle fuel taxes.

¹¹E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol actually varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

¹²Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

¹³Weighted averages of end-use fuel prices are derived from the prices shown in each sector and the corresponding sectoral consumption.

Btu = British thermal unit.

N/A = Not applicable.

Note: Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 prices for motor gasoline, distillate, and jet fuel are based on prices in the Energy Information Administration (EIA), *Petroleum Marketing Annual 2004*, DOE/EIA-0487(2004) (Washington, DC, August 2005). 2003 residential and commercial natural gas delivered prices: EIA, *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004). 2004 residential and commercial natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2003 and 2004 industrial natural gas delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey 1994* and industrial and wellhead prices from the *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004) and the *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2003 transportation sector natural gas delivered prices are based on EIA, *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004) and estimated state and federal taxes. 2004 transportation sector natural gas delivered prices are model results. 2003 and 2004 electric power sector natural gas prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, May 2003 through April 2004, Table 4.11.A. 2003 and 2004 coal prices based on: EIA, *Quarterly Coal Report, October-December 2004*, DOE/EIA-0121(2004/4Q) (Washington, DC, March 2005) and EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A. 2003 and 2004 electricity prices: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2003 and 2004 ethanol prices derived from weekly spot prices in the Oxy Fuel News. **Projections:** EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A4. Residential Sector Key Indicators and Consumption
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Key Indicators								
Households (millions)								
Single-Family	76.15	77.53	84.95	90.49	95.85	100.66	105.20	1.2%
Multifamily	29.51	29.80	31.46	32.72	34.09	35.37	36.81	0.8%
Mobile Homes	6.35	6.32	6.52	6.90	7.25	7.52	7.80	0.8%
Total	112.01	113.65	122.93	130.11	137.19	143.55	149.81	1.1%
Average House Square Footage	1728	1740	1812	1861	1905	1944	1977	0.5%
Energy Intensity								
(million Btu per household)								
Delivered Energy Consumption	102.7	100.6	99.6	98.4	97.0	95.0	93.7	-0.3%
Total Energy Consumption	187.7	185.1	187.0	185.0	183.4	180.3	177.8	-0.2%
(thousand Btu per square foot)								
Delivered Energy Consumption	59.5	57.8	55.0	52.9	50.9	48.9	47.4	-0.8%
Total Energy Consumption	108.6	106.4	103.2	99.4	96.3	92.8	89.9	-0.6%
Delivered Energy Consumption by Fuel								
Electricity								
Space Heating	0.40	0.39	0.44	0.46	0.48	0.49	0.49	0.9%
Space Cooling	0.65	0.64	0.70	0.73	0.77	0.80	0.85	1.1%
Water Heating	0.37	0.37	0.38	0.39	0.39	0.39	0.39	0.2%
Refrigeration	0.41	0.40	0.37	0.35	0.36	0.36	0.38	-0.2%
Cooking	0.10	0.10	0.11	0.12	0.13	0.14	0.14	1.2%
Clothes Dryers	0.24	0.24	0.26	0.27	0.28	0.29	0.30	0.8%
Freezers	0.13	0.13	0.12	0.12	0.12	0.13	0.13	0.1%
Lighting	0.76	0.78	0.85	0.93	0.99	1.05	1.11	1.4%
Clothes Washers ¹	0.03	0.03	0.03	0.03	0.03	0.03	0.03	-0.6%
Dishwashers ¹	0.02	0.02	0.03	0.03	0.03	0.03	0.03	1.2%
Color Televisions	0.13	0.14	0.19	0.23	0.27	0.28	0.30	3.0%
Personal Computers	0.07	0.07	0.10	0.11	0.13	0.14	0.16	3.1%
Furnace Fans	0.08	0.08	0.09	0.10	0.11	0.11	0.12	1.4%
Other Uses ²	0.94	1.00	1.31	1.51	1.70	1.86	2.03	2.8%
Delivered Energy	4.34	4.41	4.99	5.38	5.77	6.10	6.47	1.5%
Natural Gas								
Space Heating	3.69	3.50	3.73	3.87	3.98	4.02	4.06	0.6%
Space Cooling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.9%
Water Heating	1.17	1.15	1.19	1.22	1.25	1.26	1.28	0.4%
Cooking	0.21	0.21	0.23	0.24	0.26	0.27	0.28	1.0%
Clothes Dryers	0.07	0.07	0.08	0.09	0.10	0.11	0.11	1.8%
Other Uses ³	0.10	0.10	0.09	0.09	0.09	0.09	0.09	-0.4%
Delivered Energy	5.25	5.03	5.33	5.52	5.68	5.74	5.82	0.6%
Distillate								
Space Heating	0.79	0.82	0.73	0.69	0.64	0.59	0.53	-1.7%
Water Heating	0.11	0.12	0.11	0.10	0.09	0.08	0.08	-1.9%
Other Uses ⁴	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Delivered Energy	0.91	0.94	0.84	0.79	0.73	0.67	0.61	-1.7%
Liquefied Petroleum Gas								
Space Heating	0.29	0.29	0.28	0.28	0.28	0.27	0.26	-0.4%
Water Heating	0.05	0.05	0.05	0.05	0.05	0.05	0.05	-0.1%
Cooking	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.4%
Other Uses ³	0.16	0.17	0.20	0.23	0.25	0.28	0.30	2.2%
Delivered Energy	0.52	0.54	0.56	0.59	0.61	0.63	0.65	0.7%
Marketed Renewables (wood) ⁵	0.40	0.41	0.44	0.43	0.43	0.42	0.41	0.1%
Other Fuels ⁶	0.09	0.10	0.10	0.10	0.09	0.09	0.08	-1.0%

Reference Case

Table A4. Residential Sector Key Indicators and Consumption (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Delivered Energy Consumption by End Use								
Space Heating	5.66	5.51	5.73	5.84	5.91	5.87	5.84	0.2%
Space Cooling	0.65	0.64	0.70	0.73	0.77	0.80	0.85	1.1%
Water Heating	1.70	1.70	1.73	1.76	1.78	1.78	1.80	0.2%
Refrigeration	0.41	0.40	0.37	0.35	0.36	0.36	0.38	-0.2%
Cooking	0.34	0.35	0.37	0.39	0.42	0.43	0.45	1.0%
Clothes Dryers	0.31	0.32	0.34	0.36	0.38	0.39	0.42	1.1%
Freezers	0.13	0.13	0.12	0.12	0.12	0.13	0.13	0.1%
Lighting	0.76	0.78	0.85	0.93	0.99	1.05	1.11	1.4%
Clothes Washers	0.03	0.03	0.03	0.03	0.03	0.03	0.03	-0.6%
Dishwashers	0.02	0.02	0.03	0.03	0.03	0.03	0.03	1.2%
Color Televisions	0.13	0.14	0.19	0.23	0.27	0.28	0.30	3.0%
Personal Computers	0.07	0.07	0.10	0.11	0.13	0.14	0.16	3.1%
Furnace Fans	0.08	0.08	0.09	0.10	0.11	0.11	0.12	1.4%
Other Uses ⁷	1.20	1.27	1.60	1.83	2.04	2.22	2.42	2.5%
Delivered Energy	11.51	11.44	12.25	12.81	13.31	13.64	14.04	0.8%
Electricity Related Losses	9.51	9.60	10.74	11.26	11.85	12.24	12.60	1.1%
Total Energy Consumption by End Use								
Space Heating	6.55	6.36	6.68	6.81	6.89	6.84	6.80	0.3%
Space Cooling	2.08	2.04	2.22	2.26	2.34	2.42	2.51	0.8%
Water Heating	2.52	2.51	2.55	2.58	2.59	2.57	2.56	0.1%
Refrigeration	1.29	1.27	1.15	1.09	1.08	1.09	1.12	-0.5%
Cooking	0.57	0.57	0.62	0.65	0.68	0.70	0.73	0.9%
Clothes Dryers	0.84	0.85	0.89	0.91	0.94	0.97	1.01	0.7%
Freezers	0.42	0.41	0.37	0.37	0.38	0.38	0.39	-0.2%
Lighting	2.41	2.46	2.69	2.87	3.03	3.15	3.27	1.1%
Clothes Washers	0.10	0.10	0.10	0.09	0.08	0.08	0.08	-0.9%
Dishwashers	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.9%
Color Televisions	0.42	0.45	0.60	0.71	0.82	0.86	0.89	2.7%
Personal Computers	0.22	0.22	0.32	0.35	0.38	0.42	0.46	2.8%
Furnace Fans	0.27	0.26	0.30	0.31	0.33	0.34	0.35	1.2%
Other Uses ⁷	3.26	3.46	4.42	4.98	5.52	5.95	6.38	2.4%
Total	21.02	21.04	22.99	24.07	25.17	25.88	26.64	0.9%
Nonmarketed Renewables								
Geothermal ⁸	0.00	0.00	0.01	0.01	0.01	0.01	0.01	7.1%
Solar ⁹	0.02	0.02	0.03	0.04	0.04	0.05	0.05	3.0%
Total	0.02	0.03	0.04	0.04	0.05	0.06	0.06	3.5%

¹Does not include electric water heating portion of load.

²Includes small electric devices, heating elements, and motors not listed above.

³Includes such appliances as swimming pool heaters, outdoor grills, and outdoor lighting (natural gas).

⁴Includes such appliances as swimming pool and spa heaters.

⁵Includes wood used for primary and secondary heating in wood stoves or fireplaces as reported in the *Residential Energy Consumption Survey 2001*.

⁶Includes kerosene and coal.

⁷Includes all other uses listed above.

⁸Includes primary energy displaced by geothermal heat pumps in space heating and cooling applications.

⁹Includes primary energy displaced by solar thermal water heaters and electricity generated using photovoltaics.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 based on: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005).

Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A5. Commercial Sector Key Indicators and Consumption
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Key Indicators								
Total Floorspace (billion square feet)								
Surviving	71.6	73.1	80.4	86.8	93.7	101.2	109.4	1.6%
New Additions	2.1	2.0	2.0	2.1	2.3	2.4	2.6	1.1%
Total	73.7	75.0	82.3	88.9	96.0	103.7	112.0	1.6%
Energy Consumption Intensity (thousand Btu per square foot)								
Delivered Energy Consumption	113.2	109.9	109.3	110.8	111.1	111.0	111.0	0.0%
Electricity Related Losses	121.6	121.6	127.7	127.9	128.7	128.5	127.5	0.2%
Total Energy Consumption	234.8	231.5	237.0	238.8	239.8	239.5	238.6	0.1%
Delivered Energy Consumption by Fuel								
Purchased Electricity								
Space Heating ¹	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.7%
Space Cooling ¹	0.43	0.41	0.44	0.46	0.48	0.51	0.55	1.1%
Water Heating ¹	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.5%
Ventilation	0.16	0.17	0.17	0.18	0.19	0.20	0.21	1.0%
Cooking	0.03	0.03	0.03	0.03	0.03	0.03	0.03	-0.1%
Lighting	1.09	1.10	1.17	1.27	1.36	1.44	1.52	1.2%
Refrigeration	0.20	0.21	0.22	0.24	0.25	0.27	0.29	1.3%
Office Equipment (PC)	0.13	0.14	0.23	0.26	0.29	0.30	0.30	3.0%
Office Equipment (non-PC)	0.27	0.31	0.46	0.55	0.65	0.76	0.89	4.1%
Other Uses ²	1.48	1.53	1.84	2.12	2.44	2.80	3.19	2.9%
Delivered Energy	4.09	4.19	4.88	5.43	6.01	6.63	7.34	2.2%
Natural Gas								
Space Heating ¹	1.27	1.20	1.30	1.40	1.47	1.53	1.60	1.1%
Space Cooling ¹	0.01	0.01	0.01	0.02	0.02	0.03	0.03	4.3%
Water Heating ¹	0.55	0.54	0.53	0.60	0.65	0.71	0.76	1.3%
Cooking	0.26	0.26	0.28	0.32	0.35	0.37	0.40	1.7%
Other Uses ³	1.23	1.07	1.05	1.13	1.19	1.25	1.32	0.8%
Delivered Energy	3.32	3.09	3.18	3.46	3.68	3.89	4.11	1.1%
Distillate								
Space Heating ¹	0.21	0.19	0.22	0.23	0.23	0.24	0.25	1.0%
Water Heating ¹	0.07	0.07	0.06	0.06	0.06	0.06	0.06	-0.1%
Other Uses ⁴	0.20	0.24	0.20	0.20	0.20	0.20	0.20	-0.7%
Delivered Energy	0.48	0.50	0.48	0.49	0.50	0.51	0.52	0.1%
Marketed Renewables (biomass)	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.0%
Other Fuels ⁵	0.35	0.37	0.37	0.38	0.38	0.38	0.39	0.2%
Delivered Energy Consumption by End Use								
Space Heating ¹	1.63	1.55	1.67	1.79	1.87	1.94	2.02	1.0%
Space Cooling ¹	0.44	0.42	0.46	0.48	0.51	0.54	0.58	1.2%
Water Heating ¹	0.76	0.75	0.73	0.80	0.87	0.93	0.99	1.1%
Ventilation	0.16	0.17	0.17	0.18	0.19	0.20	0.21	1.0%
Cooking	0.29	0.29	0.32	0.35	0.38	0.40	0.43	1.5%
Lighting	1.09	1.10	1.17	1.27	1.36	1.44	1.52	1.2%
Refrigeration	0.20	0.21	0.22	0.24	0.25	0.27	0.29	1.3%
Office Equipment (PC)	0.13	0.14	0.23	0.26	0.29	0.30	0.30	3.0%
Office Equipment (non-PC)	0.27	0.31	0.46	0.55	0.65	0.76	0.89	4.1%
Other Uses ⁶	3.36	3.31	3.55	3.93	4.31	4.72	5.19	1.7%
Delivered Energy	8.34	8.24	9.00	9.85	10.66	11.50	12.44	1.6%

Reference Case

Table A5. Commercial Sector Key Indicators and Consumption (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Electricity Related Losses	8.96	9.13	10.51	11.37	12.35	13.32	14.29	1.7%
Total Energy Consumption by End Use								
Space Heating ¹	1.97	1.87	2.02	2.13	2.21	2.29	2.37	0.9%
Space Cooling ¹	1.39	1.32	1.41	1.44	1.50	1.57	1.66	0.9%
Water Heating ¹	1.06	1.06	1.04	1.11	1.18	1.24	1.30	0.8%
Ventilation	0.52	0.53	0.54	0.56	0.57	0.60	0.63	0.7%
Cooking	0.36	0.36	0.38	0.42	0.44	0.46	0.49	1.2%
Lighting	3.48	3.51	3.70	3.94	4.15	4.33	4.49	1.0%
Refrigeration	0.65	0.66	0.71	0.74	0.78	0.82	0.86	1.0%
Office Equipment (PC)	0.41	0.44	0.74	0.82	0.88	0.89	0.89	2.7%
Office Equipment (non-PC)	0.86	0.99	1.46	1.71	1.98	2.29	2.63	3.8%
Other Uses ⁶	6.61	6.64	7.52	8.37	9.33	10.34	11.41	2.1%
Total	17.30	17.37	19.51	21.23	23.02	24.82	26.73	1.7%
Nonmarketed Renewable Fuels								
Solar ⁷	0.02	0.03	0.03	0.03	0.03	0.03	0.04	1.6%

¹Includes fuel consumption for district services.

²Includes miscellaneous uses, such as service station equipment, automated teller machines, telecommunications equipment, and medical equipment.

³Includes miscellaneous uses, such as pumps, emergency electric generators, combined heat and power in commercial buildings, and manufacturing performed in commercial buildings.

⁴Includes miscellaneous uses, such as cooking, emergency electric generators, and combined heat and power in commercial buildings.

⁵Includes residual fuel oil, liquefied petroleum gas, coal, motor gasoline, and kerosene.

⁶Includes miscellaneous uses, such as service station equipment, automated teller machines, telecommunications equipment, medical equipment, pumps, emergency electric generators, combined heat and power in commercial buildings, manufacturing performed in commercial buildings, and cooking (distillate), plus residual fuel oil, liquefied petroleum gas, coal, motor gasoline, and kerosene.

⁷Includes primary energy displaced by solar thermal space heating and water heating, and electricity generation by solar photovoltaic systems.

Btu = British thermal unit.

PC = Personal computer.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 based on: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005).

Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A6. Industrial Sector Key Indicators and Consumption

Key Indicators and Consumption	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Key Indicators								
Value of Shipments (billion 2000 dollars)								
Manufacturing	3985	4204	4783	5347	5969	6664	7509	2.3%
Nonmanufacturing	1393	1439	1572	1689	1808	1926	2069	1.4%
Total	5378	5643	6355	7036	7778	8589	9578	2.1%
Energy Prices (2004 dollars per million Btu)								
Distillate Oil	7.45	10.29	10.75	11.42	11.84	12.35	12.91	0.9%
Liquefied Petroleum Gas	12.93	14.24	12.03	11.80	12.92	14.06	15.25	0.3%
Residual Oil	4.72	5.88	6.31	6.32	6.70	6.99	7.27	0.8%
Motor Gasoline	13.16	15.18	16.46	16.29	16.97	17.43	17.87	0.6%
Natural Gas	5.59	6.10	5.69	5.16	5.49	5.99	6.45	0.2%
Metallurgical Coal	1.90	2.24	2.36	2.19	2.23	2.28	2.28	0.1%
Other Industrial Coal	1.62	1.74	1.86	1.80	1.81	1.86	1.92	0.4%
Coal to Liquids	N/A	N/A	N/A	0.86	1.04	1.22	1.26	N/A
Electricity	15.49	15.54	15.65	14.95	15.35	15.76	15.95	0.1%
Energy Consumption (quadrillion Btu)¹								
Distillate	1.14	1.19	1.20	1.20	1.23	1.26	1.32	0.4%
Liquefied Petroleum Gas	2.12	2.19	2.21	2.26	2.34	2.44	2.54	0.6%
Petrochemical Feedstocks	1.37	1.49	1.48	1.49	1.51	1.53	1.55	0.2%
Residual Fuel	0.22	0.24	0.20	0.19	0.20	0.21	0.21	-0.4%
Motor Gasoline	0.31	0.32	0.32	0.32	0.32	0.33	0.34	0.2%
Petroleum Coke	0.83	0.94	1.12	1.18	1.24	1.26	1.34	1.4%
Still Gas	1.55	1.55	1.78	1.94	2.07	2.27	2.44	1.8%
Asphalt and Road Oil	1.22	1.24	1.22	1.23	1.25	1.30	1.39	0.4%
Miscellaneous Petroleum ²	0.53	0.43	0.48	0.48	0.49	0.50	0.52	0.7%
Petroleum Subtotal	9.28	9.58	10.01	10.29	10.65	11.10	11.66	0.8%
Natural Gas	7.38	7.64	8.07	8.33	8.52	8.77	9.08	0.7%
Lease and Plant Fuel ³	1.16	1.14	1.12	1.22	1.28	1.24	1.21	0.2%
Natural Gas Subtotal	8.54	8.78	9.19	9.55	9.80	10.02	10.29	0.6%
Metallurgical Coal and Coke ⁴	0.72	0.79	0.64	0.62	0.61	0.59	0.59	-1.1%
Other Industrial Coal	1.38	1.38	1.43	1.43	1.43	1.43	1.45	0.2%
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.16	0.49	1.22	1.61	33.8%
Coal Subtotal	2.09	2.16	2.07	2.21	2.53	3.25	3.65	2.0%
Renewables ⁵	1.59	1.68	1.79	1.90	2.01	2.14	2.29	1.2%
Purchased Electricity	3.44	3.48	3.62	3.76	3.91	4.08	4.31	0.8%
Delivered Energy	24.94	25.68	26.67	27.72	28.91	30.58	32.19	0.9%
Electricity Related Losses	7.53	7.58	7.79	7.88	8.04	8.19	8.39	0.4%
Total	32.46	33.27	34.46	35.60	36.95	38.77	40.58	0.8%
Energy Consumption per dollar of Shipment (thousand Btu per 2000 dollars)								
Distillate	0.21	0.21	0.19	0.17	0.16	0.15	0.14	-1.6%
Liquefied Petroleum Gas	0.39	0.39	0.35	0.32	0.30	0.28	0.27	-1.4%
Petrochemical Feedstocks	0.25	0.26	0.23	0.21	0.19	0.18	0.16	-1.9%
Residual Fuel	0.04	0.04	0.03	0.03	0.03	0.02	0.02	-2.4%
Motor Gasoline	0.06	0.06	0.05	0.05	0.04	0.04	0.04	-1.8%
Petroleum Coke	0.15	0.17	0.18	0.17	0.16	0.15	0.14	-0.7%
Still Gas	0.29	0.28	0.28	0.28	0.27	0.26	0.25	-0.3%
Asphalt and Road Oil	0.23	0.22	0.19	0.17	0.16	0.15	0.15	-1.6%
Miscellaneous Petroleum ²	0.10	0.08	0.08	0.07	0.06	0.06	0.05	-1.3%
Petroleum Subtotal	1.73	1.70	1.57	1.46	1.37	1.29	1.22	-1.3%
Natural Gas	1.37	1.35	1.27	1.18	1.09	1.02	0.95	-1.4%
Lease and Plant Fuel ³	0.22	0.20	0.18	0.17	0.16	0.14	0.13	-1.8%
Natural Gas Subtotal	1.59	1.56	1.45	1.36	1.26	1.17	1.07	-1.4%
Metallurgical Coal and Coke ⁴	0.13	0.14	0.10	0.09	0.08	0.07	0.06	-3.1%
Other Industrial Coal	0.26	0.24	0.23	0.20	0.18	0.17	0.15	-1.8%
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.02	0.06	0.14	0.17	31.1%
Coal Subtotal	0.39	0.38	0.33	0.31	0.33	0.38	0.38	-0.0%
Renewables ⁵	0.30	0.30	0.28	0.27	0.26	0.25	0.24	-0.8%
Purchased Electricity	0.64	0.62	0.57	0.53	0.50	0.47	0.45	-1.2%
Delivered Energy	4.64	4.55	4.20	3.94	3.72	3.56	3.36	-1.2%
Electricity Related Losses	1.40	1.34	1.23	1.12	1.03	0.95	0.88	-1.6%
Total	6.04	5.89	5.42	5.06	4.75	4.51	4.24	-1.3%

Reference Case

Table A6. Industrial Sector Key Indicators and Consumption (Continued)

Key Indicators and Consumption	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Industrial Combined Heat and Power								
Capacity (gigawatts)	26.74	27.53	30.09	34.56	41.70	53.64	60.83	3.1%
Generation (billion kilowatthours)	149.85	149.23	178.58	212.43	266.77	356.08	412.59	4.0%

¹Fuel consumption includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

²Includes lubricants and miscellaneous petroleum products.

³Represents natural gas used in the field gathering and processing plant machinery.

⁴Includes net coal coke imports.

⁵Includes consumption of energy from hydroelectric, wood and wood waste, municipal solid waste, and other biomass.

Btu = British thermal unit.

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 prices for motor gasoline and distillate are based on: Energy Information Administration (EIA), *Petroleum Marketing Annual 2004*, DOE/EIA-0487(2004) (Washington, DC, August 2005). 2003 and 2004 coal prices are based on: EIA, *Quarterly Coal Report, October-December 2004*, DOE/EIA-0121(2004/4Q) (Washington, DC, March 2005) and EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A. 2003 and 2004 electricity prices: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2003 and 2004 natural gas prices based on: EIA, *Manufacturing Energy Consumption Survey 1994* and industrial and wellhead prices from the *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004) and the *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2003 and 2004 consumption values based on: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2003 and 2004 shipments: Global Insight industry model, July 2004. **Projections:** EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A7. Transportation Sector Key Indicators and Delivered Energy Consumption

Key Indicators and Consumption	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Key Indicators								
Level of Travel								
(billion vehicle miles traveled)								
Light-Duty Vehicles less than 8,500 pounds	2594	2632	2890	3171	3474	3791	4132	1.8%
Commercial Light Trucks ¹	66	69	77	85	94	103	115	2.0%
Freight Trucks greater than 10,000 pounds	216	226	261	292	328	367	413	2.3%
(billion seat miles available)								
Air	919	980	1192	1340	1452	1507	1567	1.8%
(billion ton miles traveled)								
Rail	1489	1539	1721	1825	1983	2188	2403	1.7%
Domestic Shipping	597	629	683	727	767	792	824	1.0%
Energy Efficiency Indicators								
(miles per gallon)								
New Light-Duty Vehicle ²	25.0	24.9	26.7	27.4	28.0	28.8	29.2	0.6%
New Car ²	29.4	29.3	31.4	32.2	32.7	33.5	33.8	0.6%
New Light Truck ²	21.6	21.5	23.2	24.0	24.9	25.8	26.4	0.8%
Light-Duty Stock ³	20.2	20.2	20.4	20.8	21.4	22.0	22.5	0.4%
New Commercial Light Truck ¹	14.4	14.5	15.4	15.8	16.3	16.9	17.1	0.6%
Stock Commercial Light Truck ¹	14.0	14.1	14.6	15.2	15.7	16.2	16.7	0.7%
Freight Truck	6.0	6.0	6.0	6.2	6.4	6.6	6.8	0.5%
(seat miles per gallon)								
Aircraft	55.3	55.5	59.0	63.0	67.6	72.4	76.0	1.2%
(ton miles per thousand Btu)								
Rail	2.9	2.9	2.9	2.9	3.0	3.0	3.0	0.1%
Domestic Shipping	2.1	2.1	2.2	2.2	2.2	2.2	2.2	0.2%
Energy Use by Mode								
(quadrillion Btu)								
Light-Duty Vehicles	15.90	16.21	17.71	19.00	20.30	21.56	22.98	1.4%
Commercial Light Trucks ¹	0.59	0.61	0.66	0.70	0.75	0.80	0.86	1.3%
Bus Transportation	0.26	0.27	0.28	0.29	0.29	0.29	0.30	0.4%
Freight Trucks	4.50	4.70	5.42	5.92	6.37	6.90	7.57	1.9%
Rail, Passenger	0.13	0.13	0.14	0.15	0.15	0.16	0.17	0.8%
Rail, Freight	0.51	0.53	0.59	0.62	0.67	0.74	0.80	1.6%
Shipping, Domestic	0.28	0.30	0.32	0.33	0.35	0.36	0.37	0.8%
Shipping, International	0.51	0.55	0.55	0.56	0.56	0.57	0.57	0.1%
Recreational Boats	0.16	0.17	0.17	0.17	0.18	0.18	0.19	0.5%
Air	2.76	2.82	3.32	3.68	3.92	3.98	4.15	1.5%
Military Use	0.67	0.71	0.76	0.78	0.81	0.82	0.84	0.7%
Lubricants	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.4%
Pipeline Fuel	0.69	0.69	0.65	0.74	0.80	0.79	0.78	0.5%
Total	27.12	27.82	30.70	33.09	35.30	37.31	39.72	1.4%

Reference Case

Table A7. Transportation Sector Key Indicators and Delivered Energy Consumption (Continued)

Key Indicators and Consumption	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Energy Use by Mode								
(million barrels per day oil equivalent)								
Light-Duty Vehicles	8.36	8.51	9.40	10.13	10.83	11.49	12.23	1.4%
Commercial Light Trucks ¹	0.31	0.32	0.35	0.37	0.40	0.43	0.46	1.4%
Bus Transportation	0.12	0.13	0.13	0.14	0.14	0.14	0.14	0.5%
Freight Trucks	2.15	2.24	2.59	2.84	3.05	3.31	3.63	1.9%
Rail, Passenger	0.06	0.06	0.07	0.07	0.07	0.08	0.08	0.8%
Rail, Freight	0.24	0.25	0.28	0.30	0.32	0.35	0.38	1.6%
Shipping, Domestic	0.13	0.14	0.15	0.16	0.16	0.17	0.17	0.9%
Shipping, International	0.22	0.24	0.24	0.24	0.25	0.25	0.25	0.1%
Recreational Boats	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.5%
Air	1.33	1.37	1.60	1.78	1.90	1.93	2.01	1.5%
Military Use	0.32	0.34	0.36	0.38	0.39	0.40	0.40	0.7%
Lubricants	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.4%
Pipeline Fuel	0.35	0.35	0.33	0.37	0.41	0.40	0.39	0.5%
Total	13.76	14.09	15.67	16.94	18.08	19.10	20.32	1.4%

¹Commercial trucks 8,500 to 10,000 pounds.

²Environmental Protection Agency rated miles per gallon.

³Combined car and light truck "on-the-road" estimate.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004: Energy Information Administration (EIA), *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004); Federal Highway Administration, *Highway Statistics 2003* (Washington, DC, December 2004); Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 24 and Annual* (Oak Ridge, TN, December 2004); National Highway Traffic and Safety Administration, *Summary of Fuel Economy Performance* (Washington, DC, March 2004); U.S. Department of Commerce, Bureau of the Census, "Vehicle Inventory and Use Survey," EC97TV (Washington, DC, October 1999); EIA, *Describing Current and Potential Markets for Alternative-Fuel Vehicles*, DOE/EIA-0604(96) (Washington, DC, March 1996); EIA, *Alternatives to Traditional Transportation Fuels 2004*, <http://www.eia.doe.gov/fuelrenewable.html>; EIA, *State Energy Data Report 2001*, DOE/EIA-0214(2001) (Washington, DC, December 2004) U.S. Department of Transportation, Research and Special Programs Administration, *Air Carrier Statistics Monthly, December 2004/2003* (Washington, DC, 2004); EIA, *Fuel Oil and Kerosene Sales 2003*, DOE/EIA-0535(2003) (Washington, DC, November 2004); and United States Department of Defense, Defense Fuel Supply Center. **Projections:** EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A8. Electricity Supply, Disposition, Prices, and Emissions
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Generation by Fuel Type								
Electric Power Sector¹								
Power Only²								
Coal	1916	1916	2164	2209	2405	2728	3178	2.0%
Petroleum	111	110	90	89	90	93	99	-0.4%
Natural Gas ³	439	486	533	743	814	775	691	1.4%
Nuclear Power	764	789	809	829	871	871	871	0.4%
Pumped Storage/Other	-9	-8	-9	-9	-9	-9	-9	0.3%
Renewable Sources ⁴	322	319	432	445	465	486	500	1.7%
Distributed Generation (Natural Gas)	0	0	0	0	1	1	2	N/A
Total	3543	3612	4020	4306	4638	4945	5332	1.5%
Combined Heat and Power⁵								
Coal	37	38	30	30	30	29	27	-1.3%
Petroleum	5	5	2	2	2	2	2	-2.8%
Natural Gas	129	132	140	159	153	141	131	-0.1%
Renewable Sources	4	4	4	4	4	4	4	-0.3%
Total	177	182	176	195	189	177	164	-0.4%
Total Net Generation	3720	3794	4196	4501	4827	5121	5497	1.4%
Less Direct Use	27	26	28	28	28	28	28	0.3%
Net Available to the Grid	3694	3768	4168	4473	4799	5093	5469	1.4%
End-Use Generation⁶								
Coal	21	23	23	38	70	139	175	8.2%
Petroleum	5	5	12	13	14	13	13	3.9%
Natural Gas	83	83	101	116	134	152	169	2.8%
Other Gaseous Fuels ⁷	7	5	4	4	5	5	5	0.3%
Renewable Sources ⁴	35	35	40	43	46	50	55	1.8%
Other ⁸	11	12	12	12	12	12	12	-0.0%
Total	162	161	192	226	280	370	429	3.8%
Less Direct Use	137	135	149	163	186	224	250	2.4%
Total Sales to the Grid	24	26	43	62	94	146	179	7.7%
Total Electricity Generation	3882	3955	4388	4727	5108	5491	5926	1.6%
Total Net Generation to the Grid	3718	3793	4211	4536	4893	5240	5648	1.5%
Net Imports	6	11	22	23	14	15	14	0.9%
Electricity Sales by Sector								
Residential	1273	1293	1461	1576	1691	1787	1897	1.5%
Commercial	1200	1229	1430	1592	1762	1944	2151	2.2%
Industrial	1008	1021	1060	1103	1147	1195	1262	0.8%
Transportation	25	25	26	28	29	30	31	0.9%
Total	3505	3567	3978	4300	4629	4956	5341	1.6%
Direct Use	164	161	177	192	214	252	278	2.1%
Total Electricity Use	3669	3729	4155	4491	4844	5208	5619	1.6%
End-Use Prices								
(2004 cents per kilowatthour)								
Residential	8.9	8.9	8.5	8.3	8.3	8.4	8.5	-0.2%
Commercial	8.2	8.0	7.6	7.4	7.5	7.7	7.8	-0.1%
Industrial	5.3	5.3	5.3	5.1	5.2	5.4	5.4	0.1%
Transportation	7.4	7.4	7.1	6.9	7.0	7.1	7.2	-0.1%
All Sectors Average	7.6	7.6	7.3	7.1	7.2	7.4	7.5	-0.0%
Prices by Service Category								
(2004 cents per kilowatthour)								
Generation	5.0	5.0	4.7	4.6	4.8	5.0	5.1	0.1%
Transmission	0.6	0.5	0.6	0.6	0.7	0.7	0.7	0.9%
Distribution	2.1	2.1	2.0	1.9	1.9	1.8	1.8	-0.6%

Reference Case

Table A8. Electricity Supply, Disposition, Prices, and Emissions (Continued)
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Electric Power Sector Emissions¹								
Sulfur Dioxide (million tons)	10.60	10.89	5.91	4.63	4.04	3.80	3.72	-4.0%
Nitrogen Oxide (million tons)	4.12	3.74	2.34	2.10	2.13	2.16	2.17	-2.1%
Mercury (tons)	50.70	53.31	37.73	24.04	18.74	16.59	15.31	-4.7%

¹Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.

²Includes plants that only produce electricity.

³Includes electricity generation from fuel cells.

⁴Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power.

⁵Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report North American Industry Classification System code 22).

⁶Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.

⁷Other gaseous fuels include refinery and still gas.

⁸Other includes batteries, chemicals, hydrogen, pitch, purchased steam, sulfur and miscellaneous technologies.

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 power only and combined heat and power generation, sales to utilities, net imports, residential, industrial, and total electricity sales, and emissions: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005), and supporting databases. 2003 and 2004 commercial and transportation electricity sales based on: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005), and Oak Ridge National Laboratory, *Transportation Energy Data Book 24* (Oak Ridge, TN, December 2004). 2003 and 2004 prices: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A. **Projections:** EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

**Table A9. Electricity Generating Capacity
(Gigawatts)**

Net Summer Capacity ¹	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Electric Power Sector²								
Power Only³								
Coal Steam	305.5	305.0	313.7	315.0	340.9	385.7	453.1	1.5%
Other Fossil Steam ⁴	128.8	123.8	121.8	85.9	79.8	78.8	74.8	-1.9%
Combined Cycle	110.4	126.3	151.5	157.0	181.4	193.4	198.3	1.7%
Combustion Turbine/Diesel	125.2	127.2	136.1	136.3	146.1	155.9	170.8	1.1%
Nuclear Power ⁵	99.5	99.6	100.9	104.0	108.8	108.8	108.8	0.3%
Pumped Storage	20.7	20.8	20.8	20.8	20.8	20.8	20.8	N/A
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Renewable Sources ⁶	91.4	91.9	102.3	104.6	107.8	111.4	113.7	0.8%
Distributed Generation ⁷	0.0	0.0	0.2	0.6	1.4	2.4	5.5	N/A
Total	881.5	894.6	947.4	924.2	986.9	1057.2	1145.7	1.0%
Combined Heat and Power⁸								
Coal Steam	4.9	4.9	4.9	4.3	4.3	4.3	4.3	-0.4%
Other Fossil Steam ⁴	0.5	0.5	0.5	0.5	0.5	0.5	0.5	N/A
Combined Cycle	31.7	32.4	32.3	32.3	32.3	32.3	32.3	-0.0%
Combustion Turbine/Diesel	2.9	2.9	2.9	2.9	2.9	2.9	2.9	-0.0%
Renewable Sources ⁶	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.2%
Total	40.4	41.0	41.0	40.5	40.5	40.5	40.5	-0.0%
Cumulative Planned Additions⁹								
Coal Steam	0.0	0.0	8.3	9.3	9.3	9.3	9.3	N/A
Other Fossil Steam ⁴	0.0	0.0	0.1	0.1	0.1	0.1	0.1	N/A
Combined Cycle	0.0	0.0	25.7	25.7	25.7	25.7	25.7	N/A
Combustion Turbine/Diesel	0.0	0.0	5.3	5.3	5.3	5.3	5.3	N/A
Nuclear Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Pumped Storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Renewable Sources ⁶	0.0	0.0	10.0	11.0	11.1	11.2	11.4	N/A
Distributed Generation ⁷	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Total	0.0	0.0	49.4	51.5	51.6	51.7	51.8	N/A
Cumulative Unplanned Additions⁹								
Coal Steam	0.0	0.0	3.4	7.0	32.9	77.7	145.1	N/A
Other Fossil Steam ⁴	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Combined Cycle	0.0	0.0	0.0	5.5	29.9	41.9	46.8	N/A
Combustion Turbine/Diesel	0.0	0.0	4.7	11.6	21.5	31.3	46.2	N/A
Nuclear Power	0.0	0.0	0.0	2.2	6.0	6.0	6.0	N/A
Pumped Storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Renewable Sources ⁶	0.0	0.0	0.4	1.7	4.8	8.3	10.4	N/A
Distributed Generation ⁷	0.0	0.0	0.2	0.6	1.4	2.4	5.5	N/A
Total	0.0	0.0	8.8	28.6	96.5	167.7	260.0	N/A
Cumulative Electric Power Sector	0.0	0.0	58.2	80.1	148.1	219.3	311.8	N/A
Cumulative Retirements¹⁰								
Coal Steam	0.0	0.0	3.0	6.8	6.8	6.8	6.8	N/A
Other Fossil Steam ⁴	0.0	0.0	2.0	37.9	44.0	45.1	49.0	N/A
Combined Cycle	0.0	0.0	0.6	0.6	0.6	0.6	0.6	N/A
Combustion Turbine/Diesel	0.0	0.0	1.4	8.2	8.2	8.2	8.2	N/A
Nuclear Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Pumped Storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Renewable Sources ⁶	0.0	0.0	0.1	0.1	0.1	0.1	0.1	N/A
Total	0.0	0.0	7.1	53.6	59.8	60.8	64.7	N/A
Total Electric Power Sector Capacity	921.9	935.6	988.4	964.7	1027.4	1097.7	1186.2	0.9%

Reference Case

Table A9. Electricity Generating Capacity (Continued)
(Gigawatts)

Net Summer Capacity ¹	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
End-Use Generators¹¹								
Coal	4.2	4.1	4.2	6.2	10.2	19.2	23.6	6.9%
Petroleum	0.8	1.6	1.8	1.8	2.0	1.8	1.9	0.7%
Natural Gas	15.7	15.8	17.7	19.6	22.1	24.5	26.7	2.0%
Other Gaseous Fuels	1.8	1.8	1.5	1.5	1.5	1.5	1.6	-0.5%
Renewable Sources ⁶	5.3	5.4	6.6	7.1	7.7	8.4	9.9	2.4%
Other	0.7	0.7	0.7	0.7	0.7	0.7	0.7	N/A
Total	28.5	29.3	32.4	36.9	44.2	56.3	64.3	3.1%
Cumulative Capacity Additions⁹	0.0	0.0	3.1	7.6	14.8	26.9	35.0	N/A

¹Net summer capacity is the steady hourly output that generating equipment is expected to supply to system load (exclusive of auxiliary power), as demonstrated by tests during summer peak demand.

²Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.

³Includes plants that only produce electricity. Includes capacity increases (uprates) at existing units.

⁴Includes oil-, gas-, and dual-fired capacity.

⁵Nuclear capacity includes 3 gigawatts of uprates through 2030.

⁶Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power. Facilities co-firing biomass and coal are classified as coal.

⁷Primarily peak load capacity fueled by natural gas.

⁸Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report North American Industry Classification System code 22).

⁹Cumulative additions after December 31, 2004.

¹⁰Cumulative retirements after December 31, 2004.

¹¹Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 electric generating capacity and projected planned additions: Energy Information Administration (EIA), Form EIA-860, "Annual Electric Generator Report" (preliminary). Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A10. Electricity Trade
(Billion Kilowatthours, Unless Otherwise Noted)

Electricity Trade	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Interregional Electricity Trade								
Gross Domestic Sales								
Firm Power	136.7	142.4	105.5	82.4	50.6	37.9	37.9	-5.0%
Economy	215.1	233.2	231.5	200.4	168.3	165.4	158.2	-1.5%
Total	351.8	375.6	336.9	282.8	218.9	203.3	196.1	-2.5%
Gross Domestic Sales (million 2004 dollars)								
Firm Power	7129.0	7428.5	5500.9	4298.7	2639.5	1975.9	1975.9	-5.0%
Economy	9070.8	9820.2	9433.0	8328.1	7360.0	7381.2	7234.1	-1.2%
Total	16199.8	17248.6	14933.9	12626.8	9999.5	9357.1	9210.0	-2.4%
International Electricity Trade								
Imports from Canada and Mexico								
Firm Power	11.3	12.5	2.5	1.9	0.8	0.4	0.4	-12.5%
Economy	19.0	21.6	39.7	39.3	28.6	27.1	26.5	0.8%
Total	30.3	34.1	42.3	41.1	29.4	27.5	26.9	-0.9%
Exports to Canada and Mexico								
Firm Power	5.5	7.4	1.0	0.7	0.2	0.0	0.0	N/A
Economy	18.7	15.6	19.6	17.2	14.8	12.9	12.9	-0.7%
Total	24.1	23.0	20.6	17.8	15.0	12.9	12.9	-2.2%

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports. Firm Power Sales are capacity sales, meaning the delivery of the power is scheduled as part of the normal operating conditions of the affected electric systems. Economy Sales are subject to curtailment or cessation of delivery by the supplier in accordance with prior agreements or under specified conditions.

Sources: 2003 and 2004 interregional firm electricity trade data: North American Electric Reliability Council (NERC), Electricity Sales and Demand Database 2003. 2003 and 2004 Mexican electricity trade data: DOE Form FE-718R, "Annual Report of International Electrical Export/Import Data." 2003 Canadian international electricity trade data: National Energy Board, *Annual Report 2003*. 2004 Canadian electricity trade data: National Energy Board, *Annual Report 2004*. Projections: Energy Information Administration, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Reference Case

Table A11. Petroleum Supply and Disposition Balance
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Crude Oil								
Domestic Crude Production ¹	5.69	5.42	5.88	5.84	5.55	4.99	4.57	-0.7%
Alaska	0.99	0.91	0.83	0.89	0.76	0.47	0.27	-4.5%
Lower 48 States	4.71	4.51	5.05	4.95	4.79	4.52	4.30	-0.2%
Net Imports	9.65	10.06	10.05	10.47	11.26	12.33	13.51	1.1%
Gross Imports	9.66	10.09	10.08	10.50	11.28	12.35	13.53	1.1%
Exports	0.01	0.03	0.03	0.03	0.03	0.02	0.02	-0.7%
Other Crude Supply ²	-0.03	-0.00	0.00	0.00	0.00	0.00	0.00	N/A
Total Crude Supply	15.32	15.48	15.93	16.31	16.81	17.32	18.08	0.6%
Other Petroleum Supply								
Natural Gas Plant Liquids	1.72	1.81	1.75	1.88	1.94	1.90	1.87	0.1%
Net Product Imports	1.60	2.05	2.28	2.76	3.16	3.35	3.73	2.3%
Gross Refined Product Imports ³	1.85	2.07	2.39	2.83	3.13	3.25	3.56	2.1%
Unfinished Oil Imports	0.34	0.49	0.41	0.44	0.54	0.60	0.66	1.2%
Blending Component Imports	0.41	0.41	0.46	0.49	0.52	0.55	0.57	1.3%
Exports	0.96	0.96	0.98	1.00	1.03	1.04	1.07	0.4%
Refinery Processing Gain ⁴	0.97	1.05	1.31	1.37	1.44	1.63	1.82	2.1%
Other Inputs	0.44	0.35	0.94	1.25	1.52	1.92	2.16	7.2%
Liquids from Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Liquids from Coal	0.00	0.00	0.00	0.08	0.23	0.58	0.76	N/A
Other ⁵	0.44	0.35	0.94	1.18	1.28	1.34	1.39	5.4%
Total Primary Supply⁶	20.05	20.74	22.21	23.57	24.87	26.12	27.65	1.1%
Refined Petroleum Products Supplied								
by Fuel								
Motor Gasoline ⁷	8.94	9.10	9.94	10.63	11.28	11.86	12.49	1.2%
Jet Fuel ⁸	1.58	1.63	1.88	2.06	2.19	2.23	2.31	1.4%
Distillate Fuel ⁹	3.93	4.06	4.61	4.91	5.21	5.59	6.09	1.6%
Residual Fuel	0.77	0.87	0.73	0.73	0.74	0.75	0.78	-0.4%
Other ¹⁰	4.84	5.10	5.01	5.20	5.40	5.62	5.89	0.6%
by Sector								
Residential and Commercial	1.24	1.29	1.25	1.26	1.25	1.23	1.22	-0.2%
Industrial ¹¹	4.86	5.02	5.23	5.37	5.55	5.78	6.06	0.7%
Transportation	13.34	13.69	15.27	16.48	17.57	18.59	19.81	1.4%
Electric Power ¹²	0.50	0.49	0.43	0.43	0.43	0.44	0.47	-0.1%
Total	20.05	20.76	22.17	23.53	24.81	26.05	27.57	1.1%
Discrepancy¹³	-0.01	-0.02	0.03	0.04	0.05	0.07	0.09	N/A

Table A11. Petroleum Supply and Disposition Balance (Continued)
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Imported Low Sulfur Light Crude Oil Price (2004 dollars per barrel) ¹⁴	31.72	40.49	47.29	47.79	50.70	54.08	56.97	1.3%
Imported Crude Oil Price (2004 dollars per barrel) ¹⁴	28.46	35.99	43.99	43.00	44.99	47.99	49.99	1.3%
Import Share of Product Supplied	0.56	0.58	0.56	0.56	0.58	0.60	0.62	0.3%
Net Expenditures for Imported Crude Oil and Petroleum Products (billion 2004 dollars)	117.53	152.36	189.84	201.18	231.71	268.22	310.15	2.8%
Domestic Refinery Distillation Capacity ¹⁵	16.8	16.9	17.6	17.9	18.1	18.5	19.3	0.5%
Capacity Utilization Rate (percent) ¹⁶	93.0	93.0	91.9	92.2	94.1	95.1	94.8	0.1%

¹Includes lease condensate.

²Strategic petroleum reserve stock additions plus unaccounted for crude oil and crude stock withdrawals minus crude product supplied.

³Includes other hydrocarbons and alcohols.

⁴Represents volumetric gain in refinery distillation and cracking processes.

⁵Includes petroleum product stock withdrawals; domestic sources of blending components, other hydrocarbons, alcohols, and ethers.

⁶Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.

⁷Includes ethanol and ethers blended into gasoline.

⁸Includes only kerosene type.

⁹Includes distillate and kerosene.

¹⁰Includes aviation gasoline, liquefied petroleum gas, petrochemical feedstocks, lubricants, waxes, asphalt, road oil, still gas, special naphthas, petroleum coke, crude oil product supplied, and miscellaneous petroleum products.

¹¹Includes consumption for combined heat and power (CHP), which produces electricity and other useful thermal energy.

¹²Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

¹³Balancing item. Includes unaccounted for supply, losses, and gains.

¹⁴Weighted average price delivered to U.S. refiners.

¹⁵End-of-year operable capacity.

¹⁶Rate is calculated by dividing the gross annual input to atmospheric crude oil distillation units by their operable refining capacity in barrels per calendar day.

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 imported crude oil price and petroleum product supplied based on: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2003 and 2004 imported low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2003 data: EIA, *Petroleum Supply Annual 2003*, DOE/EIA-0340(2003)/1 (Washington, DC, July 2004). Other 2004 data: EIA, *Petroleum Supply Annual 2004*, DOE/EIA-0340(2004)/1 (Washington, DC, June 2005). Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Reference Case

Table A12. Petroleum Product Prices
(2004 Cents per Gallon, Unless Otherwise Noted)

Sector and Fuel	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Crude Oil Prices (2004 dollars per barrel)								
Imported Low Sulfur Light Crude Oil Price ¹	31.72	40.49	47.29	47.79	50.70	54.08	56.97	1.3%
Imported Crude Oil Price ¹	28.46	35.99	43.99	43.00	44.99	47.99	49.99	1.3%
Delivered Sector Product Prices								
Residential								
Distillate Fuel	136.6	188.8	178.2	176.6	188.0	197.4	202.0	0.3%
Liquefied Petroleum Gas	129.7	149.1	156.5	154.3	166.6	182.6	195.4	1.0%
Commercial								
Distillate Fuel	100.2	138.3	140.0	143.2	150.1	156.3	162.2	0.6%
Residual Fuel	76.5	95.3	91.8	90.5	94.4	99.7	103.5	0.3%
Residual Fuel (2004 dollars per barrel)	32.13	40.03	38.57	38.00	39.66	41.88	43.47	0.3%
Industrial²								
Distillate Fuel	103.2	142.5	147.8	156.8	162.5	169.6	177.2	0.8%
Liquefied Petroleum Gas	111.7	122.7	103.6	101.7	111.3	121.1	131.4	0.3%
Residual Fuel	70.7	87.9	94.4	94.6	100.2	104.6	108.9	0.8%
Residual Fuel (2004 dollars per barrel)	29.69	36.94	39.67	39.74	42.10	43.95	45.72	0.8%
Transportation								
Diesel Fuel (distillate) ³	154.8	182.4	195.9	199.5	202.5	207.6	214.4	0.6%
Jet Fuel ⁴	89.7	121.8	130.6	133.2	141.6	147.4	155.6	0.9%
Motor Gasoline ⁵	165.0	190.4	202.7	199.6	207.6	213.4	218.8	0.5%
Liquid Petroleum Gas	148.1	147.7	144.0	140.7	144.9	158.5	165.8	0.4%
Residual Fuel	69.2	73.5	96.3	94.5	97.8	105.5	113.6	1.7%
Residual Fuel (2004 dollars per barrel)	29.08	30.89	40.43	39.68	41.09	44.31	47.70	1.7%
Ethanol (E85) ⁶	156.9	190.2	198.3	191.5	197.1	203.1	210.0	0.4%
Ethanol Wholesale Price	134.2	171.5	157.5	146.1	164.1	169.0	167.2	-0.1%
Electric Power⁷								
Distillate Fuel	92.2	128.0	125.4	125.2	133.5	139.4	142.6	0.4%
Residual Fuel	73.4	71.2	85.3	85.6	90.1	96.3	100.7	1.3%
Residual Fuel (2004 dollars per barrel)	30.82	29.90	35.84	35.95	37.84	40.44	42.29	1.3%
Refined Petroleum Product Prices⁸								
Distillate Fuel	140.8	174.2	182.8	188.3	193.1	199.2	206.3	0.7%
Jet Fuel ⁴	89.7	121.8	130.6	133.2	141.6	147.4	155.6	0.9%
Liquefied Petroleum Gas	115.8	128.3	115.4	113.7	123.9	134.9	145.6	0.5%
Motor Gasoline ⁵	164.9	190.4	202.7	199.6	207.6	213.4	218.8	0.5%
Residual Fuel	71.9	75.5	90.9	90.3	94.5	101.0	106.6	1.3%
Residual Fuel (2004 dollars per barrel)	30.19	31.71	38.19	37.94	39.70	42.42	44.75	1.3%
Average	140.6	164.3	173.2	173.4	181.1	187.9	194.7	0.7%

¹Weighted average price delivered to U.S. refiners.

²Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

³Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

⁴Includes only kerosene type.

⁵Sales weighted-average price for all grades. Includes Federal, State and local taxes.

⁶E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol actually varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

⁷Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

⁸Weighted averages of end-use fuel prices are derived from the prices in each sector and the corresponding sectoral consumption.

Note: Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 imported low sulfur light crude oil price: Energy Information Administration (EIA), Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." 2003 and 2004 imported crude oil price: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2003 and 2004 prices for motor gasoline, distillate, and jet fuel are based on: EIA, *Petroleum Marketing Annual 2004*, DOE/EIA-0487(2004) (Washington, DC, August 2005). 2003 and 2004 residential, commercial, industrial, and transportation sector petroleum product prices are derived from: EIA, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report." 2003 and 2004 electric power prices based on: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2003 and 2004 ethanol prices derived from weekly spot prices in the Oxy Fuel News. 2003 and 2004 wholesale ethanol prices derived from Bloomberg U.S. average rack price. Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A13. Natural Gas Supply, Disposition, and Prices
(Trillion Cubic Feet per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Production								
Dry Gas Production ¹	19.04	18.46	18.58	20.36	21.44	21.16	20.83	0.5%
Supplemental Natural Gas ²	0.07	0.06	0.07	0.07	0.07	0.07	0.07	1.1%
Net Imports	3.29	3.40	4.35	5.10	5.02	5.37	5.57	1.9%
Pipeline	2.85	2.81	2.28	2.05	1.32	1.24	1.22	-3.2%
Liquefied Natural Gas ³	0.44	0.59	2.07	3.05	3.70	4.13	4.36	8.0%
Total Supply	22.40	21.92	23.00	25.54	26.54	26.60	26.48	0.7%
Consumption by Sector								
Residential	5.08	4.88	5.17	5.36	5.51	5.57	5.64	0.6%
Commercial	3.22	3.00	3.08	3.36	3.57	3.77	3.99	1.1%
Industrial ⁴	7.14	7.41	7.82	8.08	8.26	8.51	8.81	0.7%
Electric Power ⁵	5.10	5.32	5.51	7.14	7.46	7.05	6.38	0.7%
Transportation ⁶	0.02	0.02	0.05	0.08	0.09	0.11	0.12	6.2%
Pipeline Fuel	0.66	0.67	0.63	0.71	0.78	0.77	0.75	0.5%
Lease and Plant Fuel ⁷	1.13	1.11	1.09	1.18	1.25	1.20	1.17	0.2%
Total	22.34	22.41	23.35	25.91	26.92	26.99	26.86	0.7%
Natural Gas to Liquids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Discrepancy⁸	0.06	-0.49	-0.36	-0.37	-0.38	-0.38	-0.39	N/A
Natural Gas Prices (2004 dollars per thousand cubic feet)								
Average Lower 48 Wellhead Price⁹	5.08	5.49	5.03	4.52	4.90	5.43	5.92	0.3%
Delivered Prices								
Residential	9.74	10.72	10.65	10.11	10.48	11.10	11.67	0.3%
Commercial	8.53	9.38	9.03	8.37	8.63	9.11	9.58	0.1%
Industrial ⁴	5.77	6.29	5.86	5.32	5.66	6.18	6.65	0.2%
Electric Power ⁵	5.81	6.07	5.60	5.21	5.53	6.02	6.41	0.2%
Transportation ¹⁰	9.20	10.25	10.40	9.91	10.21	10.64	11.01	0.3%
Average¹¹	7.20	7.74	7.41	6.80	7.14	7.69	8.22	0.2%

¹Marketed production (wet) minus extraction losses.

²Synthetic natural gas, propane air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

³Includes any natural gas regasified in the Bahamas and transported via pipeline to Florida.

⁴Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

⁵Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

⁶Compressed natural gas used as vehicle fuel.

⁷Represents natural gas used in field gathering and processing plant machinery.

⁸Balancing item. Natural gas lost as a result of converting flow data measured at varying temperatures and pressures to a standard temperature and pressure and the merger of different data reporting systems which vary in scope, format, definition, and respondent type. In addition, 2003 and 2004 values include net storage injections.

⁹Represents lower 48 onshore and offshore supplies.

¹⁰Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.

¹¹Weighted average prices. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 supply values; and lease, plant, and pipeline fuel consumption: Energy Information Administration (EIA), *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004). 2004 supply values; and lease, plant, and pipeline fuel consumption; and wellhead price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005), subtracting 1 billion cubic feet per day to account for carbon dioxide included in production in Texas. Other 2003 and 2004 consumption based on: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2003 wellhead price: Mineral Management Service and EIA, *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004). 2003 residential and commercial delivered prices: EIA, *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004). 2004 residential and commercial delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2003 and 2004 electric power sector prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, May 2004 through April 2005. 2003 and 2004 industrial delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey 1994* and industrial and wellhead prices from the *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004) and the *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2003 transportation sector delivered prices are based on: EIA, *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004) and estimated state and federal taxes. 2004 transportation sector delivered prices are model results. **Projections:** EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Reference Case

Table A14. Oil and Gas Supply

Production and Supply	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Crude Oil								
Lower 48 Average Wellhead Price¹ (2004 dollars per barrel)	29.68	38.06	43.49	44.98	47.50	50.41	53.16	1.3%
Production (million barrels per day)²								
U.S. Total	5.69	5.40	5.88	5.84	5.55	4.99	4.57	-0.6%
Lower 48 Onshore	2.99	2.90	2.62	2.48	2.42	2.36	2.27	-0.9%
Lower 48 Offshore	1.72	1.59	2.42	2.47	2.36	2.15	2.03	0.9%
Alaska	0.99	0.91	0.83	0.89	0.76	0.47	0.27	-4.5%
Lower 48 End of Year Reserves² (billion barrels)	18.66	18.21	19.83	19.98	19.61	18.74	17.91	-0.1%
Natural Gas								
Lower 48 Average Wellhead Price¹ (2004 dollars per thousand cubic feet)	5.08	5.49	5.03	4.52	4.90	5.43	5.92	0.3%
Dry Production (trillion cubic feet)³								
U.S. Total	19.04	18.46	18.58	20.36	21.44	21.16	20.83	0.5%
Lower 48 Onshore	13.82	13.76	14.03	14.23	14.52	14.73	14.72	0.3%
Associated-Dissolved ⁴	1.49	1.51	1.34	1.26	1.20	1.15	1.10	-1.2%
Non-Associated	12.33	12.26	12.69	12.97	13.33	13.58	13.62	0.4%
Conventional	5.49	4.79	5.01	4.86	4.66	4.44	4.17	-0.5%
Unconventional	6.84	7.47	7.68	8.11	8.66	9.14	9.45	0.9%
Lower 48 Offshore	4.76	4.26	4.31	5.08	4.71	4.25	3.97	-0.3%
Associated-Dissolved ⁴	0.95	0.85	1.08	1.40	1.34	1.20	1.15	1.2%
Non-Associated	3.81	3.41	3.23	3.68	3.37	3.05	2.82	-0.7%
Alaska	0.46	0.44	0.24	1.06	2.21	2.19	2.14	6.3%
Lower 48 End of Year Dry Reserves³ (trillion cubic feet)	180.76	183.64	214.35	228.95	229.52	226.85	222.72	0.7%
Supplemental Gas Supplies (trillion cubic feet)⁵	0.07	0.06	0.07	0.07	0.07	0.07	0.07	1.1%
Total Lower 48 Wells Drilled (thousands)	30.62	33.74	32.31	27.86	26.95	26.40	26.42	-0.9%

¹Represents lower 48 onshore and offshore supplies.

²Includes lease condensate.

³Marketed production (wet) minus extraction losses.

⁴Gas which occurs in crude oil reservoirs either as free gas (associated) or as gas in solution with crude oil (dissolved).

⁵Synthetic natural gas, propane air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 lower 48 onshore, lower 48 offshore, and Alaska crude oil production: Energy Information Administration (EIA), *Petroleum Supply Annual 2004*, DOE/EIA-0340(2004)/1 (Washington, DC, June 2005). 2003 U.S. crude oil and natural gas reserves: EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*, DOE/EIA-0216(2003) (Washington, DC, November 2004). 2003 Alaska and total natural gas production, and supplemental gas supplies: EIA, *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004). 2003 natural gas lower 48 average wellhead price: Mineral Management Service and EIA, *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004). 2004 natural gas lower 48 average wellhead price, Alaska and total natural gas production, and supplemental gas supplies: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005), subtracting 1 billion cubic feet per day to account for carbon dioxide included in production in Texas. 2003 and 2004 crude oil lower 48 average wellhead price: EIA, *Petroleum Marketing Annual 2004*, DOE/EIA-0487(2004) (Washington, DC, August 2005). Other 2003 and 2004 values: EIA, Office of Integrated Analysis and Forecasting. Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A15. Coal Supply, Disposition, and Prices
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Production¹								
Appalachia	388	403	426	389	379	391	412	0.1%
Interior	146	146	190	209	219	236	281	2.5%
West	549	575	645	674	758	904	1010	2.2%
East of the Mississippi	481	497	559	538	542	570	633	0.9%
West of the Mississippi	603	627	702	734	813	960	1070	2.1%
Total	1083	1125	1261	1272	1355	1530	1703	1.6%
Net Imports								
Imports	25	27	15	27	55	82	99	5.1%
Exports	43	48	41	22	19	20	17	-4.0%
Total	-18	-21	-26	5	36	63	83	N/A
Total Supply²	1065	1104	1235	1277	1391	1593	1785	1.9%
Consumption by Sector								
Residential and Commercial	4	4	4	4	4	4	4	0.0%
Coke Plants	24	24	23	22	22	21	21	-0.4%
Other Industrial ³	61	61	66	66	66	67	67	0.4%
Coal-to-Liquids Heat and Power	0	0	0	11	31	74	96	N/A
Coal-to-Liquids Liquids Production	0	0	0	11	31	72	94	N/A
Electric Power ⁴	1005	1015	1140	1161	1235	1354	1502	1.5%
Total Coal Use	1095	1104	1233	1276	1390	1592	1784	1.9%
Discrepancy and Stock Change⁵	-30	-0	2	1	1	1	1	N/A
Average Minemouth Price								
(2004 dollars per short ton)	18.40	20.07	22.23	20.39	20.20	20.63	21.73	0.3%
(2004 dollars per million Btu)	0.89	0.98	1.09	1.01	1.00	1.03	1.09	0.4%
Delivered Prices (2004 dollars per short ton)⁶								
Coke Plants	51.96	61.50	64.63	60.06	61.12	62.64	62.67	0.1%
Other Industrial ³	36.22	39.53	39.99	38.48	38.76	39.83	41.05	0.1%
Coal to Liquids	N/A	N/A	N/A	12.74	16.28	20.07	21.06	N/A
Electric Power								
(2004 dollars per short ton)	26.99	27.43	29.74	28.12	28.07	29.02	30.58	0.4%
(2004 dollars per million Btu)	1.33	1.36	1.48	1.40	1.39	1.44	1.51	0.4%
Average	28.06	28.81	30.90	28.93	28.55	29.06	30.30	0.2%
Exports ⁷	40.85	54.11	54.45	46.68	47.86	48.94	46.91	-0.5%

¹Includes anthracite, bituminous coal, lignite, and waste coal delivered to independent power producers. Waste coal deliveries totaled 11.6 million tons in 2003 and 12.5 million tons in 2004.

²Production plus net imports plus net storage withdrawals.

³Includes consumption for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public. Excludes all coal use in the coal-to-liquids process.

⁴Includes all electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

⁵Balancing item: the sum of production, net imports, and net storage withdrawals minus total consumption.

⁶Prices weighted by consumption tonnage less imports; weighted average excludes residential and commercial prices, import prices, and export free-alongside-ship (f.a.s.) prices.

⁷F.a.s. price at U.S. port of exit.

N/A = Not applicable.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 data based on: Energy Information Administration (EIA), *Annual Coal Report 2004*, DOE/EIA-0584(2004) (Washington, DC, November 2005); EIA, *Quarterly Coal Report, October-December 2004*, DOE/EIA-0121(2004/4Q) (Washington, DC, March 2005); and EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A. Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Reference Case

Table A16. Renewable Energy Generating Capacity and Generation
(Gigawatts, Unless Otherwise Noted)

Capacity and Generation	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Electric Power Sector¹								
Net Summer Capacity								
Conventional Hydropower	77.69	77.64	77.67	77.72	77.87	77.87	77.87	0.0%
Geothermal ²	2.11	2.11	2.56	3.19	4.61	6.02	6.64	4.5%
Municipal Solid Waste ³	3.19	3.22	3.52	3.65	3.76	3.84	3.87	0.7%
Wood and Other Biomass ^{4,5}	2.00	2.00	2.15	2.15	2.46	3.45	4.63	3.3%
Solar Thermal	0.39	0.39	0.47	0.48	0.50	0.53	0.55	1.3%
Solar Photovoltaic ⁶	0.03	0.03	0.07	0.14	0.22	0.31	0.39	10.5%
Wind	6.39	6.87	16.27	17.71	18.81	19.80	20.10	4.2%
Total	91.80	92.26	102.69	105.03	108.23	111.81	114.06	0.8%
Generation (billion kilowatthours)								
Conventional Hydropower	270.26	264.50	296.98	297.40	298.46	298.64	298.85	0.5%
Geothermal ²	14.42	14.36	17.51	22.84	34.01	46.74	52.70	5.1%
Municipal Solid Waste ³	20.84	19.86	24.89	25.96	26.83	27.52	27.79	1.3%
Wood and Other Biomass ⁵	9.53	9.49	44.67	44.80	48.59	51.30	57.83	7.2%
Dedicated Plants	9.53	8.00	10.39	9.98	13.03	22.05	31.67	5.4%
Cofiring	0.00	1.49	34.29	34.82	35.55	29.25	26.16	11.7%
Solar Thermal	0.53	0.58	0.84	0.89	0.96	1.03	1.11	2.5%
Solar Photovoltaic ⁶	0.00	0.00	0.18	0.34	0.54	0.76	0.98	26.9%
Wind	11.19	14.15	50.87	55.98	59.82	63.48	64.51	6.0%
Total	326.78	322.93	435.94	448.23	469.21	489.47	503.77	1.7%
End-Use Generators⁷								
Net Summer Capacity								
Conventional Hydropower ⁸	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.0%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Municipal Solid Waste	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.0%
Biomass	4.32	4.33	5.01	5.48	6.02	6.60	7.29	2.0%
Solar Photovoltaic ⁶	0.08	0.12	0.63	0.68	0.75	0.87	1.68	10.6%
Total	5.32	5.38	6.57	7.09	7.70	8.40	9.89	2.4%
Generation (billion kilowatthours)								
Conventional Hydropower ⁸	4.29	4.45	4.42	4.42	4.42	4.42	4.42	-0.0%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Municipal Solid Waste	2.22	2.12	2.24	2.24	2.24	2.24	2.24	0.2%
Biomass	28.00	27.81	31.81	34.52	37.69	41.05	45.09	1.9%
Solar Photovoltaic ⁶	0.17	0.26	1.34	1.46	1.60	1.89	3.62	10.7%
Total	34.69	34.63	39.80	42.63	45.94	49.59	55.37	1.8%

¹Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

²Includes hydrothermal resources only (hot water and steam).

³Includes landfill gas.

⁴Facilities co-firing biomass and coal are classified as coal.

⁵Includes projections for energy crops after 2010.

⁶Does not include off-grid photovoltaics (PV). Based on annual PV shipments from 1989 through 2003, EIA estimates that as much as 149 megawatts of remote electricity generation PV applications (i.e., off-grid power systems) were in service in 2003, plus an additional 414 megawatts in communications, transportation, and assorted other non-grid-connected, specialized applications. See Energy Information Administration, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005), Table 10.6 (annual PV shipments, 1989-2003). The approach used to develop the estimate, based on shipment data, provides an upper estimate of the size of the PV stock, including both grid-based and off-grid PV. It will overestimate the size of the stock, because shipments include a substantial number of units that are exported, and each year some of the PV units installed earlier will be retired from service or abandoned.

⁷Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.

⁸Represents own-use industrial hydroelectric power.

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 capacity: Energy Information Administration (EIA), Form EIA-860, "Annual Electric Generator Report" (preliminary). 2003 and 2004 generation: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A17. Renewable Energy, Consumption by Sector and Source¹
(Quadrillion Btu per Year)

Sector and Source	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Marketed Renewable Energy²								
Residential (wood)	0.40	0.41	0.44	0.43	0.43	0.42	0.41	0.1%
Commercial (biomass)	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.0%
Industrial³	1.59	1.68	1.79	1.90	2.01	2.14	2.29	1.2%
Conventional Hydroelectric	0.04	0.04	0.04	0.04	0.04	0.04	0.04	N/A
Municipal Solid Waste	0.01	0.01	0.01	0.01	0.01	0.01	0.01	N/A
Biomass	1.53	1.62	1.74	1.84	1.96	2.09	2.24	1.3%
Transportation	0.23	0.28	0.66	0.87	0.96	1.00	1.01	5.0%
Ethanol used in E85 ⁴	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.4%
Ethanol used in Gasoline Blending	0.23	0.28	0.65	0.87	0.95	0.99	1.00	5.0%
Electric Power⁵	3.62	3.57	4.76	5.01	5.47	5.95	6.22	2.2%
Conventional Hydroelectric	2.77	2.67	2.98	2.99	2.99	2.99	2.99	0.4%
Geothermal	0.30	0.30	0.39	0.57	0.92	1.33	1.54	6.5%
Municipal Solid Waste ⁶	0.30	0.31	0.33	0.35	0.36	0.37	0.37	0.8%
Biomass	0.12	0.14	0.52	0.52	0.57	0.58	0.63	6.1%
Dedicated Plants	0.12	0.11	0.11	0.10	0.14	0.24	0.34	4.4%
Cofiring	0.00	0.03	0.41	0.42	0.43	0.34	0.30	9.6%
Solar Thermal	0.01	0.01	0.01	0.01	0.02	0.02	0.02	5.1%
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Wind	0.11	0.14	0.52	0.58	0.62	0.65	0.66	6.1%
Total Marketed Renewable Energy	5.93	6.02	7.73	8.30	8.96	9.60	10.02	2.0%
Sources of Ethanol								
From Corn	0.23	0.28	0.61	0.80	0.87	0.91	0.92	4.6%
From Cellulose	0.00	0.00	0.01	0.02	0.02	0.02	0.02	N/A
Imports	0.00	0.00	0.04	0.06	0.06	0.07	0.07	N/A
Total	0.23	0.28	0.66	0.87	0.96	1.00	1.01	5.0%
Nonmarketed Renewable Energy⁷								
Selected Consumption								
Residential	0.02	0.03	0.04	0.04	0.05	0.06	0.06	3.5%
Solar Hot Water Heating	0.02	0.02	0.03	0.03	0.04	0.04	0.05	2.8%
Geothermal Heat Pumps	0.00	0.00	0.01	0.01	0.01	0.01	0.01	7.1%
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.8%
Commercial	0.02	0.03	0.03	0.03	0.03	0.03	0.04	1.6%
Solar Thermal	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.5%
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	0.01	10.2%

¹Actual heat rates used to determine fuel consumption for all renewable fuels except hydropower, solar, and wind. Consumption at hydroelectric, solar, and wind facilities determined by using the fossil fuel equivalent of 10,280 Btu per kilowatt-hour.

²Includes nonelectric renewable energy groups for which the energy source is bought and sold in the marketplace, although all transactions may not necessarily be marketed, and marketed renewable energy inputs for electricity entering the marketplace on the electric power grid. Excludes electricity imports; see Table A8.

³Includes all electricity production by industrial and other combined heat and power for the grid and for own use.

⁴Excludes motor gasoline component of E85.

⁵Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

⁶Includes landfill gas.

⁷Includes selected renewable energy consumption data for which the energy is not bought or sold, either directly or indirectly as an input to marketed energy. The Energy Information Administration does not estimate or project total consumption of nonmarketed renewable energy.

N/A = Not applicable.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 ethanol: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2003 and 2004 electric power sector: EIA, Form EIA-860, "Annual Electric Generator Report" (preliminary). Other 2003 and 2004 values: EIA, Office of Integrated Analysis and Forecasting. Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Reference Case

Table A18. Carbon Dioxide Emissions by Sector and Source
(Million Metric Tons, Unless Otherwise Noted)

Sector and Source	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Residential								
Petroleum	103.3	108.1	102.0	100.5	97.5	93.0	89.3	-0.7%
Natural Gas	276.9	265.5	281.4	291.6	299.7	303.3	307.3	0.6%
Coal	1.0	1.0	1.1	1.0	1.0	1.0	0.9	-0.4%
Electricity	827.8	833.2	930.5	975.8	1035.6	1100.1	1178.4	1.3%
Total	1209.0	1207.8	1315.0	1369.0	1433.9	1497.4	1575.9	1.0%
Commercial								
Petroleum	53.9	57.9	55.2	56.4	57.1	57.8	58.7	0.1%
Natural Gas	175.4	162.7	167.9	182.7	194.6	205.4	217.1	1.1%
Coal	8.0	8.2	8.2	8.2	8.2	8.2	8.2	-0.0%
Electricity	779.8	791.6	910.6	985.6	1079.2	1197.1	1335.9	2.0%
Total	1017.1	1020.4	1141.8	1232.9	1339.0	1468.5	1620.0	1.8%
Industrial¹								
Petroleum	409.4	440.6	441.5	456.9	475.1	497.5	523.8	0.7%
Natural Gas ²	428.8	441.9	477.9	497.1	510.4	521.8	535.9	0.7%
Coal	188.9	186.8	192.9	206.4	236.2	303.4	340.6	2.3%
Electricity	655.2	657.7	674.9	682.8	702.6	735.8	784.1	0.7%
Total	1682.3	1727.1	1787.2	1843.2	1924.3	2058.4	2184.5	0.9%
Transportation								
Petroleum ³	1833.8	1891.3	2067.1	2212.4	2356.6	2496.3	2667.1	1.3%
Natural Gas ⁴	37.3	37.4	37.1	43.0	47.4	47.5	47.5	0.9%
Electricity	15.9	16.0	16.7	17.1	17.7	18.6	19.6	0.8%
Total	1887.0	1944.7	2121.0	2272.4	2421.8	2562.4	2734.1	1.3%
Electric Power⁵								
Petroleum	97.1	97.4	74.5	73.6	74.5	76.4	81.8	-0.7%
Natural Gas	277.6	295.9	297.4	385.7	402.8	380.7	344.3	0.6%
Coal	1892.4	1893.9	2147.8	2188.4	2343.5	2579.4	2876.6	1.6%
Other ⁶	11.7	11.4	13.0	13.6	14.3	15.0	15.3	1.1%
Total	2278.8	2298.6	2532.7	2661.3	2835.2	3051.6	3318.0	1.4%
Carbon Dioxide Emissions by Primary Fuel⁷								
Petroleum ³	2497.5	2595.2	2740.3	2899.8	3060.8	3221.0	3420.8	1.1%
Natural Gas	1196.0	1203.4	1261.6	1400.1	1454.9	1458.7	1452.1	0.7%
Coal	2090.2	2089.9	2350.0	2404.0	2589.0	2892.0	3226.3	1.7%
Other ⁶	11.7	11.4	13.0	13.6	14.3	15.0	15.3	1.1%
Total	5795.5	5899.9	6364.9	6717.6	7119.0	7586.7	8114.5	1.2%
Carbon Dioxide Emissions								
(ton per person)	19.9	20.1	20.5	20.8	21.1	21.6	22.2	0.4%

¹Fuel consumption includes energy for combined heat and power plants (CHP), except those plants whose primary business is to sell electricity, or electricity and heat, to the public.

²Includes lease and plant fuel.

³This includes carbon dioxide from international bunker fuels, both civilian and military, which are excluded from the accounting of carbon dioxide emissions under the United Nations convention. From 1990 through 2003, international bunker fuels accounted for 83 to 115 million metric tons annually.

⁴Includes pipeline fuel natural gas and compressed natural gas used as vehicle fuel.

⁵Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Does not include emissions from the nonbiogenic component of municipal solid waste because under international guidelines these are accounted for as waste, not energy.

⁶Includes emissions from geothermal power and nonbiogenic emissions from municipal solid waste.

⁷Emissions from the electric power sector are distributed to the primary fuels.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 emissions and emission factors: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005). Projections: EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Table A19. Macroeconomic Indicators
(Billion 2000 Chain-Weighted Dollars, Unless Otherwise Noted)

Indicators	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Real Gross Domestic Product	10321	10756	13043	15082	17541	20123	23112	3.0%
Real Potential Gross Domestic Product	10686	11030	13367	15073	17176	19765	22738	2.8%
Components of Real Gross Domestic Product								
Real Consumption	7307	7589	9128	10373	11916	13555	15352	2.7%
Real Investment	1617	1810	2259	2713	3293	4025	4985	4.0%
Real Government Spending	1911	1952	2150	2296	2464	2631	2838	1.4%
Real Exports	1031	1118	1831	2671	3776	5083	6833	7.2%
Real Imports	1553	1719	2295	2857	3659	4734	6156	5.0%
Energy Intensity (thousand Btu per 2000 dollar of GDP)								
Delivered Energy	6.97	6.81	6.03	5.54	5.03	4.63	4.26	-1.8%
Total Energy	9.51	9.27	8.28	7.58	6.88	6.32	5.80	-1.8%
Price Indices								
GDP Chain-Type Price Index (2000=1.000) . . .	1.063	1.091	1.235	1.398	1.597	1.818	2.048	2.5%
Consumer Price Index (1982-4=1)								
All-Urban	1.84	1.89	2.15	2.46	2.86	3.31	3.78	2.7%
Energy Commodities and Services	1.36	1.51	1.67	1.86	2.19	2.57	2.96	2.6%
Wholesale Price Index (1982=1.00)								
All Commodities	1.38	1.47	1.55	1.66	1.82	1.98	2.13	1.5%
Fuel and Power	1.13	1.27	1.36	1.49	1.77	2.12	2.49	2.6%
Interest Rates (percent, nominal)								
Federal Funds Rate	1.13	1.35	5.30	5.46	5.24	5.01	5.04	N/A
10-Year Treasury Note	4.01	4.27	5.92	6.11	6.21	6.14	6.13	N/A
AA Utility Bond Rate	6.39	6.04	7.55	7.69	8.15	8.35	8.52	N/A
Value of Shipments (billion 2000 dollars)								
Total Industrial	5378	5643	6355	7036	7778	8589	9578	2.1%
Non-manufacturing	1393	1439	1572	1689	1808	1926	2069	1.4%
Manufacturing	3985	4204	4783	5347	5969	6664	7509	2.3%
Energy-Intensive	1117	1161	1265	1350	1441	1529	1627	1.3%
Non-Energy Intensive	2868	3044	3518	3997	4528	5135	5882	2.6%
Population and Employment (millions)								
Population, with Armed Forces Overseas	291.4	294.1	310.1	323.5	337.0	350.6	364.8	0.8%
Population, aged 16 and over	226.5	229.1	244.1	254.5	265.3	276.6	288.5	0.9%
Population, over age 65	36.0	36.4	40.4	47.0	54.9	63.8	71.6	2.6%
Employment, Nonfarm	129.9	131.4	142.1	147.6	156.2	164.2	173.6	1.1%
Employment, Manufacturing	14.5	14.3	14.0	13.5	13.3	12.9	12.6	-0.5%
Key Labor Indicators								
Labor Force (millions)	146.5	147.4	158.9	162.9	167.7	173.1	180.8	0.8%
Non-farm Labor Productivity (1992=1.00)	1.29	1.34	1.52	1.73	1.93	2.15	2.42	2.3%
Unemployment Rate (percent)	5.99	5.53	4.69	4.58	4.37	4.80	4.90	N/A
Key Indicators for Energy Demand								
Real Disposable Personal Income	7742	8004	9622	11058	13057	15182	17562	3.1%
Housing Starts (millions)	1.98	2.08	1.97	1.95	1.89	1.83	1.82	-0.5%
Commercial Floorspace (billion square feet) . . .	73.7	75.0	82.3	88.9	96.0	103.7	112.0	1.6%
Unit Sales of Light-Duty Vehicles (millions) . . .	16.64	16.87	17.61	18.00	18.90	20.31	21.75	1.0%

GDP = Gross domestic product.

Btu = British thermal unit.

N/A = Not applicable.

Sources: 2003 and 2004: Global Insight macroeconomic model CTL0805 and Global Insight industry model, July 2004. **Projections:** Energy Information Administration, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Reference Case

Table A20. International Petroleum Supply and Disposition Summary
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Crude Oil Prices (2004 dollars per barrel)								
Imported Low Sulfur Light Crude Oil Price ¹	31.72	40.49	47.29	47.79	50.70	54.08	56.97	1.3%
Imported Crude Oil Price ¹	28.46	35.99	43.99	43.00	44.99	47.99	49.99	1.3%
Production (Conventional)²								
Mature Market Economies								
United States (50 states)	8.64	8.41	9.39	9.62	9.51	9.13	8.92	0.2%
Canada	2.37	2.40	1.66	1.43	1.45	1.45	1.43	-2.0%
Mexico	4.00	4.10	3.97	4.19	4.48	4.78	5.01	0.8%
Western Europe ³	7.04	6.85	5.88	5.32	5.22	4.83	4.37	-1.7%
Japan	0.14	0.14	0.09	0.07	0.07	0.07	0.07	-2.8%
Australia and New Zealand	0.70	0.67	0.89	0.83	0.84	0.83	0.81	0.7%
Total Mature Market Economies	22.88	22.57	21.88	21.46	21.58	21.09	20.60	-0.3%
Transitional Economies								
Former Soviet Union								
Russia	8.81	9.29	9.50	9.88	10.66	11.06	11.26	0.7%
Caspian Area ⁴	1.92	2.32	2.99	4.18	5.16	6.25	7.43	4.6%
Eastern Europe ⁵	0.24	0.25	0.31	0.34	0.39	0.44	0.48	2.5%
Total Transitional Economies	10.96	11.86	12.80	14.40	16.21	17.74	19.17	1.9%
Emerging Economies								
OPEC ⁶								
Asia	1.33	1.39	1.49	1.39	1.26	1.17	1.09	-0.9%
Middle East	20.25	21.25	24.76	25.57	26.99	28.88	31.07	1.5%
North Africa	2.89	2.98	3.48	3.53	3.70	3.59	3.50	0.6%
West Africa	1.91	1.96	2.39	2.51	2.61	2.81	3.05	1.7%
South America	2.75	2.82	3.38	3.63	3.70	3.90	4.14	1.5%
Non-OPEC								
China	3.26	3.25	3.38	3.18	3.33	3.30	3.22	-0.0%
Other Asia	2.73	2.88	2.48	2.53	2.61	2.58	2.51	-0.5%
Middle East ⁷	1.90	1.76	2.09	2.24	2.45	2.69	2.91	1.9%
Africa	3.10	3.54	3.62	4.49	5.41	6.65	8.03	3.2%
South and Central America	4.14	4.22	4.34	5.04	5.83	6.45	7.00	2.0%
Total Emerging Economies	44.26	46.07	51.41	54.12	57.89	62.03	66.52	1.4%
Total Production (Conventional)	78.10	80.50	86.09	89.98	95.68	100.87	106.29	1.1%
Production (Nonconventional)⁸								
United States (50 states)	0.18	0.22	0.48	0.72	0.94	1.31	1.50	7.6%
Other North America	0.79	0.92	1.79	2.32	2.67	3.16	3.58	5.4%
Western Europe	0.03	0.03	0.09	0.11	0.12	0.12	0.13	6.4%
Asia	0.20	0.20	0.68	1.07	1.25	1.54	2.06	9.4%
Middle East ⁷	0.01	0.01	0.53	0.64	0.73	0.86	1.08	18.3%
Africa	0.08	0.08	0.21	0.41	0.53	0.67	0.85	9.4%
South and Central America	0.49	0.49	1.13	1.65	1.78	2.07	2.31	6.1%
Total Production (Nonconventional)	1.79	1.96	4.91	6.92	8.02	9.73	11.52	7.1%
Total Production	79.89	82.46	91.00	96.90	103.70	110.60	117.80	1.4%

Table A20. International Petroleum Supply and Disposition Summary (Continued)
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	Reference Case							Annual Growth 2004-2030 (percent)
	2003	2004	2010	2015	2020	2025	2030	
Consumption⁹								
Mature Market Economies								
United States (50 states)	20.05	20.76	22.17	23.53	24.81	26.05	27.57	1.1%
United States Territories	0.31	0.33	0.34	0.35	0.38	0.41	0.45	1.2%
Canada	2.11	2.15	2.13	2.18	2.25	2.30	2.34	0.3%
Mexico	1.98	2.00	2.13	2.18	2.24	2.27	2.29	0.5%
Western Europe ³	13.66	13.63	13.44	13.37	13.52	13.95	14.27	0.2%
Japan	5.24	5.22	4.85	4.57	4.40	4.27	4.13	-0.9%
Australia and New Zealand	1.04	1.07	1.16	1.21	1.28	1.37	1.45	1.2%
Total Mature Market Economies	44.40	45.16	46.22	47.39	48.89	50.62	52.50	0.6%
Transitional Economies								
Former Soviet Union	4.11	4.14	4.55	4.66	4.93	5.19	5.41	1.0%
Eastern Europe ⁵	1.41	1.42	1.58	1.72	1.87	2.01	2.15	1.6%
Total Transitional Economies	5.52	5.56	6.13	6.38	6.81	7.20	7.57	1.2%
Emerging Economies								
China	5.87	6.63	8.64	9.82	11.38	13.08	14.93	3.2%
India	2.29	2.42	2.92	3.33	3.81	4.30	4.85	2.7%
South Korea	2.20	2.23	2.41	2.50	2.57	2.62	2.66	0.7%
Other Asia	5.84	6.10	7.64	8.69	9.85	10.93	12.05	2.6%
Middle East ⁷	5.86	6.09	7.16	7.75	8.34	8.85	9.34	1.7%
Africa	2.81	2.96	3.63	4.00	4.31	4.56	4.81	1.9%
South and Central America	5.11	5.30	6.25	7.02	7.75	8.42	9.10	2.1%
Total Emerging Economies	29.98	31.74	38.65	43.13	48.01	52.78	57.74	2.3%
Total Consumption	79.89	82.46	91.00	96.90	103.70	110.60	117.80	1.4%
OPEC Production ¹⁰	29.50	30.78	36.67	38.34	40.27	42.82	45.82	1.5%
Non-OPEC Production ¹⁰	50.39	51.68	54.33	58.56	63.43	67.78	71.98	1.3%
Net Eurasia Exports	5.44	6.31	6.67	8.02	9.40	10.54	11.60	2.4%
OPEC Market Share	0.37	0.37	0.40	0.40	0.39	0.39	0.39	0.2%

¹Weighted average price delivered to U.S. refiners.

²Includes production of crude oil (including lease condensates), natural gas plant liquids, other hydrogen and hydrocarbons for refinery feedstocks, alcohol and other sources, and refinery gains.

³Western Europe = Austria, Belgium, Bosnia and Herzegovina, Croatia, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Macedonia, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and Yugoslavia.

⁴Caspian area includes Other Former Soviet Union.

⁵Eastern Europe = Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, and Slovakia.

⁶OPEC = Organization of Petroleum Exporting Countries - Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

⁷Non-OPEC Middle East includes Turkey.

⁸Includes liquids produced from energy crops, natural gas, coal, oil sands, and shale. Includes both OPEC and non-OPEC producers in the regional breakdown.

⁹Includes both OPEC and non-OPEC consumers in the regional breakdown.

¹⁰Includes both conventional and nonconventional liquids production.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 low sulfur light crude oil price: Energy Information Administration (EIA), Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." 2003 and 2004 imported crude oil price: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2003 quantities derived from: EIA, *International Energy Annual 2003*, DOE/EIA-0219(2003) (Washington, DC, May-July 2005). **2004 quantities and projections:** EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.

Economic Growth Case Comparisons

Table B1. Total Energy Supply and Disposition Summary
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2004	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Production										
Crude Oil and Lease Condensate	11.47	12.44	12.45	12.46	11.66	11.75	11.73	9.61	9.68	9.73
Natural Gas Plant Liquids	2.46	2.35	2.39	2.42	2.61	2.67	2.71	2.50	2.57	2.64
Dry Natural Gas	19.02	18.79	19.13	19.48	21.51	22.09	22.64	20.75	21.45	22.15
Coal	22.86	25.27	25.78	26.09	25.70	27.30	29.07	29.78	34.10	38.77
Nuclear Power	8.23	8.44	8.44	8.44	8.93	9.09	9.09	8.94	9.09	9.09
Renewable Energy ¹	5.74	6.98	7.08	7.15	7.55	8.00	8.42	8.34	9.02	9.83
Other ²	0.64	2.12	2.16	2.20	3.06	3.16	3.26	3.23	3.44	3.69
Total	70.42	76.39	77.42	78.23	81.03	84.05	86.91	83.15	89.36	95.89
Imports										
Crude Oil ³	22.02	21.93	22.01	22.81	23.07	24.63	26.72	26.25	29.54	32.70
Petroleum Products ⁴	5.93	5.29	6.36	6.82	6.97	8.01	8.95	7.58	9.27	11.08
Natural Gas	4.36	4.75	5.01	5.30	4.96	5.83	6.27	6.07	6.72	7.49
Other Imports ⁵	0.83	0.44	0.45	0.45	1.24	1.36	1.57	2.08	2.42	2.58
Total	33.14	32.41	33.83	35.38	36.24	39.83	43.50	41.97	47.95	53.84
Exports										
Petroleum ⁶	2.07	2.11	2.15	2.19	2.15	2.24	2.32	2.19	2.31	2.44
Natural Gas	0.86	0.56	0.55	0.55	0.71	0.68	0.65	1.08	1.01	0.92
Coal	1.25	1.03	1.03	1.03	0.47	0.46	0.46	0.39	0.40	0.40
Total	4.18	3.71	3.74	3.77	3.33	3.39	3.43	3.66	3.72	3.77
Discrepancy⁷	-0.31	-0.33	-0.36	-0.36	-0.06	-0.15	-0.27	-0.08	-0.30	-0.42
Consumption										
Petroleum Products ⁸	40.08	41.93	43.14	44.45	45.11	48.14	51.46	47.89	53.58	59.33
Natural Gas	23.07	23.43	24.04	24.68	26.22	27.70	28.73	26.20	27.66	29.23
Coal	22.53	24.58	25.09	25.40	26.13	27.65	29.50	30.13	34.49	38.86
Nuclear Power	8.23	8.44	8.44	8.44	8.93	9.09	9.09	8.94	9.09	9.09
Renewable Energy ¹	5.74	6.98	7.08	7.15	7.55	8.00	8.42	8.34	9.02	9.83
Other ⁹	0.04	0.07	0.07	0.08	0.05	0.05	0.05	0.04	0.05	0.05
Total	99.68	105.42	107.87	110.19	114.00	120.63	127.25	121.54	133.88	146.39
Net Imports - Petroleum	25.88	25.11	26.22	27.43	27.89	30.39	33.34	31.64	36.49	41.34
Prices (2004 dollars per unit)										
Imported Low Sulfur Light Crude Oil Price (dollars per barrel) ¹⁰	40.49	47.29	47.29	47.29	50.70	50.70	50.78	56.97	56.97	56.97
Imported Crude Oil Price (dollars per barrel) ¹⁰	35.99	43.99	43.99	43.99	44.99	44.99	44.99	49.99	49.99	49.99
Natural Gas Wellhead Price (dollars per thousand cubic feet) ¹¹	5.49	4.87	5.03	5.20	4.76	4.90	5.10	5.61	5.92	6.22
Coal Minemouth Price (dollars per ton)	20.07	21.79	22.23	22.02	19.60	20.20	20.85	19.96	21.73	23.05
Average Electricity Price (cents per kilowatthour)	7.6	7.2	7.3	7.4	7.0	7.2	7.5	7.2	7.5	7.8

¹Includes grid-connected electricity from conventional hydroelectric; wood and wood waste; landfill gas; municipal solid waste; other biomass; wind; photovoltaic and solar thermal sources; non-electric energy from renewable sources, such as active and passive solar systems, and wood; and both the ethanol and gasoline components of E85, but not the ethanol components of blends less than 85 percent. Excludes electricity imports using renewable sources and nonmarketed renewable energy.

²Includes liquid hydrogen, methanol, supplemental natural gas, and some domestic inputs to refineries.

³Includes imports of crude oil for the Strategic Petroleum Reserve.

⁴Includes imports of finished petroleum products, unfinished oils, alcohols, ethers, and blending components.

⁵Includes coal, coal coke (net), and electricity (net).

⁶Includes crude oil and petroleum products.

⁷Balancing item. Includes unaccounted for supply, losses, gains, net storage withdrawals, heat loss when natural gas is converted to liquid fuel, and heat loss when coal is converted to liquid fuel.

⁸Includes natural gas plant liquids, crude oil consumed as a fuel, and nonpetroleum-based liquids for blending, such as ethanol.

⁹Includes net electricity imports, methanol, and liquid hydrogen.

¹⁰Weighted average price delivered to U.S. refiners. Crude oil prices were held constant in alternative economic growth cases.

¹¹Represents lower 48 onshore and offshore supplies.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 natural gas supply values and natural gas wellhead price: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005), subtracting 1 billion cubic feet per day to account for carbon dioxide included in production in Texas. 2004 petroleum supply values: EIA, *Petroleum Supply Annual 2004*, DOE/EIA-0340(2004)/1 (Washington, DC, June 2005). 2004 imported low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2004 coal values: *Quarterly Coal Report, October-December 2004*, DOE/EIA-0121(2004/4Q) (Washington, DC, March 2005). Other 2004 values: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). Projections: EIA, AEO2006 National Energy Modeling System runs LM2006.D113005A, AEO2006.D111905A, and HM2006.D112505B.

Economic Growth Case Comparisons

Table B2. Energy Consumption by Sector and Source
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2004	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Energy Consumption										
Residential										
Distillate Fuel	0.94	0.84	0.84	0.84	0.73	0.73	0.74	0.60	0.61	0.62
Kerosene	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.07	0.07	0.07
Liquefied Petroleum Gas	0.54	0.55	0.56	0.56	0.60	0.61	0.63	0.61	0.65	0.68
Petroleum Subtotal	1.57	1.48	1.48	1.49	1.41	1.43	1.45	1.28	1.32	1.36
Natural Gas	5.03	5.29	5.33	5.37	5.49	5.68	5.87	5.45	5.82	6.19
Coal	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Renewable Energy ¹	0.41	0.43	0.44	0.44	0.42	0.43	0.44	0.40	0.41	0.43
Electricity	4.41	4.94	4.99	5.04	5.55	5.77	5.99	6.00	6.47	6.95
Delivered Energy	11.44	12.16	12.25	12.34	12.88	13.31	13.75	13.13	14.04	14.94
Electricity Related Losses	9.60	10.62	10.74	10.79	11.55	11.85	12.15	12.03	12.60	13.15
Total	21.04	22.78	22.99	23.14	24.43	25.17	25.90	25.16	26.64	28.08
Commercial										
Distillate Fuel	0.50	0.48	0.48	0.48	0.49	0.50	0.51	0.49	0.52	0.54
Residual Fuel	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13
Kerosene	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03
Liquefied Petroleum Gas	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Motor Gasoline ²	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Petroleum Subtotal	0.79	0.77	0.77	0.77	0.78	0.79	0.81	0.78	0.82	0.85
Natural Gas	3.09	3.17	3.18	3.19	3.54	3.68	3.83	3.76	4.11	4.46
Coal	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Renewable Energy ³	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Electricity	4.19	4.86	4.88	4.90	5.77	6.01	6.22	6.71	7.34	7.96
Delivered Energy	8.24	8.97	9.00	9.03	10.26	10.66	11.03	11.42	12.44	13.45
Electricity Related Losses	9.13	10.46	10.51	10.50	12.00	12.35	12.63	13.45	14.29	15.07
Total	17.37	19.43	19.51	19.53	22.26	23.02	23.67	24.88	26.73	28.51
Industrial⁴										
Distillate Fuel	1.19	1.13	1.20	1.27	1.11	1.23	1.35	1.15	1.32	1.50
Liquefied Petroleum Gas	2.19	2.07	2.21	2.35	2.06	2.34	2.64	2.10	2.54	2.97
Petrochemical Feedstock	1.49	1.38	1.48	1.57	1.32	1.51	1.72	1.27	1.55	1.87
Residual Fuel	0.24	0.19	0.20	0.21	0.19	0.20	0.21	0.19	0.21	0.23
Motor Gasoline ²	0.32	0.31	0.32	0.34	0.30	0.32	0.35	0.30	0.34	0.37
Other Petroleum ⁵	4.16	4.41	4.60	4.83	4.60	5.05	5.66	4.85	5.69	6.54
Petroleum Subtotal	9.58	9.49	10.01	10.57	9.57	10.65	11.93	9.85	11.66	13.49
Natural Gas	7.64	7.80	8.07	8.32	7.89	8.52	9.06	8.11	9.08	10.09
Lease and Plant Fuel ⁶	1.14	1.10	1.12	1.13	1.26	1.28	1.31	1.17	1.21	1.24
Natural Gas Subtotal	8.78	8.90	9.19	9.45	9.15	9.80	10.36	9.29	10.29	11.33
Metallurgical Coal	0.65	0.60	0.62	0.64	0.55	0.59	0.64	0.51	0.58	0.64
Other Industrial Coal	1.38	1.41	1.43	1.45	1.39	1.43	1.47	1.38	1.45	1.52
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.26	0.49	0.62	1.28	1.61	2.07
Net Coal Coke Imports	0.14	0.02	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.02
Coal Subtotal	2.16	2.02	2.07	2.12	2.21	2.53	2.74	3.18	3.65	4.25
Renewable Energy ⁷	1.68	1.73	1.79	1.86	1.86	2.01	2.17	1.99	2.29	2.60
Electricity	3.48	3.45	3.62	3.79	3.55	3.91	4.29	3.66	4.31	4.96
Delivered Energy	25.68	25.59	26.67	27.78	26.34	28.91	31.51	27.97	32.19	36.63
Electricity Related Losses	7.58	7.42	7.79	8.11	7.39	8.04	8.71	7.34	8.39	9.38
Total	33.27	33.02	34.46	35.89	33.73	36.95	40.22	35.31	40.58	46.01

Economic Growth Case Comparisons

Table B2. Energy Consumption by Sector and Source (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2004	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Transportation										
Distillate Fuel ⁸	5.91	6.53	6.82	7.14	7.41	8.13	8.89	8.67	9.98	11.38
Jet Fuel ⁹	3.35	3.82	3.89	3.97	4.35	4.53	4.70	4.36	4.79	5.26
Motor Gasoline ²	16.93	18.03	18.33	18.65	19.77	20.73	21.71	21.08	22.99	24.88
Residual Fuel	0.61	0.62	0.62	0.63	0.63	0.64	0.65	0.64	0.65	0.67
Liquefied Petroleum Gas	0.03	0.06	0.06	0.06	0.08	0.09	0.09	0.10	0.11	0.11
Other Petroleum ¹⁰	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.18	0.19	0.20
Petroleum Subtotal	27.02	29.23	29.91	30.63	32.43	34.30	36.22	35.03	38.71	42.50
Pipeline Fuel Natural Gas	0.69	0.64	0.65	0.66	0.77	0.80	0.82	0.75	0.78	0.81
Compressed Natural Gas	0.03	0.05	0.05	0.06	0.09	0.09	0.10	0.10	0.12	0.13
Renewable Energy (E85) ¹¹	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.11
Delivered Energy	27.82	30.01	30.70	31.44	33.39	35.30	37.25	35.99	39.72	43.56
Electricity Related Losses	0.18	0.19	0.19	0.19	0.20	0.20	0.21	0.21	0.21	0.21
Total	28.00	30.20	30.90	31.64	33.59	35.50	37.46	36.19	39.93	43.78
Delivered Energy Consumption for All Sectors										
Distillate Fuel	8.55	8.98	9.34	9.73	9.74	10.59	11.49	10.90	12.43	14.04
Kerosene	0.13	0.14	0.14	0.14	0.13	0.13	0.13	0.11	0.11	0.12
Jet Fuel ⁹	3.35	3.82	3.89	3.97	4.35	4.53	4.70	4.36	4.79	5.26
Liquefied Petroleum Gas	2.85	2.78	2.92	3.07	2.84	3.14	3.47	2.91	3.40	3.87
Motor Gasoline ²	17.30	18.39	18.70	19.03	20.12	21.10	22.10	21.43	23.38	25.30
Petrochemical Feedstock	1.49	1.38	1.48	1.57	1.32	1.51	1.72	1.27	1.55	1.87
Residual Fuel	0.97	0.93	0.94	0.96	0.94	0.96	0.98	0.95	0.99	1.03
Other Petroleum ¹²	4.32	4.56	4.75	4.99	4.76	5.21	5.83	5.01	5.86	6.71
Petroleum Subtotal	38.96	40.97	42.17	43.46	44.19	47.17	50.41	46.93	52.51	58.19
Natural Gas	15.79	16.32	16.63	16.93	17.01	17.97	18.85	17.42	19.13	20.87
Lease and Plant Fuel Plant ⁶	1.14	1.10	1.12	1.13	1.26	1.28	1.31	1.17	1.21	1.24
Pipeline Natural Gas	0.69	0.64	0.65	0.66	0.77	0.80	0.82	0.75	0.78	0.81
Natural Gas Subtotal	17.62	18.06	18.40	18.72	19.03	20.06	20.98	19.34	21.11	22.93
Metallurgical Coal	0.65	0.60	0.62	0.64	0.55	0.59	0.64	0.51	0.58	0.64
Other Coal	1.47	1.50	1.53	1.55	1.48	1.53	1.57	1.47	1.54	1.61
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.26	0.49	0.62	1.28	1.61	2.07
Net Coal Coke Imports	0.14	0.02	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.02
Coal Subtotal	2.26	2.12	2.17	2.21	2.30	2.63	2.84	3.28	3.74	4.35
Renewable Energy ¹³	2.17	2.25	2.32	2.39	2.37	2.53	2.70	2.49	2.80	3.13
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	12.17	13.33	13.57	13.82	14.96	15.79	16.60	16.47	18.22	19.97
Delivered Energy	73.18	76.73	78.62	80.60	82.86	88.19	93.55	88.52	98.40	108.57
Electricity Related Losses	26.50	28.69	29.24	29.60	31.14	32.45	33.70	33.02	35.48	37.81
Total	99.68	105.42	107.87	110.19	114.00	120.63	127.25	121.54	133.88	146.39
Electric Power¹⁴										
Distillate Fuel	0.17	0.23	0.23	0.24	0.23	0.24	0.26	0.25	0.27	0.30
Residual Fuel	0.95	0.73	0.74	0.75	0.69	0.73	0.79	0.71	0.80	0.84
Petroleum Subtotal	1.12	0.96	0.97	0.99	0.91	0.97	1.05	0.96	1.07	1.14
Natural Gas	5.45	5.37	5.65	5.96	7.19	7.65	7.74	6.85	6.54	6.30
Steam Coal	20.26	22.46	22.92	23.18	23.83	25.02	26.66	26.85	30.74	34.51
Nuclear Power	8.23	8.44	8.44	8.44	8.93	9.09	9.09	8.94	9.09	9.09
Renewable Energy ¹⁵	3.57	4.73	4.76	4.76	5.19	5.47	5.72	5.85	6.22	6.70
Electricity Imports	0.04	0.07	0.07	0.08	0.05	0.05	0.05	0.04	0.05	0.05
Total	38.67	42.03	42.82	43.41	46.10	48.24	50.31	49.50	53.71	57.79

Economic Growth Case Comparisons

Table B2. Energy Consumption by Sector and Source (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2004	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Total Energy Consumption										
Distillate Fuel	8.72	9.21	9.57	9.97	9.96	10.83	11.75	11.15	12.70	14.34
Kerosene	0.13	0.14	0.14	0.14	0.13	0.13	0.13	0.11	0.11	0.12
Jet Fuel ⁹	3.35	3.82	3.89	3.97	4.35	4.53	4.70	4.36	4.79	5.26
Liquefied Petroleum Gas	2.85	2.78	2.92	3.07	2.84	3.14	3.47	2.91	3.40	3.87
Motor Gasoline ²	17.30	18.39	18.70	19.03	20.12	21.10	22.10	21.43	23.38	25.30
Petrochemical Feedstock	1.49	1.38	1.48	1.57	1.32	1.51	1.72	1.27	1.55	1.87
Residual Fuel	1.91	1.66	1.68	1.70	1.63	1.69	1.77	1.66	1.79	1.86
Other Petroleum ¹²	4.32	4.56	4.75	4.99	4.76	5.21	5.83	5.01	5.86	6.71
Petroleum Subtotal	40.08	41.93	43.14	44.45	45.11	48.14	51.46	47.89	53.58	59.33
Natural Gas	21.24	21.69	22.28	22.89	24.19	25.62	26.60	24.28	25.67	27.18
Lease and Plant Fuel ⁶	1.14	1.10	1.12	1.13	1.26	1.28	1.31	1.17	1.21	1.24
Pipeline Natural Gas	0.69	0.64	0.65	0.66	0.77	0.80	0.82	0.75	0.78	0.81
Natural Gas Subtotal	23.07	23.43	24.04	24.68	26.22	27.70	28.73	26.20	27.66	29.23
Metallurgical Coal	0.65	0.60	0.62	0.64	0.55	0.59	0.64	0.51	0.58	0.64
Other Coal	21.74	23.97	24.45	24.74	25.31	26.55	28.23	28.32	32.29	36.13
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.26	0.49	0.62	1.28	1.61	2.07
Net Coal Coke Imports	0.14	0.02	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.02
Coal Subtotal	22.53	24.58	25.09	25.40	26.13	27.65	29.50	30.13	34.49	38.86
Nuclear Power	8.23	8.44	8.44	8.44	8.93	9.09	9.09	8.94	9.09	9.09
Renewable Energy ¹⁶	5.74	6.98	7.08	7.15	7.55	8.00	8.42	8.34	9.02	9.83
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity Imports	0.04	0.07	0.07	0.08	0.05	0.05	0.05	0.04	0.05	0.05
Total	99.68	105.42	107.87	110.19	114.00	120.63	127.25	121.54	133.88	146.39
Energy Use and Related Statistics										
Delivered Energy Use	73.18	76.73	78.62	80.60	82.86	88.19	93.55	88.52	98.40	108.57
Total Energy Use	99.68	105.42	107.87	110.19	114.00	120.63	127.25	121.54	133.88	146.39
Population (millions)	294.10	307.61	310.12	312.62	322.74	336.99	351.24	334.11	364.79	395.48
Gross Domestic Product (billion 2000 dollars)	10756	12529	13043	13561	16022	17541	19073	19771	23112	26471
Carbon Dioxide Emissions (million metric tons)	5899.9	6219.0	6364.9	6501.9	6720.4	7119.0	7542.4	7283.7	8114.5	8956.8

¹Includes wood used for residential heating.

²Includes ethanol (blends of 10 percent or less) and ethers blended into gasoline.

³Includes commercial sector consumption of wood and wood waste, landfill gas, municipal solid waste, and other biomass for combined heat and power.

⁴Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

⁵Includes petroleum coke, asphalt, road oil, lubricants, still gas, and miscellaneous petroleum products.

⁶Represents natural gas used in the field gathering and processing plant machinery.

⁷Includes consumption of energy from hydroelectric, wood and wood waste, municipal solid waste, and other biomass.

⁸Diesel fuel for on- and off- road use.

⁹Includes only kerosene type.

¹⁰Includes aviation gasoline and lubricants.

¹¹E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol actually varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

¹²Includes unfinished oils, natural gasoline, motor gasoline blending components, aviation gasoline, lubricants, still gas, asphalt, road oil, petroleum coke, and miscellaneous petroleum products.

¹³Includes electricity generated for sale to the grid and for own use from renewable sources, and non-electric energy from renewable sources. Excludes nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

¹⁴Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

¹⁵Includes conventional hydroelectric, geothermal, wood and wood waste, municipal solid waste, other biomass, petroleum coke, wind, photovoltaic and solar thermal sources. Excludes net electricity imports.

¹⁶Includes hydroelectric, geothermal, wood and wood waste, municipal solid waste, other biomass, wind, photovoltaic and solar thermal sources. Includes ethanol components of E85; excludes ethanol blends (10 percent or less) in motor gasoline. Excludes net electricity imports and nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports. Consumption values of 0.00 are values that round to 0.00, because they are less than 0.005.

Sources: 2004 consumption based on: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2004 population and gross domestic product: Global Insight macroeconomic model CTL0805. 2004 carbon dioxide emissions: EIA, *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005). Projections: EIA, AEO2006 National Energy Modeling System runs LM2006.D113005A, AEO2006.D111905A, and HM2006.D112505B.

Economic Growth Case Comparisons

Table B3. Energy Prices by Sector and Source
(2004 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2004	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Residential	17.31	16.65	16.98	17.25	16.69	17.19	17.74	17.85	18.51	19.19
Primary Energy ¹	11.39	11.05	11.28	11.46	11.06	11.31	11.58	12.26	12.62	13.01
Petroleum Products ²	14.63	14.27	14.77	14.95	15.36	15.94	16.39	17.92	18.42	19.15
Distillate Fuel	13.62	12.39	12.85	12.88	13.46	13.55	13.63	14.56	14.56	14.66
Liquefied Petroleum Gas	17.30	17.62	18.17	18.59	18.15	19.34	20.23	21.79	22.68	23.92
Natural Gas	10.40	10.17	10.33	10.51	9.98	10.16	10.41	10.95	11.32	11.68
Electricity	26.19	24.36	24.78	25.15	23.69	24.44	25.26	24.12	25.02	25.92
Commercial	16.56	15.87	16.27	16.60	15.75	16.28	16.87	16.74	17.52	18.35
Primary Energy ¹	9.20	8.79	8.96	9.11	8.59	8.74	8.94	9.41	9.65	9.94
Petroleum Products ²	10.39	10.30	10.56	10.63	10.99	11.22	11.37	12.17	12.28	12.66
Distillate Fuel	9.99	9.85	10.15	10.18	10.75	10.89	10.99	11.75	11.77	12.12
Residual Fuel	6.37	6.13	6.14	6.14	6.29	6.31	6.29	6.89	6.91	6.96
Natural Gas	9.10	8.61	8.76	8.93	8.22	8.37	8.58	9.01	9.29	9.57
Electricity	23.52	21.74	22.31	22.78	21.22	22.00	22.90	21.80	22.90	24.06
Industrial³	8.67	8.23	8.48	8.67	8.18	8.48	8.85	8.84	9.27	9.85
Primary Energy	7.42	6.99	7.19	7.33	7.01	7.24	7.54	7.75	8.09	8.62
Petroleum Products ²	9.65	9.24	9.46	9.55	9.58	9.94	10.26	11.01	11.36	12.21
Distillate Fuel	10.29	10.44	10.75	10.79	11.66	11.84	11.97	12.92	12.91	13.39
Liquefied Petroleum Gas	14.24	11.70	12.03	12.30	11.87	12.92	13.67	14.38	15.25	16.42
Residual Fuel	5.88	6.30	6.31	6.35	6.61	6.70	6.59	7.16	7.27	7.51
Natural Gas ⁴	6.10	5.53	5.69	5.85	5.35	5.49	5.70	6.17	6.45	6.72
Metallurgical Coal ⁵	2.24	2.34	2.36	2.37	2.19	2.23	2.27	2.22	2.28	2.34
Other Industrial Coal ⁵	1.74	1.84	1.86	1.87	1.76	1.81	1.86	1.82	1.92	2.00
Coal to Liquids	N/A	N/A	N/A	N/A	0.86	1.04	1.11	1.23	1.26	1.32
Electricity	15.54	15.17	15.65	16.08	14.69	15.35	16.05	15.15	15.95	16.77
Transportation	13.81	14.56	14.83	14.92	15.10	15.38	15.52	16.17	16.32	16.79
Primary Energy	13.79	14.54	14.82	14.90	15.08	15.36	15.51	16.16	16.31	16.78
Petroleum Products ²	13.79	14.55	14.82	14.91	15.10	15.38	15.52	16.17	16.32	16.80
Distillate Fuel ⁶	13.25	13.98	14.29	14.36	14.49	14.78	15.06	15.52	15.65	16.38
Jet Fuel ⁷	9.02	9.35	9.67	9.71	10.25	10.49	10.69	11.24	11.53	11.94
Motor Gasoline ⁸	15.34	16.26	16.52	16.62	16.73	17.02	17.09	17.78	17.92	18.32
Residual Fuel	4.91	6.31	6.43	6.45	6.56	6.54	6.62	7.45	7.59	7.68
Liquefied Petroleum Gas ⁹	17.14	16.19	16.72	17.03	15.83	16.82	17.96	18.37	19.25	20.48
Natural Gas ¹⁰	9.94	9.91	10.09	10.26	9.68	9.90	10.19	10.31	10.68	11.06
Ethanol (E85) ¹¹	20.24	20.90	21.19	21.37	20.67	21.10	21.52	21.99	22.48	23.00
Electricity	21.67	20.30	20.76	21.15	19.84	20.56	21.33	20.12	21.00	21.79
Average End-Use Energy	13.00	13.08	13.32	13.45	13.39	13.66	13.91	14.34	14.64	15.13
Primary Energy	11.04	11.30	11.52	11.61	11.69	11.89	12.06	12.68	12.86	13.27
Electricity	22.19	21.00	21.43	21.80	20.58	21.23	21.97	21.16	22.00	22.88
Electric Power¹²										
Fossil Fuel Average	2.46	2.34	2.41	2.48	2.39	2.46	2.51	2.49	2.49	2.52
Petroleum Products	5.43	6.41	6.50	6.53	6.90	6.91	6.89	7.67	7.61	7.77
Distillate Fuel	9.23	8.75	9.04	9.07	9.52	9.62	9.66	10.24	10.28	10.43
Residual Fuel	4.76	5.67	5.70	5.71	6.05	6.02	5.97	6.76	6.73	6.82
Natural Gas	5.92	5.28	5.46	5.67	5.24	5.40	5.60	5.98	6.26	6.55
Steam Coal ⁵	1.36	1.46	1.48	1.48	1.36	1.39	1.44	1.41	1.51	1.61

Economic Growth Case Comparisons

Table B3. Energy Prices by Sector and Source (Continued)
(2004 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2004	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Average Price to All Users¹³										
Petroleum Products ²	12.61	13.17	13.41	13.47	13.80	14.05	14.19	15.02	15.16	15.68
Distillate Fuel	12.62	12.96	13.30	13.37	13.81	14.07	14.31	14.93	15.04	15.69
Jet Fuel	9.02	9.35	9.67	9.71	10.25	10.49	10.69	11.24	11.53	11.94
Liquefied Petroleum Gas	14.89	13.07	13.39	13.64	13.41	14.38	15.06	16.20	16.90	17.95
Motor Gasoline ⁸	15.33	16.26	16.52	16.62	16.73	17.02	17.09	17.78	17.92	18.32
Residual Fuel	5.04	6.02	6.07	6.09	6.33	6.31	6.31	7.08	7.12	7.22
Natural Gas	7.52	7.06	7.19	7.34	6.80	6.93	7.14	7.65	7.98	8.30
Metallurgical Coal ⁵	2.24	2.34	2.36	2.37	2.19	2.23	2.27	2.22	2.28	2.34
Other Coal ⁵	1.39	1.48	1.51	1.51	1.39	1.42	1.46	1.43	1.53	1.63
Coal to Liquids	N/A	N/A	N/A	N/A	0.86	1.04	1.11	1.23	1.26	1.32
Ethanol (E85) ¹¹	20.24	20.90	21.19	21.37	20.67	21.10	21.52	21.99	22.48	23.00
Electricity	22.19	21.00	21.43	21.80	20.58	21.23	21.97	21.16	22.00	22.88
Non-Renewable Energy Expenditures by Sector (billion 2004 dollars)										
Residential	190.90	195.27	200.59	205.38	207.93	221.50	236.10	227.28	252.12	278.41
Commercial	135.07	141.03	145.01	148.51	160.17	172.19	184.74	189.81	216.48	245.17
Industrial	170.01	156.56	169.60	182.01	156.14	179.83	205.96	177.33	216.86	264.94
Transportation	374.67	427.60	445.81	459.08	492.36	530.44	565.50	569.70	635.46	717.72
Total Non-Renewable Expenditures	870.65	920.45	961.01	994.97	1016.60	1103.97	1192.30	1164.11	1320.94	1506.24
Transportation Renewable Expenditures	0.02	0.05	0.05	0.05	0.09	0.10	0.10	0.12	0.13	0.15
Total Expenditures	870.67	920.50	961.06	995.03	1016.69	1104.07	1192.40	1164.23	1321.07	1506.39

¹Weighted average price includes fuels below as well as coal.

²This quantity is the weighted average for all petroleum products, not just those listed below.

³Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

⁴Excludes use for lease and plant fuel.

⁵Excludes imported coal.

⁶Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

⁷Kerosene-type jet fuel. Includes Federal and State taxes while excluding county and local taxes.

⁸Sales weighted-average price for all grades. Includes Federal, State and local taxes.

⁹Includes Federal and State taxes while excluding county and local taxes.

¹⁰Compressed natural gas used as a vehicle fuel. Includes estimated motor vehicle fuel taxes.

¹¹E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol actually varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

¹²Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

¹³Weighted averages of end-use fuel prices are derived from the prices shown in each sector and the corresponding sectoral consumption.

Btu = British thermal unit.

Note: Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 prices for motor gasoline, distillate, and jet fuel are based on prices in the Energy Information Administration (EIA), *Petroleum Marketing Annual 2004*, DOE/EIA-0487(2004) (Washington, DC, August 2005). 2004 residential and commercial natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2004 industrial natural gas delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey 1994* and industrial and wellhead prices from the *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004) and the *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2004 transportation sector natural gas delivered prices are model results. 2004 electric power sector natural gas prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, May 2003 through April 2004, Table 4.11.A. 2004 coal prices based on: EIA, *Quarterly Coal Report, October-December 2004*, DOE/EIA-0121(2004/4Q) (Washington, DC, March 2005) and EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A. 2004 electricity prices: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2004 ethanol prices derived from weekly spot prices in the Oxy Fuel News. **Projections:** EIA, AEO2006 National Energy Modeling System runs LM2006.D113005A, AEO2006.D111905A, and HM2006.D112505B.

Economic Growth Case Comparisons

Table B4. Macroeconomic Indicators
(Billion 2000 Chain-Weighted Dollars, Unless Otherwise Noted)

Indicators	2004	Projections								
		2010			2020			2030		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Real Gross Domestic Product	10756	12529	13043	13561	16022	17541	19073	19771	23112	26471
Real Potential Gross Domestic Product	11030	13153	13367	13583	15886	17176	18469	19756	22738	25731
Components of Real Gross Domestic Product										
Real Consumption	7589	8831	9128	9429	11016	11916	12826	13416	15352	17306
Real Investment	1810	2033	2259	2487	2858	3293	3730	3960	4985	6001
Real Government Spending	1952	2097	2150	2204	2288	2464	2640	2471	2838	3204
Real Exports	1118	1823	1831	1839	3589	3776	3967	6252	6833	7421
Real Imports	1719	2219	2295	2366	3479	3659	3788	5775	6156	6492
Energy Intensity (thousand Btu per 2000 dollar of GDP)										
Delivered Energy	6.81	6.13	6.03	5.95	5.18	5.03	4.91	4.48	4.26	4.11
Total Energy	9.27	8.42	8.28	8.13	7.12	6.88	6.68	6.15	5.80	5.53
Price Indices										
GDP Chain-Type Price Index (2000=1.000) ...	1.091	1.265	1.235	1.204	1.741	1.597	1.453	2.326	2.048	1.778
Consumer Price Index (1982-4=1)										
All-Urban	1.89	2.21	2.15	2.10	3.12	2.86	2.61	4.29	3.78	3.30
Energy Commodities and Services	1.51	1.68	1.67	1.64	2.34	2.19	2.03	3.31	2.96	2.66
Wholesale Price Index (1982=1.00)										
All Commodities	1.47	1.59	1.55	1.50	2.02	1.82	1.62	2.50	2.13	1.79
Fuel and Power	1.27	1.36	1.36	1.34	1.89	1.77	1.65	2.75	2.49	2.24
Interest Rates (percent, nominal)										
Federal Funds Rate	1.35	5.69	5.30	4.90	5.74	5.24	4.74	5.56	5.04	4.60
10-Year Treasury Note	4.27	6.44	5.92	5.38	6.82	6.21	5.62	6.76	6.13	5.57
AA Utility Bond Rate	6.04	7.91	7.55	7.17	8.79	8.15	7.54	9.20	8.52	7.91
Value of Shipments (billion 2000 dollars)										
Total Industrial	5643	6015	6355	6704	6936	7778	8636	7989	9578	11201
Non-manufacturing	1439	1437	1572	1710	1579	1808	2040	1746	2069	2392
Manufacturing	4204	4578	4783	4994	5357	5969	6596	6243	7509	8809
Energy-Intensive	1161	1226	1265	1310	1335	1441	1550	1436	1627	1819
Non-Energy Intensive	3044	3352	3518	3684	4022	4528	5046	4807	5882	6990
Population and Employment (millions)										
Population with Armed Forces Overseas	294.1	307.6	310.1	312.6	322.7	337.0	351.2	334.1	364.8	395.5
Population (aged 16 and over)	229.1	241.7	244.1	246.5	256.0	265.3	274.6	268.5	288.5	308.5
Population, over age 65	36.4	40.2	40.4	40.6	53.9	54.9	55.8	69.1	71.6	74.1
Employment, Nonfarm	131.4	135.2	142.1	148.9	145.3	156.2	167.1	157.3	173.6	189.8
Employment, Manufacturing	14.3	13.6	14.0	14.3	12.8	13.3	13.7	11.9	12.6	13.2
Key Labor Indicators										
Labor Force (millions)	147.4	156.7	158.9	161.7	161.5	167.7	174.4	171.3	180.8	190.7
Non-farm Labor Productivity (1992=1.00)	1.34	1.50	1.52	1.55	1.80	1.93	2.06	2.15	2.42	2.68
Unemployment Rate (percent)	5.53	4.70	4.69	4.67	4.46	4.37	4.27	4.98	4.90	4.83
Key Indicators for Energy Demand										
Real Disposable Personal Income	8004	9325	9622	9926	12205	13057	13923	15703	17562	19450
Housing Starts (millions)	2.08	1.64	1.97	2.30	1.45	1.89	2.34	1.21	1.82	2.43
Commercial Floorspace (billion square feet) ...	75.0	81.7	82.3	83.0	91.5	96.0	100.4	101.2	112.0	123.0
Unit Sales of Light-Duty Vehicles (millions) ...	16.87	17.02	17.61	18.50	17.40	18.90	20.55	19.15	21.75	24.70

GDP = Gross domestic product.

Btu = British thermal unit.

Sources: 2004: Global Insight macroeconomic model CTL0805, and Global Insight industry model, July 2005. **Projections:** Energy Information Administration, AEO2006 National Energy Modeling System runs LM2006.D113005A, AEO2006.D111905A, and HM2006.D112505B.

Price Case Comparisons

Table C1. Total Energy Supply and Disposition Summary
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Production										
Crude Oil and Lease Condensate	11.47	12.71	12.45	12.24	11.77	11.75	11.91	9.51	9.68	10.50
Natural Gas Plant Liquids	2.46	2.43	2.39	2.35	2.61	2.67	2.65	2.65	2.57	2.62
Dry Natural Gas	19.02	19.58	19.13	18.67	21.66	22.09	21.90	22.09	21.45	21.83
Coal	22.86	25.38	25.78	25.91	24.81	27.30	29.53	27.86	34.10	39.52
Nuclear Power	8.23	8.44	8.44	8.44	9.03	9.09	9.09	9.03	9.09	9.09
Renewable Energy ¹	5.74	7.00	7.08	7.25	7.64	8.00	8.15	8.73	9.02	9.12
Other ²	0.64	2.13	2.16	2.20	3.04	3.16	3.37	3.15	3.44	3.91
Total	70.42	77.67	77.42	77.05	80.57	84.05	86.61	83.00	89.36	96.57
Imports										
Crude Oil ³	22.02	22.25	22.01	21.23	27.19	24.63	22.09	33.90	29.54	24.59
Petroleum Products ⁴	5.93	6.55	6.36	5.90	9.08	8.01	6.31	11.68	9.27	5.88
Natural Gas	4.36	5.19	5.01	4.74	8.32	5.83	3.33	10.75	6.72	3.63
Other Imports ⁵	0.83	0.45	0.45	0.46	1.49	1.36	1.61	2.09	2.42	2.69
Total	33.14	34.43	33.83	32.33	46.08	39.83	33.35	58.43	47.95	36.79
Exports										
Petroleum ⁶	2.07	2.17	2.15	2.11	2.68	2.24	2.16	2.86	2.31	2.24
Natural Gas	0.86	0.57	0.55	0.53	0.83	0.68	0.50	1.35	1.01	0.57
Coal	1.25	1.03	1.03	1.03	0.46	0.46	0.46	0.39	0.40	0.40
Total	4.18	3.78	3.74	3.67	3.97	3.39	3.11	4.61	3.72	3.21
Discrepancy⁷	-0.31	-0.32	-0.36	-0.49	-0.10	-0.15	-0.24	0.00	-0.30	0.07
Consumption										
Petroleum Products ⁸	40.08	43.78	43.14	41.88	50.67	48.14	44.72	57.55	53.58	48.87
Natural Gas	23.07	24.65	24.04	23.34	29.62	27.70	25.05	31.97	27.66	24.71
Coal	22.53	24.68	25.09	25.22	25.77	27.65	30.01	29.49	34.49	38.25
Nuclear Power	8.23	8.44	8.44	8.44	9.03	9.09	9.09	9.03	9.09	9.09
Renewable Energy ¹	5.74	7.00	7.08	7.25	7.64	8.00	8.16	8.73	9.02	9.12
Other ⁹	0.04	0.07	0.07	0.08	0.04	0.05	0.06	0.05	0.05	0.05
Total	99.68	108.64	107.87	106.21	122.78	120.63	117.09	136.82	133.88	130.09
Net Imports - Petroleum	25.88	26.62	26.22	25.02	33.59	30.39	26.25	42.72	36.49	28.23
Prices (2004 dollars per unit)										
Imported Low Sulfur Light Crude Oil Price (dollars per barrel) ¹⁰	40.49	40.29	47.29	62.65	33.99	50.70	85.06	33.73	56.97	95.71
Imported Crude Oil Price (dollars per barrel) ¹⁰	35.99	37.00	43.99	58.99	27.99	44.99	79.98	27.99	49.99	89.98
Natural Gas Wellhead Price (dollars per thousand cubic feet) ¹¹	5.49	4.55	5.03	5.95	4.09	4.90	5.94	4.97	5.92	7.71
Coal Minemouth Price (dollars per ton)	20.07	21.74	22.23	22.53	19.19	20.20	21.54	20.66	21.73	22.66
Average Electricity Price (cents per kilowatthour)	7.6	7.1	7.3	7.6	7.0	7.2	7.6	7.3	7.5	7.9

¹Includes grid-connected electricity from conventional hydroelectric; wood and wood waste; landfill gas; municipal solid waste; other biomass; wind; photovoltaic and solar thermal sources; non-electric energy from renewable sources, such as active and passive solar systems, and wood; and both the ethanol and gasoline components of E85, but not the ethanol components of blends less than 85 percent. Excludes electricity imports using renewable sources and nonmarketed renewable energy.

²Includes liquid hydrogen, methanol, supplemental natural gas, and some domestic inputs to refineries.

³Includes imports of crude oil for the Strategic Petroleum Reserve.

⁴Includes imports of finished petroleum products, unfinished oils, alcohols, ethers, and blending components.

⁵Includes coal, coal coke (net), and electricity (net).

⁶Includes crude oil and petroleum products.

⁷Balancing item. Includes unaccounted for supply, losses, gains, net storage withdrawals, heat loss when natural gas is converted to liquid fuel, and heat loss when coal is converted to liquid fuel.

⁸Includes natural gas plant liquids, crude oil consumed as a fuel, and nonpetroleum-based liquids for blending, such as ethanol.

⁹Includes net electricity imports, methanol, and liquid hydrogen.

¹⁰Weighted average price delivered to U.S. refiners.

¹¹Represents lower 48 onshore and offshore supplies.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 natural gas supply values and natural gas wellhead price: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005), subtracting 1 billion cubic feet per day to account for carbon dioxide included in production in Texas. 2004 petroleum supply values: EIA, *Petroleum Supply Annual 2004*, DOE/EIA-0340(2004)/1 (Washington, DC, June 2005). 2004 imported low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2004 coal values: *Quarterly Coal Report, October-December 2004*, DOE/EIA-0121(2004/4Q) (Washington, DC, March 2005). Other 2004 values: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). **Projections:** EIA, AEO2006 National Energy Modeling System runs LP2006.D120105A, AEO2006.D111905A, and HP2006.D113005A.

Price Case Comparisons

Table C2. Energy Consumption by Sector and Source
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Energy Consumption										
Residential										
Distillate Fuel	0.94	0.86	0.84	0.79	0.81	0.73	0.64	0.69	0.61	0.51
Kerosene	0.09	0.09	0.09	0.09	0.09	0.08	0.07	0.08	0.07	0.06
Liquefied Petroleum Gas	0.54	0.57	0.56	0.53	0.68	0.61	0.53	0.74	0.65	0.55
Petroleum Subtotal	1.57	1.52	1.48	1.41	1.57	1.43	1.25	1.51	1.32	1.12
Natural Gas	5.03	5.38	5.33	5.25	5.76	5.68	5.59	5.90	5.82	5.71
Coal	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Renewable Energy ¹	0.41	0.43	0.44	0.46	0.39	0.43	0.47	0.38	0.41	0.45
Electricity	4.41	5.00	4.99	4.96	5.80	5.77	5.74	6.49	6.47	6.45
Delivered Energy	11.44	12.34	12.25	12.10	13.54	13.31	13.06	14.29	14.04	13.73
Electricity Related Losses	9.60	10.69	10.74	10.78	11.78	11.85	12.03	12.69	12.60	12.46
Total	21.04	23.03	22.99	22.88	25.31	25.17	25.09	26.98	26.64	26.19
Commercial										
Distillate Fuel	0.50	0.50	0.48	0.45	0.55	0.50	0.44	0.60	0.52	0.46
Residual Fuel	0.12	0.12	0.12	0.11	0.13	0.12	0.11	0.13	0.12	0.11
Kerosene	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.03	0.02
Liquefied Petroleum Gas	0.10	0.10	0.10	0.09	0.10	0.10	0.09	0.11	0.10	0.09
Motor Gasoline ²	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Petroleum Subtotal	0.79	0.79	0.77	0.73	0.86	0.79	0.72	0.91	0.82	0.74
Natural Gas	3.09	3.23	3.18	3.10	3.80	3.68	3.54	4.25	4.11	3.89
Coal	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Renewable Energy ³	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Electricity	4.19	4.90	4.88	4.84	6.08	6.01	5.90	7.45	7.34	7.20
Delivered Energy	8.24	9.09	9.00	8.84	10.91	10.66	10.33	12.79	12.44	12.00
Electricity Related Losses	9.13	10.48	10.51	10.51	12.34	12.35	12.37	14.56	14.29	13.91
Total	17.37	19.57	19.51	19.35	23.26	23.02	22.70	27.34	26.73	25.91
Industrial⁴										
Distillate Fuel	1.19	1.21	1.20	1.17	1.26	1.23	1.20	1.40	1.32	1.30
Liquefied Petroleum Gas	2.19	2.23	2.21	2.17	2.46	2.34	2.22	2.64	2.54	2.39
Petrochemical Feedstock	1.49	1.49	1.48	1.45	1.55	1.51	1.46	1.62	1.55	1.52
Residual Fuel	0.24	0.21	0.20	0.17	0.23	0.20	0.16	0.26	0.21	0.15
Motor Gasoline ²	0.32	0.33	0.32	0.32	0.32	0.32	0.32	0.34	0.34	0.33
Other Petroleum ⁵	4.16	4.65	4.60	4.48	5.37	5.05	4.70	6.09	5.69	5.17
Petroleum Subtotal	9.58	10.12	10.01	9.77	11.19	10.65	10.06	12.34	11.66	10.87
Natural Gas	7.64	8.15	8.07	7.95	8.66	8.52	8.36	9.41	9.08	8.71
Lease and Plant Fuel ⁶	1.14	1.14	1.12	1.09	1.27	1.28	1.30	1.24	1.21	1.39
Natural Gas Subtotal	8.78	9.29	9.19	9.05	9.92	9.80	9.67	10.65	10.29	10.10
Metallurgical Coal	0.65	0.63	0.62	0.60	0.61	0.59	0.57	0.60	0.58	0.56
Other Industrial Coal	1.38	1.44	1.43	1.42	1.44	1.43	1.42	1.45	1.45	1.44
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.00	0.49	0.62	0.00	1.61	3.57
Net Coal Coke Imports	0.14	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02
Coal Subtotal	2.16	2.08	2.07	2.03	2.07	2.53	2.61	2.06	3.65	5.58
Renewable Energy ⁷	1.68	1.80	1.79	1.77	2.05	2.01	1.97	2.33	2.29	2.26
Electricity	3.48	3.65	3.62	3.56	3.97	3.91	3.88	4.27	4.31	4.37
Delivered Energy	25.68	26.94	26.67	26.18	29.20	28.91	28.18	31.64	32.19	33.18
Electricity Related Losses	7.58	7.80	7.79	7.73	8.07	8.04	8.13	8.34	8.39	8.45
Total	33.27	34.74	34.46	33.91	37.27	36.95	36.31	39.99	40.58	41.63

Price Case Comparisons

Table C2. Energy Consumption by Sector and Source (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Transportation										
Distillate Fuel ⁸	5.91	6.90	6.82	6.71	8.25	8.13	7.90	10.10	9.98	9.93
Jet Fuel ⁹	3.35	3.93	3.89	3.83	4.58	4.53	4.44	4.82	4.79	4.33
Motor Gasoline ²	16.93	18.62	18.33	17.72	21.98	20.73	18.60	25.33	22.99	20.00
Residual Fuel	0.61	0.62	0.62	0.62	0.64	0.64	0.64	0.66	0.65	0.65
Liquefied Petroleum Gas	0.03	0.06	0.06	0.06	0.09	0.09	0.07	0.12	0.11	0.09
Other Petroleum ¹⁰	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.19	0.19
Petroleum Subtotal	27.02	30.30	29.91	29.11	35.73	34.30	31.83	41.21	38.71	35.18
Pipeline Fuel Natural Gas	0.69	0.66	0.65	0.64	0.80	0.80	0.76	0.85	0.78	0.74
Compressed Natural Gas	0.03	0.06	0.05	0.05	0.09	0.09	0.09	0.12	0.12	0.12
Renewable Energy (E85) ¹¹	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.10
Delivered Energy	27.82	31.11	30.70	29.89	36.73	35.30	32.78	42.29	39.72	36.15
Electricity Related Losses	0.18	0.19	0.19	0.19	0.21	0.20	0.20	0.22	0.21	0.20
Total	28.00	31.30	30.90	30.08	36.94	35.50	32.98	42.51	39.93	36.35
Delivered Energy Consumption for All Sectors										
Distillate Fuel	8.55	9.46	9.34	9.13	10.87	10.59	10.18	12.78	12.43	12.20
Kerosene	0.13	0.14	0.14	0.13	0.13	0.13	0.12	0.12	0.11	0.10
Jet Fuel ⁹	3.35	3.93	3.89	3.83	4.58	4.53	4.44	4.82	4.79	4.33
Liquefied Petroleum Gas	2.85	2.97	2.92	2.85	3.33	3.14	2.92	3.61	3.40	3.12
Motor Gasoline ²	17.30	18.99	18.70	18.08	22.35	21.10	18.97	25.71	23.38	20.37
Petrochemical Feedstock	1.49	1.49	1.48	1.45	1.55	1.51	1.46	1.62	1.55	1.52
Residual Fuel	0.97	0.96	0.94	0.91	1.00	0.96	0.91	1.04	0.99	0.92
Other Petroleum ¹²	4.32	4.81	4.75	4.64	5.53	5.21	4.86	6.26	5.86	5.34
Petroleum Subtotal	38.96	42.74	42.17	41.02	49.35	47.17	43.85	55.97	52.51	47.91
Natural Gas	15.79	16.80	16.63	16.36	18.31	17.97	17.59	19.68	19.13	18.42
Lease and Plant Fuel Plant ⁶	1.14	1.14	1.12	1.09	1.27	1.28	1.30	1.24	1.21	1.39
Pipeline Natural Gas	0.69	0.66	0.65	0.64	0.80	0.80	0.76	0.85	0.78	0.74
Natural Gas Subtotal	17.62	18.60	18.40	18.09	20.38	20.06	19.66	21.77	21.11	20.56
Metallurgical Coal	0.65	0.63	0.62	0.60	0.61	0.59	0.57	0.60	0.58	0.56
Other Coal	1.47	1.53	1.53	1.52	1.54	1.53	1.51	1.55	1.54	1.53
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.00	0.49	0.62	0.00	1.61	3.57
Net Coal Coke Imports	0.14	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02
Coal Subtotal	2.26	2.18	2.17	2.13	2.17	2.63	2.71	2.16	3.74	5.68
Renewable Energy ¹³	2.17	2.32	2.32	2.32	2.54	2.53	2.53	2.80	2.80	2.81
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	12.17	13.64	13.57	13.44	15.95	15.79	15.60	18.31	18.22	18.12
Delivered Energy	73.18	79.48	78.62	77.00	90.38	88.19	84.35	101.02	98.40	95.07
Electricity Related Losses	26.50	29.15	29.24	29.21	32.39	32.45	32.73	35.80	35.48	35.01
Total	99.68	108.64	107.87	106.21	122.78	120.63	117.09	136.82	133.88	130.09
Electric Power¹⁴										
Distillate Fuel	0.17	0.23	0.23	0.23	0.29	0.24	0.25	0.32	0.27	0.28
Residual Fuel	0.95	0.81	0.74	0.63	1.03	0.73	0.63	1.26	0.80	0.67
Petroleum Subtotal	1.12	1.05	0.97	0.86	1.32	0.97	0.88	1.58	1.07	0.96
Natural Gas	5.45	6.05	5.65	5.25	9.24	7.65	5.39	10.19	6.54	4.15
Steam Coal	20.26	22.50	22.92	23.09	23.60	25.02	27.30	27.33	30.74	32.57
Nuclear Power	8.23	8.44	8.44	8.44	9.03	9.09	9.09	9.03	9.09	9.09
Renewable Energy ¹⁵	3.57	4.68	4.76	4.93	5.10	5.47	5.62	5.93	6.22	6.32
Electricity Imports	0.04	0.07	0.07	0.08	0.04	0.05	0.06	0.05	0.05	0.05
Total	38.67	42.79	42.82	42.65	48.35	48.24	48.34	54.12	53.71	53.13

Price Case Comparisons

Table C2. Energy Consumption by Sector and Source (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Total Energy Consumption										
Distillate Fuel	8.72	9.70	9.57	9.36	11.16	10.83	10.43	13.10	12.70	12.49
Kerosene	0.13	0.14	0.14	0.13	0.13	0.13	0.12	0.12	0.11	0.10
Jet Fuel ⁹	3.35	3.93	3.89	3.83	4.58	4.53	4.44	4.82	4.79	4.33
Liquefied Petroleum Gas	2.85	2.97	2.92	2.85	3.33	3.14	2.92	3.61	3.40	3.12
Motor Gasoline ²	17.30	18.99	18.70	18.08	22.35	21.10	18.97	25.71	23.38	20.37
Petrochemical Feedstock	1.49	1.49	1.48	1.45	1.55	1.51	1.46	1.62	1.55	1.52
Residual Fuel	1.91	1.77	1.68	1.54	2.03	1.69	1.53	2.31	1.79	1.60
Other Petroleum ¹²	4.32	4.81	4.75	4.64	5.53	5.21	4.86	6.26	5.86	5.34
Petroleum Subtotal	40.08	43.78	43.14	41.88	50.67	48.14	44.72	57.55	53.58	48.87
Natural Gas	21.24	22.85	22.28	21.61	27.55	25.62	22.99	29.88	25.67	22.58
Lease and Plant Fuel ⁶	1.14	1.14	1.12	1.09	1.27	1.28	1.30	1.24	1.21	1.39
Pipeline Natural Gas	0.69	0.66	0.65	0.64	0.80	0.80	0.76	0.85	0.78	0.74
Natural Gas Subtotal	23.07	24.65	24.04	23.34	29.62	27.70	25.05	31.97	27.66	24.71
Metallurgical Coal	0.65	0.63	0.62	0.60	0.61	0.59	0.57	0.60	0.58	0.56
Other Coal	21.74	24.03	24.45	24.61	25.14	26.55	28.81	28.88	32.29	34.10
Coal-to-Liquids Heat and Power	0.00	0.00	0.00	0.00	0.00	0.49	0.62	0.00	1.61	3.57
Net Coal Coke Imports	0.14	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02
Coal Subtotal	22.53	24.68	25.09	25.22	25.77	27.65	30.01	29.49	34.49	38.25
Nuclear Power	8.23	8.44	8.44	8.44	9.03	9.09	9.09	9.03	9.09	9.09
Renewable Energy ¹⁶	5.74	7.00	7.08	7.25	7.64	8.00	8.16	8.73	9.02	9.12
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity Imports	0.04	0.07	0.07	0.08	0.04	0.05	0.06	0.05	0.05	0.05
Total	99.68	108.64	107.87	106.21	122.78	120.63	117.09	136.82	133.88	130.09
Energy Use and Related Statistics										
Delivered Energy Use	73.18	79.48	78.62	77.00	90.38	88.19	84.35	101.02	98.40	95.07
Total Energy Use	99.68	108.64	107.87	106.21	122.78	120.63	117.09	136.82	133.88	130.09
Population (millions)	294.10	310.12	310.12	310.12	336.99	336.99	336.99	364.79	364.79	364.79
Gross Domestic Product (billion 2000 dollars)	10756	13103	13043	12935	17597	17541	17469	23178	23112	23054
Carbon Dioxide Emissions (million metric tons)	5899.9	6403.1	6364.9	6255.6	7223.1	7119.0	6961.9	8158.5	8114.5	7974.7

¹Includes wood used for residential heating.

²Includes ethanol (blends of 10 percent or less) and ethers blended into gasoline.

³Includes commercial sector consumption of wood and wood waste, landfill gas, municipal solid waste, and other biomass for combined heat and power.

⁴Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

⁵Includes petroleum coke, asphalt, road oil, lubricants, still gas, and miscellaneous petroleum products.

⁶Represents natural gas used in the field gathering and processing plant machinery.

⁷Includes consumption of energy from hydroelectric, wood and wood waste, municipal solid waste, and other biomass.

⁸Diesel fuel for on- and off- road use.

⁹Includes only kerosene type.

¹⁰Includes aviation gasoline and lubricants.

¹¹E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol actually varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

¹²Includes unfinished oils, natural gasoline, motor gasoline blending components, aviation gasoline, lubricants, still gas, asphalt, road oil, petroleum coke, and miscellaneous petroleum products.

¹³Includes electricity generated for sale to the grid and for own use from renewable sources, and non-electric energy from renewable sources. Excludes nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

¹⁴Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

¹⁵Includes conventional hydroelectric, geothermal, wood and wood waste, municipal solid waste, other biomass, petroleum coke, wind, photovoltaic and solar thermal sources. Excludes net electricity imports.

¹⁶Includes hydroelectric, geothermal, wood and wood waste, municipal solid waste, other biomass, wind, photovoltaic and solar thermal sources. Includes ethanol components of E85; excludes ethanol blends (10 percent or less) in motor gasoline. Excludes net electricity imports and nonmarketed renewable energy consumption for geothermal heat pumps, buildings photovoltaic systems, and solar thermal hot water heaters.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports. Consumption values of 0.00 are values that round to 0.00, because they are less than 0.005.

Sources: 2004 consumption based on: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2004 population and gross domestic product: Global Insight macroeconomic model CTL0805. 2004 carbon dioxide emissions: EIA, *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005). Projections: EIA, AEO2006 National Energy Modeling System runs LP2006.D120105A, AEO2006.D111905A, and HP2006.D113005A.

Price Case Comparisons

Table C3. Energy Prices by Sector and Source
(2004 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Residential	17.31	16.24	16.98	18.37	15.84	17.19	19.14	17.12	18.51	20.73
Primary Energy ¹	11.39	10.41	11.28	13.01	9.65	11.31	13.96	10.58	12.62	15.75
Petroleum Products ²	14.63	12.61	14.77	19.35	11.13	15.94	26.03	11.86	18.42	29.03
Distillate Fuel	13.62	11.13	12.85	16.64	9.57	13.55	21.46	9.82	14.56	22.18
Liquefied Petroleum Gas	17.30	15.18	18.17	24.28	13.27	19.34	32.77	14.04	22.68	36.63
Natural Gas	10.40	9.81	10.33	11.33	9.25	10.16	11.30	10.27	11.32	13.17
Electricity	26.19	24.30	24.78	25.58	23.68	24.44	25.32	24.60	25.02	26.00
Commercial	16.56	15.58	16.27	17.52	15.06	16.28	17.95	16.29	17.52	19.74
Primary Energy ¹	9.20	8.30	8.96	10.27	7.51	8.74	10.70	8.21	9.65	12.17
Petroleum Products ²	10.39	9.18	10.56	13.54	8.13	11.22	17.86	8.44	12.28	18.93
Distillate Fuel	9.99	8.89	10.15	12.94	7.94	10.89	17.11	8.28	11.77	17.67
Residual Fuel	6.37	5.24	6.14	8.15	4.41	6.31	10.93	4.49	6.91	12.17
Natural Gas	9.10	8.25	8.76	9.74	7.49	8.37	9.46	8.28	9.29	11.11
Electricity	23.52	21.69	22.31	23.38	20.97	22.00	23.30	21.99	22.90	24.71
Industrial³	8.67	7.67	8.48	10.07	7.04	8.48	11.49	7.68	9.27	11.81
Primary Energy	7.42	6.32	7.19	8.93	5.65	7.24	10.65	6.24	8.09	10.93
Petroleum Products ²	9.65	8.10	9.46	12.23	7.10	9.94	16.36	7.50	11.36	17.80
Distillate Fuel	10.29	9.46	10.75	13.60	8.87	11.84	18.41	9.26	12.91	19.25
Liquefied Petroleum Gas	14.24	10.00	12.03	15.91	8.98	12.92	21.89	9.71	15.25	24.32
Residual Fuel	5.88	5.42	6.31	8.48	4.31	6.70	11.91	4.73	7.27	13.12
Natural Gas ⁴	6.10	5.19	5.69	6.62	4.67	5.49	6.53	5.51	6.45	8.24
Metallurgical Coal ⁵	2.24	2.36	2.36	2.36	2.23	2.23	2.23	2.29	2.28	2.29
Other Industrial Coal ⁵	1.74	1.84	1.86	1.89	1.73	1.81	1.89	1.80	1.92	1.99
Coal to Liquids	N/A	N/A	N/A	N/A	N/A	1.04	1.16	N/A	1.26	1.50
Electricity	15.54	15.19	15.65	16.37	14.67	15.35	16.03	15.69	15.95	16.91
Transportation	13.81	13.53	14.83	17.57	12.34	15.38	21.62	12.36	16.32	23.06
Primary Energy	13.79	13.51	14.82	17.56	12.32	15.36	21.62	12.34	16.31	23.06
Petroleum Products ²	13.79	13.51	14.82	17.57	12.33	15.38	21.65	12.34	16.32	23.10
Distillate Fuel ⁶	13.25	13.01	14.29	17.05	11.86	14.78	21.43	11.98	15.65	22.28
Jet Fuel ⁷	9.02	8.53	9.67	12.23	7.79	10.49	15.76	7.82	11.53	17.25
Motor Gasoline ⁸	15.34	15.14	16.52	19.34	13.76	17.02	23.55	13.61	17.92	25.15
Residual Fuel	4.91	5.44	6.43	8.68	4.04	6.54	11.98	4.16	7.59	13.47
Liquefied Petroleum Gas ⁹	17.14	14.31	16.72	21.26	12.39	16.82	26.89	12.70	19.25	29.37
Natural Gas ¹⁰	9.94	9.60	10.09	11.05	9.07	9.90	10.98	9.72	10.68	12.46
Ethanol (E85) ¹¹	20.24	19.59	21.19	24.57	17.58	21.10	28.92	17.73	22.48	26.66
Electricity	21.67	20.27	20.76	21.58	19.75	20.56	21.44	20.51	21.00	21.89
Average End-Use Energy	13.00	12.34	13.32	15.29	11.62	13.66	17.59	12.20	14.64	18.59
Primary Energy	11.04	10.44	11.52	13.71	9.62	11.89	16.46	10.02	12.86	17.42
Electricity	22.19	20.90	21.43	22.32	20.38	21.23	22.22	21.44	22.00	23.27
Electric Power¹²										
Fossil Fuel Average	2.46	2.34	2.41	2.59	2.35	2.46	2.54	2.60	2.49	2.60
Petroleum Products	5.43	5.47	6.50	8.86	4.33	6.91	12.32	4.47	7.61	13.16
Distillate Fuel	9.23	7.84	9.04	11.74	6.70	9.62	15.44	7.05	10.28	15.13
Residual Fuel	4.76	4.79	5.70	7.83	3.68	6.02	11.09	3.82	6.73	12.33
Natural Gas	5.92	5.06	5.46	6.33	4.68	5.40	6.28	5.56	6.26	7.89
Steam Coal ⁵	1.36	1.46	1.48	1.50	1.33	1.39	1.49	1.39	1.51	1.61

Price Case Comparisons

Table C3. Energy Prices by Sector and Source (Continued)
(2004 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Average Price to All Users¹³										
Petroleum Products ²	12.61	12.05	13.41	16.23	10.96	14.05	20.43	11.12	15.16	21.89
Distillate Fuel	12.62	11.98	13.30	16.19	11.03	14.07	20.76	11.29	15.04	21.62
Jet Fuel	9.02	8.53	9.67	12.23	7.79	10.49	15.76	7.82	11.53	17.25
Liquefied Petroleum Gas	14.89	11.17	13.39	17.71	10.01	14.38	24.16	10.76	16.90	26.82
Motor Gasoline ⁸	15.33	15.13	16.52	19.34	13.75	17.02	23.55	13.61	17.92	25.15
Residual Fuel	5.04	5.12	6.07	8.27	3.91	6.31	11.53	4.06	7.12	12.86
Natural Gas	7.52	6.68	7.19	8.15	6.03	6.93	8.10	6.88	7.98	9.94
Metallurgical Coal ⁹	2.24	2.36	2.36	2.36	2.23	2.23	2.23	2.29	2.28	2.29
Other Coal ⁵	1.39	1.48	1.51	1.53	1.36	1.42	1.51	1.42	1.53	1.63
Coal to Liquids	N/A	N/A	N/A	N/A	N/A	N/A	1.04	1.16	N/A	1.26
Ethanol (E85) ¹¹	20.24	19.59	21.19	24.57	17.58	21.10	28.92	17.73	22.48	26.66
Electricity	22.19	20.90	21.43	22.32	20.38	21.23	22.22	21.44	22.00	23.27
Non-Renewable Energy Expenditures by Sector (billion 2004 dollars)										
Residential	190.90	193.52	200.59	213.78	208.19	221.50	240.85	238.21	252.12	275.34
Commercial	135.07	140.38	145.01	153.30	163.10	172.19	183.90	206.87	216.48	235.28
Industrial	170.01	156.00	169.60	195.61	153.11	179.83	231.32	180.93	216.86	280.30
Transportation	374.67	411.84	445.81	513.93	443.45	530.44	691.99	512.03	635.46	816.38
Total Non-Renewable Expenditures	870.65	901.73	961.01	1076.61	967.86	1103.97	1348.07	1138.04	1320.94	1607.30
Transportation Renewable Expenditures	0.02	0.05	0.05	0.06	0.08	0.10	0.12	0.11	0.13	0.22
Total Expenditures	870.67	901.77	961.06	1076.67	967.94	1104.07	1348.19	1138.15	1321.07	1607.52

¹Weighted average price includes fuels below as well as coal.

²This quantity is the weighted average for all petroleum products, not just those listed below.

³Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

⁴Excludes use for lease and plant fuel.

⁵Excludes imported coal.

⁶Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

⁷Kerosene-type jet fuel. Includes Federal and State taxes while excluding county and local taxes.

⁸Sales weighted-average price for all grades. Includes Federal, State and local taxes.

⁹Includes Federal and State taxes while excluding county and local taxes.

¹⁰Compressed natural gas used as a vehicle fuel. Includes estimated motor vehicle fuel taxes.

¹¹E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol actually varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

¹²Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

¹³Weighted averages of end-use fuel prices are derived from the prices shown in each sector and the corresponding sectoral consumption.

Btu = British thermal unit.

Note: Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 prices for motor gasoline, distillate, and jet fuel are based on prices in the Energy Information Administration (EIA), *Petroleum Marketing Annual 2004*, DOE/EIA-0487(2004) (Washington, DC, August 2005). 2004 residential and commercial natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2004 industrial natural gas delivered prices are estimated based on: EIA, *Manufacturing Energy Consumption Survey 1994* and industrial and wellhead prices from the *Natural Gas Annual 2003*, DOE/EIA-0131(2003) (Washington, DC, December 2004) and the *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2004 transportation sector natural gas delivered prices are model results. 2004 electric power sector natural gas prices: EIA, *Electric Power Monthly*, DOE/EIA-0226, May 2003 through April 2004, Table 4.11.A. 2004 coal prices based on: EIA, *Quarterly Coal Report, October-December 2004*, DOE/EIA-0121(2004/4Q) (Washington, DC, March 2005) and EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A. 2004 electricity prices: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2004 ethanol prices derived from weekly spot prices in the Oxy Fuel News. **Projections:** EIA, AEO2006 National Energy Modeling System runs LP2006.D120105A, AEO2006.D111905A, and HP2006.D113005A.

Price Case Comparisons

Table C4. Petroleum Supply and Disposition Balance
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Crude Oil										
Domestic Crude Production ¹	5.42	6.00	5.88	5.78	5.56	5.55	5.63	4.49	4.57	4.96
Alaska	0.91	0.86	0.83	0.80	0.83	0.76	0.69	0.29	0.27	0.26
Lower 48 States	4.51	5.14	5.05	4.98	4.73	4.79	4.94	4.20	4.30	4.70
Net Imports	10.06	10.16	10.05	9.70	12.43	11.26	10.09	15.51	13.51	11.24
Gross Imports	10.09	10.19	10.08	9.73	12.46	11.28	10.12	15.53	13.53	11.26
Exports	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02
Other Crude Supply ²	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Crude Supply	15.48	16.17	15.93	15.48	17.99	16.81	15.72	20.00	18.08	16.20
Other Petroleum Supply										
Natural Gas Plant Liquids	1.81	1.78	1.75	1.72	1.90	1.94	1.92	1.92	1.87	1.89
Net Product Imports	2.05	2.39	2.28	2.03	3.51	3.16	2.26	4.70	3.73	2.04
Gross Refined Product Imports ³	2.07	2.49	2.39	2.18	3.55	3.13	2.39	4.52	3.56	2.12
Unfinished Oil Imports	0.49	0.42	0.41	0.36	0.63	0.54	0.39	0.86	0.66	0.44
Blending Components	0.41	0.46	0.46	0.44	0.55	0.52	0.47	0.63	0.57	0.50
Exports	0.96	0.99	0.98	0.96	1.22	1.03	0.99	1.31	1.07	1.03
Refinery Processing Gain ⁴	1.05	1.28	1.31	1.35	1.48	1.44	1.48	1.75	1.82	1.66
Other Supply	0.35	0.93	0.94	0.96	1.26	1.52	1.69	1.30	2.16	3.43
Liquids from Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.19
Liquids from Coal	0.00	0.00	0.00	0.00	0.00	0.23	0.29	0.00	0.76	1.69
Other ⁵	0.35	0.93	0.94	0.96	1.26	1.28	1.36	1.30	1.39	1.55
Total Primary Supply⁶	20.74	22.54	22.21	21.54	26.14	24.87	23.08	29.68	27.65	25.22
Refined Petroleum Products Supplied										
by Fuel										
Motor Gasoline ⁷	9.10	10.09	9.94	9.62	11.92	11.28	10.18	13.68	12.49	10.96
Jet Fuel ⁸	1.63	1.90	1.88	1.85	2.21	2.19	2.14	2.33	2.31	2.09
Distillate Fuel ⁹	4.06	4.67	4.61	4.51	5.37	5.21	5.01	6.29	6.09	5.99
Residual Fuel	0.87	0.77	0.73	0.67	0.89	0.74	0.67	1.01	0.78	0.70
Other ¹⁰	5.10	5.07	5.01	4.90	5.70	5.40	5.05	6.26	5.89	5.44
by Sector										
Residential and Commercial	1.29	1.29	1.25	1.18	1.37	1.25	1.10	1.39	1.22	1.06
Industrial ¹¹	5.02	5.28	5.23	5.11	5.83	5.55	5.25	6.40	6.06	5.67
Transportation	13.69	15.47	15.27	14.86	18.30	17.57	16.31	21.08	19.81	18.01
Electric Power ¹²	0.49	0.46	0.43	0.38	0.58	0.43	0.39	0.70	0.47	0.43
Total	20.76	22.50	22.17	21.54	26.08	24.81	23.05	29.57	27.57	25.17
Discrepancy¹³	-0.02	0.03	0.03	0.00	0.05	0.05	0.02	0.11	0.09	0.05

Price Case Comparisons

Table C4. Petroleum Supply and Disposition Balance (Continued)
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Imported Low Sulfur Light Crude Oil Price (2004 dollars per barrel) ¹⁴	40.49	40.29	47.29	62.65	33.99	50.70	85.06	33.73	56.97	95.71
Imported Crude Oil Price (2004 dollars per barrel) ¹⁴	35.99	37.00	43.99	58.99	27.99	44.99	79.98	27.99	49.99	89.98
Import Share of Product Supplied	0.58	0.56	0.56	0.54	0.61	0.58	0.54	0.68	0.62	0.53
Net Expenditures for Imported Crude Oil and Petroleum Products (billion 2004 dollars)	152.36	162.94	189.84	242.97	161.48	231.71	347.85	208.01	310.15	420.97
Domestic Refinery Distillation Capacity ¹⁵	16.9	17.6	17.6	17.3	19.2	18.1	17.6	21.3	19.3	17.9
Capacity Utilization Rate (percent) ¹⁶	93.0	93.1	91.9	90.8	95.2	94.1	90.8	95.3	94.8	91.8

¹Includes lease condensate.

²Strategic petroleum reserve stock additions plus unaccounted for crude oil and crude stock withdrawals minus crude product supplied.

³Includes other hydrocarbons and alcohols.

⁴Represents volumetric gain in refinery distillation and cracking processes.

⁵Includes petroleum product stock withdrawals; domestic sources of blending components, other hydrocarbons, alcohols, and ethers.

⁶Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.

⁷Includes ethanol and ethers blended into gasoline.

⁸Includes only kerosene type.

⁹Includes distillate and kerosene.

¹⁰Includes aviation gasoline, liquefied petroleum gas, petrochemical feedstocks, lubricants, waxes, asphalt, road oil, still gas, special naphthas, petroleum coke, crude oil product supplied, and miscellaneous petroleum products.

¹¹Includes consumption for combined heat and power (CHP), which produces electricity and other useful thermal energy.

¹²Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

¹³Balancing item. Includes unaccounted for supply, losses, and gains.

¹⁴Weighted average price delivered to U.S. refiners.

¹⁵End-of-year operable capacity.

¹⁶Rate is calculated by dividing the gross annual input to atmospheric crude oil distillation units by their operable refining capacity in barrels per calendar day.

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 imported crude oil price and petroleum product supplied based on: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2004 imported low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2004 data: EIA, *Petroleum Supply Annual 2004*, DOE/EIA-0340(2004)/1 (Washington, DC, June 2005). Projections: EIA, AEO2006 National Energy Modeling System runs LP2006.D120105A, AEO2006.D111905A, and HP2006.D113005A.

Price Case Comparisons

Table C5. Petroleum Product Prices
(2004 Cents per Gallon, Unless Otherwise Noted)

Sector and Fuel	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Crude Oil Prices (2004 dollars per barrel)										
Imported Low Sulfur Light Crude Oil Price ¹ . . .	40.49	40.29	47.29	62.65	33.99	50.70	85.06	33.73	56.97	95.71
Imported Crude Oil ¹	35.99	37.00	43.99	58.99	27.99	44.99	79.98	27.99	49.99	89.98
Delivered Sector Product Prices										
Residential										
Distillate Fuel	188.8	154.3	178.2	230.8	132.7	188.0	297.6	136.1	202.0	307.6
Liquefied Petroleum Gas	149.1	130.8	156.5	209.2	114.3	166.6	282.4	120.9	195.4	315.5
Commercial										
Distillate Fuel	138.3	122.6	140.0	178.5	109.5	150.1	236.0	114.1	162.2	243.6
Residual Fuel	95.3	78.4	91.8	122.1	66.0	94.4	163.7	67.2	103.5	182.2
Residual Fuel (2004 dollars per barrel)	40.03	32.91	38.57	51.26	27.71	39.66	68.75	28.23	43.47	76.50
Industrial²										
Distillate Fuel	142.5	130.1	147.8	187.0	121.8	162.5	252.7	127.1	177.2	264.2
Liquefied Petroleum Gas	122.7	86.1	103.6	137.1	77.4	111.3	188.6	83.7	131.4	209.5
Residual Fuel	87.9	81.2	94.4	126.9	64.6	100.2	178.2	70.8	108.9	196.4
Residual Fuel (2004 dollars per barrel)	36.94	34.09	39.67	53.29	27.11	42.10	74.86	29.72	45.72	82.49
Transportation										
Diesel Fuel (distillate) ³	182.4	178.4	195.9	233.8	162.6	202.5	293.6	164.2	214.4	305.2
Jet Fuel ⁴	121.8	115.2	130.6	165.1	105.2	141.6	212.7	105.6	155.6	232.8
Motor Gasoline ⁵	190.4	185.8	202.7	237.2	168.2	207.6	286.2	166.8	218.8	305.1
Liquid Petroleum Gas	147.7	123.3	144.0	183.2	106.7	144.9	231.6	109.4	165.8	253.0
Residual Fuel	73.5	81.4	96.3	129.9	60.5	97.8	179.3	62.3	113.6	201.7
Residual Fuel (2004 dollars per barrel)	30.89	34.19	40.43	54.57	25.43	41.09	75.30	26.16	47.70	84.70
Ethanol (E85) ⁶	190.2	183.3	198.3	229.9	164.3	197.1	269.7	165.8	210.0	248.5
Ethanol Wholesale Price	171.5	146.3	157.5	165.6	141.0	164.1	189.7	143.3	167.2	204.9
Electric Power⁷										
Distillate Fuel	128.0	108.8	125.4	162.9	92.9	133.5	214.1	97.7	142.6	209.8
Residual Fuel	71.2	71.7	85.3	117.2	55.0	90.1	166.0	57.2	100.7	184.5
Residual Fuel (2004 dollars per barrel)	29.90	30.10	35.84	49.22	23.11	37.84	69.72	24.01	42.29	77.50
Refined Petroleum Product Prices⁸										
Distillate Fuel	174.2	164.6	182.8	222.5	151.5	193.1	284.8	154.9	206.3	296.7
Jet Fuel ⁴	121.8	115.2	130.6	165.1	105.2	141.6	212.7	105.6	155.6	232.8
Liquefied Petroleum Gas	128.3	96.3	115.4	152.6	86.2	123.9	208.1	92.7	145.6	231.0
Motor Gasoline ⁵	190.4	185.8	202.7	237.2	168.2	207.6	286.2	166.8	218.8	305.1
Residual Fuel	75.5	76.7	90.9	123.8	58.5	94.5	172.6	60.7	106.6	192.5
Residual Fuel (2004 dollars per barrel)	31.71	32.21	38.19	51.98	24.59	39.70	72.50	25.50	44.75	80.86
Average	164.3	156.2	173.2	208.7	142.2	181.1	260.9	144.0	194.7	279.6

¹Weighted average price delivered to U.S. refiners.

²Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

³Diesel fuel for on-road use. Includes Federal and State taxes while excluding county and local taxes.

⁴Includes only kerosene type.

⁵Sales weighted-average price for all grades. Includes Federal, State and local taxes.

⁶E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol actually varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

⁷Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

⁸Weighted averages of end-use fuel prices are derived from the prices in each sector and the corresponding sectoral consumption.

Note: Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 imported low sulfur light crude oil price: Energy Information Administration (EIA), Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." 2004 imported crude oil price: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2004 prices for motor gasoline, distillate, and jet fuel are based on: EIA, *Petroleum Marketing Annual 2004*, DOE/EIA-0487(2004) (Washington, DC, August 2005). 2004 residential, commercial, industrial, and transportation sector petroleum product prices are derived from: EIA, Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report." 2004 electric power prices based on: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2004 ethanol prices derived from weekly spot prices in the Oxy Fuel News. 2004 wholesale ethanol prices derived from Bloomberg U.S. average rack price. **Projections:** EIA, AEO2006 National Energy Modeling System runs LP2006.D120105A, AEO2006.D111905A, and HP2006.D113005A.

Price Case Comparisons

Table C6. International Petroleum Supply and Disposition Summary
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Crude Oil Prices (2004 dollars per barrel)										
Imported Low Sulfur Light Crude Oil Price ¹ . . .	40.49	40.29	47.29	62.65	33.99	50.70	85.06	33.73	56.97	95.71
Imported Crude Oil Price ¹	35.99	37.00	43.99	58.99	27.99	44.99	79.98	27.99	49.99	89.98
Production (Conventional)²										
Mature Market Economies										
United States (50 states)	8.41	9.51	9.39	9.33	9.55	9.51	9.53	8.83	8.92	8.76
Canada	2.40	1.72	1.66	1.61	1.70	1.45	1.34	1.80	1.43	1.09
Mexico	4.10	4.10	3.97	3.91	4.96	4.48	4.30	5.76	5.01	4.16
Western Europe ³	6.85	6.08	5.88	5.75	5.90	5.22	4.89	5.17	4.37	3.53
Japan	0.14	0.09	0.09	0.09	0.07	0.07	0.08	0.08	0.07	0.06
Australia and New Zealand	0.67	0.92	0.89	0.87	0.94	0.84	0.80	0.94	0.81	0.66
Total Mature Market Economies	22.57	22.42	21.88	21.57	23.13	21.58	20.92	22.57	20.60	18.25
Transitional Economies										
Former Soviet Union										
Russia	9.29	9.79	9.50	9.37	11.75	10.66	10.29	12.86	11.26	9.41
Caspian Area ⁴	2.32	3.08	2.99	2.95	5.66	5.16	5.01	8.43	7.43	6.25
Eastern Europe ⁵	0.25	0.32	0.31	0.31	0.44	0.39	0.37	0.56	0.48	0.39
Total Transitional Economies	11.86	13.19	12.80	12.63	17.84	16.21	15.67	21.85	19.17	16.05
Emerging Economies										
OPEC ⁶										
Asia	1.39	1.55	1.49	1.31	1.37	1.26	0.86	1.25	1.09	0.68
Middle East	21.25	25.67	24.76	21.80	29.36	26.99	18.48	35.65	31.07	19.36
North Africa	2.98	3.61	3.48	3.06	4.02	3.70	2.53	4.02	3.50	2.18
West Africa	1.96	2.47	2.39	2.10	2.84	2.61	1.79	3.50	3.05	1.90
South America	2.82	3.50	3.38	2.98	4.02	3.70	2.53	4.75	4.14	2.58
Non-OPEC										
China	3.25	3.49	3.38	3.32	3.72	3.33	3.15	3.75	3.22	2.63
Other Asia	2.88	2.56	2.48	2.44	2.90	2.61	2.49	2.91	2.51	2.07
Middle East ⁷	1.76	2.15	2.09	2.05	2.74	2.45	2.32	3.39	2.91	2.38
Africa	3.54	3.73	3.62	3.58	5.91	5.41	5.29	9.05	8.03	6.80
South and Central America	4.22	4.47	4.34	4.28	6.40	5.83	5.66	7.95	7.00	5.89
Total Emerging Economies	46.07	53.20	51.41	46.93	63.29	57.89	45.11	76.22	66.52	46.48
Total Production (Conventional)	80.50	88.81	86.09	81.12	104.26	95.68	81.70	120.64	106.29	80.78
Production⁶ (Nonconventional)										
United States (50 states)	0.22	0.48	0.48	0.48	0.65	0.94	1.19	0.64	1.50	3.18
Other North America	0.92	1.12	1.79	1.86	2.33	2.67	3.54	2.67	3.58	4.88
Western Europe	0.03	0.09	0.09	0.10	0.10	0.12	0.15	0.10	0.13	0.17
Asia	0.20	0.60	0.68	0.79	0.81	1.25	2.33	0.91	2.06	5.09
Middle East ⁷	0.01	0.06	0.53	0.69	0.19	0.73	1.13	0.30	1.08	1.49
Africa	0.08	0.20	0.21	0.30	0.38	0.53	1.07	0.57	0.85	2.09
South and Central America	0.49	1.14	1.13	1.65	1.69	1.78	3.07	1.85	2.31	4.22
Total Production (Nonconventional) . . .	1.96	3.69	4.91	5.88	6.14	8.02	12.50	7.06	11.52	21.12
Total Production	82.46	92.50	91.00	87.00	110.40	103.70	94.20	127.70	117.80	101.90

Price Case Comparisons

Table C6. International Petroleum Supply and Disposition Summary (Continued)
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2004	Projections								
		2010			2020			2030		
		Low Price	Reference	High Price	Low Price	Reference	High Price	Low Price	Reference	High Price
Consumption⁸										
Mature Market Economies										
United States (50 states)	20.76	22.50	22.17	21.54	26.08	24.81	23.05	29.57	27.57	25.17
United States Territories	0.33	0.35	0.34	0.31	0.44	0.38	0.30	0.55	0.45	0.34
Canada	2.15	2.20	2.13	1.98	2.58	2.25	1.85	2.80	2.34	1.79
Mexico	2.00	2.18	2.13	1.97	2.61	2.24	1.73	3.03	2.29	1.37
Western Europe ³	13.63	13.67	13.44	12.80	14.37	13.52	12.30	15.32	14.27	12.34
Japan	5.22	4.99	4.85	4.48	5.23	4.40	3.39	5.43	4.13	2.66
Australia and New Zealand	1.07	1.17	1.16	1.11	1.35	1.28	1.18	1.53	1.45	1.26
Total Mature Market Economies	45.16	47.06	46.22	44.18	52.66	48.89	43.80	58.22	52.50	44.93
Transitional Economies										
Former Soviet Union	4.14	4.61	4.55	4.35	5.17	4.93	4.57	5.70	5.41	4.79
Eastern Europe ⁵	1.42	1.60	1.58	1.53	1.93	1.87	1.78	2.22	2.15	1.98
Total Transitional Economies	5.56	6.21	6.13	5.88	7.10	6.81	6.35	7.92	7.57	6.78
Emerging Economies										
China	6.63	8.84	8.64	8.15	12.41	11.38	10.02	16.58	14.93	12.51
India	2.42	2.98	2.92	2.75	4.13	3.81	3.32	5.43	4.85	3.82
South Korea	2.23	2.47	2.41	2.26	2.84	2.57	2.21	3.03	2.66	2.10
Other Asia	6.10	7.74	7.64	7.34	10.24	9.85	9.21	12.56	12.05	10.72
Middle East ⁷	6.09	7.22	7.16	6.94	8.52	8.34	8.00	9.52	9.34	8.67
Africa	2.96	3.67	3.63	3.46	4.48	4.31	3.99	5.01	4.81	4.12
South and Central America	5.30	6.32	6.25	6.03	8.02	7.75	7.30	9.43	9.10	8.27
Total Emerging Economies	31.74	39.23	38.65	36.94	50.64	48.01	44.05	61.55	57.74	50.19
Total Consumption	82.46	92.50	91.00	87.00	110.40	103.70	94.20	127.70	117.80	101.90
OPEC Production ¹⁰	30.78	37.50	36.67	32.99	42.95	40.27	29.58	50.77	45.82	31.66
Non-OPEC Production ¹⁰	51.68	55.00	54.33	54.01	67.45	63.43	64.62	76.93	71.98	70.24
Net Eurasia Exports	6.31	6.98	6.67	6.74	10.74	9.40	9.32	13.93	11.60	9.28
OPEC Market Share	0.37	0.41	0.40	0.38	0.39	0.39	0.31	0.40	0.39	0.31

¹Weighted average price delivered to U.S. refiners.

²Includes production of crude oil (including lease condensates), natural gas plant liquids, other hydrogen and hydrocarbons for refinery feedstocks, alcohol and other sources, and refinery gains.

³Western Europe = Austria, Belgium, Bosnia and Herzegovina, Croatia, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Macedonia, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and Yugoslavia.

⁴Caspian area includes Other Former Soviet Union.

⁵Eastern Europe = Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, and Slovakia.

⁶OPEC = Organization of Petroleum Exporting Countries - Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

⁷Non-OPEC Middle East includes Turkey.

⁸Includes liquids produced from energy crops, natural gas, coal, oil sands, and shale. Includes both OPEC and non-OPEC producers in the regional breakdown.

⁹Includes both OPEC and non-OPEC consumers in the regional breakdown.

¹⁰Includes both conventional and nonconventional liquids production.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 low sulfur light crude oil price: Energy Information Administration (EIA), Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." 2004 imported crude oil price: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). **2004 quantities and projections:** Energy Information Administration, AEO2006 National Energy Modeling System runs LP2006.D120105A, AEO2006.D111905A, and HP2006.D113005A.

Appendix D

Results from Side Cases

Table D1. Key Results for Residential and Commercial Sector Technology Cases

Energy Consumption	2004	2010				2020			
		2005 Technology	Reference	High Technology	Best Available Technology	2005 Technology	Reference	High Technology	Best Available Technology
Residential									
Energy Consumption (quadrillion Btu)									
Distillate Fuel	0.94	0.86	0.83	0.83	0.81	0.78	0.73	0.71	0.67
Kerosene	0.09	0.10	0.09	0.09	0.09	0.09	0.08	0.08	0.07
Liquefied Petroleum Gas	0.54	0.56	0.56	0.55	0.54	0.63	0.61	0.60	0.57
Petroleum Subtotal	1.57	1.51	1.48	1.47	1.44	1.50	1.43	1.39	1.32
Natural Gas	5.03	5.39	5.33	5.30	5.25	5.86	5.68	5.43	5.25
Coal	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Renewable Energy	0.41	0.44	0.44	0.43	0.43	0.45	0.43	0.41	0.40
Electricity	4.41	5.01	4.99	4.92	4.62	5.88	5.77	5.52	4.88
Delivered Energy	11.44	12.37	12.25	12.13	11.76	13.69	13.31	12.77	11.86
Electricity Related Losses	9.60	10.80	10.74	10.60	9.96	12.07	11.85	11.35	10.02
Total	21.04	23.17	22.99	22.73	21.72	25.77	25.17	24.12	21.88
Delivered Energy Intensity (million Btu per household)	100.6	100.7	99.6	98.7	95.6	99.8	97.0	93.1	86.4
Nonmarketed Renewables Consumption (quadrillion Btu)	0.03	0.04	0.04	0.04	0.03	0.05	0.05	0.07	0.06
Commercial									
Energy Consumption (quadrillion Btu)									
Distillate Fuel	0.50	0.49	0.48	0.48	0.49	0.53	0.50	0.50	0.54
Residual Fuel	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Kerosene	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Liquefied Petroleum Gas	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Motor Gasoline	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Petroleum Subtotal	0.79	0.77	0.77	0.77	0.78	0.83	0.79	0.79	0.84
Natural Gas	3.09	3.19	3.18	3.17	3.12	3.68	3.68	3.65	3.48
Coal	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Renewable Energy	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Electricity	4.19	4.94	4.88	4.77	4.41	6.35	6.01	5.79	5.01
Delivered Energy	8.24	9.07	9.00	8.88	8.47	11.03	10.66	10.41	9.50
Electricity Related Losses	9.13	10.64	10.51	10.27	9.49	13.04	12.35	11.90	10.29
Total	17.37	19.71	19.51	19.15	17.97	24.07	23.02	22.31	19.78
Delivered Energy Intensity (thousand Btu per square foot)	109.9	110.2	109.3	107.9	102.9	115.0	111.1	108.5	99.0
Commercial Sector Generation									
Net Summer Generation Capacity (megawatts)									
Natural Gas	561	569	570	570	570	570	587	587	587
Solar Photovoltaic	111	453	491	491	505	528	577	577	1093
Electricity Generation (billion kilowatthours)									
Natural Gas	4.04	4.10	4.10	4.10	4.10	4.10	4.23	4.23	4.23
Solar Photovoltaic	0.23	0.96	1.04	1.04	1.07	1.12	1.22	1.22	2.34
Nonmarketed Renewables Consumption (quadrillion Btu)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports. Side cases were run without the fully integrated modeling system, so not all feedbacks are captured. The reference case ratio of electricity losses to electricity use was used to compute electricity losses for the technology cases.

Source: Energy Information Administration, AEO2006 National Energy Modeling System, runs BLDFRZN.D112205A, BLDDEF.D112205A, BLDHIGH.D112205A, and BLDBEST.D112205C.

Results from Side Cases

2030				Annual Growth 2004-2030 (percent)			
2005 Technology	Reference	High Technology	Best Available Technology	2005 Technology	Reference	High Technology	Best Available Technology
0.67	0.61	0.58	0.53	-1.3%	-1.7%	-1.9%	-2.2%
0.08	0.07	0.07	0.06	-0.6%	-1.0%	-1.2%	-1.8%
0.67	0.65	0.62	0.60	0.8%	0.7%	0.5%	0.4%
1.42	1.32	1.27	1.18	-0.4%	-0.7%	-0.8%	-1.1%
6.13	5.82	5.39	5.08	0.8%	0.6%	0.3%	0.0%
0.01	0.01	0.01	0.01	-0.1%	-0.5%	-0.6%	-0.7%
0.46	0.41	0.39	0.38	0.4%	0.1%	-0.1%	-0.3%
6.68	6.47	6.16	5.29	1.6%	1.5%	1.3%	0.7%
14.70	14.04	13.22	11.93	1.0%	0.8%	0.6%	0.2%
13.01	12.60	11.99	10.30	1.2%	1.1%	0.9%	0.3%
27.72	26.64	25.22	22.23	1.1%	0.9%	0.7%	0.2%
98.1	93.7	88.3	79.7	-0.1%	-0.3%	-0.5%	-0.9%
0.06	0.06	0.13	0.12	3.6%	3.5%	6.4%	6.0%
0.58	0.52	0.52	0.60	0.6%	0.1%	0.1%	0.7%
0.12	0.12	0.12	0.12	0.1%	0.1%	0.1%	0.1%
0.03	0.03	0.03	0.03	0.3%	0.3%	0.3%	0.3%
0.10	0.10	0.10	0.10	0.2%	0.2%	0.2%	0.2%
0.05	0.05	0.05	0.05	0.3%	0.3%	0.3%	0.3%
0.88	0.82	0.82	0.90	0.4%	0.1%	0.1%	0.5%
4.11	4.11	4.06	3.81	1.1%	1.1%	1.0%	0.8%
0.09	0.09	0.09	0.09	-0.0%	-0.0%	-0.0%	-0.0%
0.09	0.09	0.09	0.09	0.0%	0.0%	0.0%	0.0%
7.98	7.34	7.05	6.03	2.5%	2.2%	2.0%	1.4%
13.15	12.44	12.09	10.92	1.8%	1.6%	1.5%	1.1%
15.55	14.29	13.72	11.74	2.1%	1.7%	1.6%	1.0%
28.69	26.73	25.82	22.66	1.9%	1.7%	1.5%	1.0%
117.3	111.0	107.9	97.5	0.3%	0.0%	-0.1%	-0.5%
581	696	701	749	0.1%	0.8%	0.9%	1.1%
616	1357	1774	4769	6.8%	10.1%	11.3%	15.6%
4.19	5.02	5.05	5.41	0.1%	0.8%	0.9%	1.1%
1.31	2.92	3.79	9.81	6.9%	10.2%	11.3%	15.5%
0.03	0.04	0.04	0.06	1.0%	1.6%	1.8%	3.5%

Results from Side Cases

Table D2. Key Results for Industrial Sector Technology Cases

Consumption	2004	2010			2020			2030		
		2005 Technology	Reference	High Technology	2005 Technology	Reference	High Technology	2005 Technology	Reference	High Technology
Value of Shipments (billion 2000 dollars)										
Manufacturing	4204	4783	4783	4783	5969	5969	5969	7509	7509	7509
Nonmanufacturing	1439	1572	1572	1572	1808	1808	1808	2069	2069	2069
Total	5643	6355	6355	6355	7778	7778	7778	9578	9578	9578
Energy Consumption (quadrillion Btu)¹										
Distillate Fuel	1.19	1.25	1.20	1.16	1.37	1.23	1.11	1.53	1.32	1.18
Liquefied Petroleum Gas	2.19	2.27	2.21	2.16	2.50	2.34	2.21	2.75	2.54	2.38
Petrochemical Feedstocks	1.49	1.52	1.48	1.44	1.62	1.51	1.41	1.71	1.55	1.45
Residual Fuel	0.24	0.20	0.20	0.20	0.20	0.20	0.18	0.23	0.21	0.19
Motor Gasoline	0.32	0.34	0.32	0.31	0.36	0.32	0.29	0.38	0.34	0.30
Petroleum Coke	0.94	1.13	1.12	1.10	1.29	1.24	1.19	1.41	1.34	1.28
Still Gas	1.55	1.78	1.78	1.78	2.07	2.07	2.07	2.44	2.44	2.44
Asphalt and Road Oil	1.24	1.33	1.22	1.14	1.53	1.25	1.04	1.76	1.39	1.14
Miscellaneous Petroleum ²	0.43	0.50	0.48	0.46	0.53	0.49	0.44	0.57	0.52	0.45
Petroleum Subtotal	9.58	10.32	10.01	9.73	11.46	10.65	9.95	12.78	11.66	10.80
Natural Gas	7.64	8.30	8.07	7.93	9.12	8.51	8.07	9.78	9.08	8.32
Lease and Plant Fuel ³	1.14	1.12	1.12	1.12	1.28	1.28	1.28	1.21	1.21	1.21
Natural Gas Subtotal	8.78	9.42	9.19	9.05	10.41	9.80	9.36	10.99	10.28	9.53
Metallurgical Coal and Coke ⁴	0.79	0.67	0.64	0.60	0.68	0.61	0.52	0.68	0.59	0.47
Other Industrial Coal	1.38	1.45	1.43	1.41	1.47	1.43	1.38	1.51	1.45	1.37
Coal to Liquids Heat and Power	0.00	0.00	0.00	0.00	0.49	0.49	0.49	1.61	1.61	1.61
Coal Subtotal	2.16	2.12	2.07	2.01	2.64	2.53	2.39	3.80	3.65	3.45
Renewable Energy ⁵	1.68	1.79	1.79	1.83	2.00	2.01	2.17	2.26	2.29	2.61
Purchased Electricity	3.48	3.71	3.62	3.50	4.18	3.91	3.61	4.76	4.31	3.82
Delivered Energy	25.68	27.35	26.67	26.12	30.70	28.91	27.48	34.59	32.19	30.21
Electricity Related Losses	7.58	7.99	7.79	7.54	8.59	8.04	7.41	9.27	8.39	7.43
Total	33.27	35.34	34.46	33.66	39.29	36.95	34.89	43.86	40.58	37.64
Delivered Energy Use per Dollar of Shipments (thousand Btu per 2000 dollar)										
	5.89	5.56	5.42	5.30	5.05	4.75	4.49	4.58	4.24	3.93
Industrial Combined Heat and Power										
Capacity (gigawatts)	27.53	30.11	30.09	31.36	41.40	41.69	45.12	59.28	60.79	65.72
Generation (billion kilowatthours)	149.23	178.82	178.57	187.10	265.31	266.65	288.81	402.96	412.28	442.53

¹Fuel consumption includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

²Includes lubricants and miscellaneous petroleum products.

³Represents natural gas used in the field gathering and processing plant machinery.

⁴Includes net coal coke imports.

⁵Includes consumption of energy from hydroelectric, wood and wood waste, municipal solid waste, and other biomass.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports. Side cases were run without the fully integrated modeling system, so not all potential feedbacks were captured. The reference case ratio of electricity losses to electricity use was used to compute electricity losses for the technology cases.

Source: Energy Information Administration, AEO2006 National Energy Modeling System runs INDFRZN.D120505A, INDEF.D120505A, and INDHIGH.D120505A.

Results from Side Cases

Table D3. Key Results for Transportation Sector Technology Cases

Consumption and Indicators	2004	2010			2020			2030		
		2005 Technology	Reference	High Technology	2005 Technology	Reference	High Technology	2005 Technology	Reference	High Technology
Level of Travel										
(billion vehicle miles traveled)										
Light-Duty Vehicles less than 8,500	2632	2887	2889	2895	3450	3474	3509	4066	4132	4198
Commercial Light Trucks ¹	69	77	77	77	93	94	94	114	114	115
Freight Trucks greater than 10,000	226	261	261	261	328	328	329	414	414	414
(billion seat miles available)										
Air	980	1192	1192	1192	1452	1452	1452	1567	1567	1567
(billion ton miles traveled)										
Rail	1539	1723	1723	1724	1985	1985	1987	2406	2406	2408
Domestic Shipping	629	684	684	684	768	768	768	825	825	825
Energy Efficiency Indicators										
(miles per gallon)										
New Light-Duty Vehicle ²	24.9	26.1	26.7	28.2	26.0	28.0	30.5	26.2	29.2	32.1
New Car ²	29.3	30.5	31.4	33.4	30.6	32.7	35.5	30.7	33.8	36.9
New Light Truck ²	21.5	22.8	23.2	24.3	22.9	24.9	27.1	23.4	26.4	29.0
Light-Duty Stock ³	20.2	20.3	20.3	20.6	20.5	21.4	22.6	20.7	22.5	24.4
New Commercial Light Truck ¹	14.5	15.1	15.4	16.2	14.7	16.3	18.0	14.7	17.1	19.1
Stock Commercial Light Truck ¹	14.1	14.6	14.6	14.8	14.9	15.7	16.8	14.7	16.7	18.5
Freight Truck	6.0	6.0	6.0	6.1	6.1	6.4	6.5	6.1	6.8	6.9
(seat miles per gallon)										
Aircraft	55.5	58.5	59.0	64.5	61.0	67.6	83.8	61.6	76.0	99.6
(ton miles per thousand Btu)										
Rail	2.9	2.9	2.9	3.0	2.9	3.0	3.3	2.9	3.0	3.6
Domestic Shipping	2.1	2.1	2.2	2.2	2.1	2.2	2.3	2.1	2.2	2.4
Energy Use by Mode										
(quadrillion Btu)										
Light-Duty Vehicles	16.21	17.75	17.69	17.46	20.94	20.26	19.37	24.57	22.94	21.47
Commercial Light Trucks ¹	0.61	0.66	0.66	0.65	0.79	0.75	0.70	0.97	0.86	0.78
Bus Transportation	0.27	0.28	0.28	0.28	0.30	0.29	0.29	0.33	0.30	0.30
Freight Trucks	4.70	5.42	5.42	5.39	6.76	6.38	6.31	8.47	7.58	7.50
Rail, Passenger	0.13	0.14	0.14	0.14	0.16	0.15	0.14	0.17	0.17	0.14
Rail, Freight	0.53	0.59	0.59	0.57	0.68	0.67	0.60	0.83	0.81	0.68
Shipping, Domestic	0.30	0.32	0.32	0.31	0.36	0.35	0.33	0.39	0.37	0.34
Shipping, International	0.55	0.56	0.55	0.55	0.57	0.56	0.56	0.57	0.57	0.57
Recreational Boats	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.19	0.19	0.19
Air	2.82	3.35	3.32	3.04	4.34	3.92	3.16	5.12	4.15	3.16
Military Use	0.71	0.76	0.76	0.76	0.81	0.81	0.80	0.84	0.84	0.84
Lubricants	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16
Pipeline Fuel	0.69	0.65	0.65	0.65	0.80	0.80	0.80	0.78	0.78	0.78
Total	27.82	30.80	30.69	30.11	36.85	35.27	33.40	43.38	39.69	36.91
Energy Use by Fuel										
(quadrillion Btu)										
Distillate Fuel ⁴	5.91	6.84	6.83	6.76	8.57	8.14	7.92	10.96	10.00	9.60
Jet Fuel ⁵	3.35	3.92	3.89	3.61	4.96	4.53	3.77	5.76	4.79	3.80
Motor Gasoline ⁶	16.93	18.38	18.31	18.09	21.41	20.69	19.82	24.68	22.95	21.58
Residual Fuel	0.61	0.62	0.62	0.62	0.65	0.64	0.63	0.66	0.65	0.64
Liquefied Petroleum Gas	0.03	0.06	0.06	0.06	0.09	0.09	0.08	0.11	0.11	0.10
Other Petroleum ⁷	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.19	0.19
Petroleum Subtotal	27.02	30.00	29.90	29.32	35.84	34.27	32.41	42.36	38.68	35.92
Pipeline Fuel Natural Gas	0.69	0.65	0.65	0.65	0.80	0.80	0.80	0.78	0.78	0.78
Compressed Natural Gas	0.03	0.05	0.05	0.05	0.09	0.09	0.09	0.12	0.12	0.11
Renewable Energy (E85) ⁸	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.08	0.09	0.09	0.09	0.10	0.10	0.09	0.11	0.11	0.09
Delivered Energy	27.82	30.80	30.69	30.11	36.85	35.27	33.40	43.38	39.69	36.91
Electricity Related Losses	0.18	0.19	0.19	0.19	0.20	0.20	0.18	0.21	0.21	0.18
Total	28.00	30.99	30.88	30.30	37.05	35.47	33.59	43.59	39.90	37.09

¹Commercial trucks 8,500 to 10,000 pounds.

²Environmental Protection Agency rated miles per gallon.

³Combined car and light truck "on-the-road" estimate.

⁴Diesel fuel for on- and off- road use.

⁵Includes only kerosene type.

⁶Includes ethanol (blends of 10 percent or less) and ethers blended into gasoline.

⁷Includes aviation gasoline and lubricants.

⁸E85 refers to a blend of 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable). To address cold starting issues, the percentage of ethanol actually varies seasonally. The annual average ethanol content of 74 percent is used for this forecast.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports. Side cases were run without the fully integrated modeling system, so not all potential feedbacks were captured. The reference case ratio of electricity losses to electricity use was used to compute electricity losses for the technology cases.

Source: Energy Information Administration, AEO2006 National Energy Modeling System runs LOTEK_06.D113005A, REF.D120505A, and HITEK_06.D120805B.

Results from Side Cases

Table D4. Key Results for Integrated Technology Cases

Consumption and Emissions	2004	2010			2020			2030		
		2005 Technology	Reference	High Technology	2005 Technology	Reference	High Technology	2005 Technology	Reference	High Technology
Consumption by Sector (quadrillion Btu)										
Residential	21.0	23.1	23.0	22.8	25.7	25.2	24.3	27.7	26.6	25.2
Commercial	17.4	19.6	19.5	19.2	23.9	23.0	22.5	28.4	26.7	25.9
Industrial	33.3	35.3	34.5	33.7	39.4	37.0	34.7	44.6	40.6	37.4
Transportation	28.0	31.0	30.9	30.4	37.0	35.5	33.7	43.5	39.9	37.2
Total	99.7	109.1	107.9	106.1	125.9	120.6	115.2	144.2	133.9	125.7
Consumption by Fuel (quadrillion Btu)										
Petroleum Products	40.1	43.6	43.1	42.3	50.7	48.1	45.5	58.7	53.6	49.7
Natural Gas	23.1	24.6	24.0	23.5	28.5	27.7	26.4	28.8	27.7	26.7
Coal	22.5	25.3	25.1	24.7	29.7	27.6	26.0	38.1	34.5	30.2
Nuclear Power	8.2	8.4	8.4	8.4	9.1	9.1	8.9	9.7	9.1	9.5
Renewable Energy	5.7	7.1	7.1	7.1	7.8	8.0	8.3	8.8	9.0	9.6
Other	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0
Total	99.7	109.1	107.9	106.1	125.9	120.6	115.2	144.2	133.9	125.7
Energy Intensity (thousand Btu per 2000 dollar of GDP)	9.3	8.4	8.3	8.1	7.2	6.9	6.6	6.3	5.8	5.4
Carbon Dioxide Emissions by Sector (million metric tons)										
Residential	1207.8	1323.9	1315.0	1301.2	1487.3	1433.9	1366.1	1653.2	1575.9	1432.1
Commercial	1020.4	1151.5	1141.8	1123.2	1418.2	1339.0	1292.8	1748.5	1620.0	1502.2
Industrial	1727.1	1831.0	1787.2	1744.8	2073.2	1924.3	1778.1	2444.8	2184.5	1945.6
Transportation	1944.7	2127.6	2121.0	2083.4	2527.8	2421.8	2296.9	2985.0	2734.1	2541.0
Total	5899.9	6433.9	6364.9	6252.6	7506.5	7119.0	6733.8	8831.5	8114.5	7420.8
Carbon Dioxide Emissions by End-Use Fuel (million metric tons)										
Petroleum	2497.8	2685.1	2665.8	2619.8	3135.3	2986.3	2829.1	3653.9	3339.0	3102.9
Natural Gas	907.5	979.6	964.2	955.6	1089.9	1052.1	1015.1	1158.1	1107.8	1042.1
Coal	196.1	206.3	202.2	197.4	266.4	245.4	212.9	434.0	349.7	318.8
Electricity	2298.6	2562.8	2532.7	2479.8	3014.8	2835.2	2676.8	3585.5	3318.0	2957.1
Total	5899.9	6433.9	6364.9	6252.6	7506.5	7119.0	6733.8	8831.5	8114.5	7420.8
Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)										
Petroleum	97.4	75.3	74.5	73.1	77.5	74.5	70.4	91.0	81.8	75.2
Natural Gas	295.9	311.3	297.4	276.6	408.5	402.8	372.9	352.9	344.3	361.2
Coal	1893.9	2163.3	2147.8	2117.1	2514.6	2343.5	2219.3	3127.0	2876.6	2505.7
Other	11.4	13.0	13.0	13.0	14.2	14.3	14.2	14.6	15.3	15.0
Total	2298.6	2562.8	2532.7	2479.8	3014.8	2835.2	2676.8	3585.5	3318.0	2957.1
Carbon Dioxide Emissions by Primary Fuel (million metric tons)										
Petroleum	2595.2	2760.5	2740.3	2692.9	3212.8	3060.8	2899.5	3744.9	3420.8	3178.1
Natural Gas	1203.4	1290.9	1261.6	1232.2	1498.5	1454.9	1388.0	1511.0	1452.1	1403.2
Coal	2089.9	2369.6	2350.0	2314.5	2781.0	2589.0	2432.1	3561.0	3226.3	2824.5
Other	11.4	13.0	13.0	13.0	14.2	14.3	14.2	14.6	15.3	15.0
Total	5899.9	6433.9	6364.9	6252.6	7506.5	7119.0	6733.8	8831.5	8114.5	7420.8

Btu = British thermal unit.
GDP = Gross domestic product.

Note: Includes end-use, fossil electricity, and renewable technology assumptions. Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2006 National Energy Modeling System runs LTRKITE.D121905A, AEO2006.D111905A, and HTRKITE.D121905A.

Results from Side Cases

Table D5. Key Results for Advanced Nuclear Cost Cases
(Gigawatts, Unless Otherwise Noted)

Net Summer Capacity, Generation, Emissions, and Fuel Prices	2004	2010			2020			2030		
		Reference	Vendor Estimate	Advanced Nuclear Cost	Reference	Vendor Estimate	Advanced Nuclear Cost	Reference	Vendor Estimate	Advanced Nuclear Cost
Capacity										
Coal Steam	309.9	318.6	318.7	318.7	345.3	337.0	342.0	457.4	390.5	437.3
Other Fossil Steam	124.3	122.4	122.4	122.4	80.3	78.3	78.6	75.3	73.1	72.9
Combined Cycle	158.7	183.8	183.8	183.8	213.8	210.2	212.8	230.6	223.2	222.8
Combustion Turbine/Diesel	130.1	139.0	139.0	139.0	149.0	153.8	151.8	173.7	184.2	179.5
Nuclear Power	99.6	100.9	100.9	100.9	108.8	116.1	111.7	108.8	179.5	136.8
Pumped Storage	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewable Sources	92.3	102.7	102.7	102.7	108.2	107.2	108.2	114.1	110.8	112.4
Distributed Generation (Natural Gas)	0.0	0.2	0.2	0.2	1.4	1.3	1.4	5.5	7.1	6.7
Combined Heat and Power ¹	29.3	32.4	32.4	32.4	44.2	44.1	44.2	64.3	64.3	63.7
Total	964.9	1020.8	1021.0	1021.0	1071.6	1068.8	1071.4	1250.5	1253.5	1252.7
Cumulative Additions										
Coal Steam	0.0	11.7	11.9	11.9	42.2	34.1	38.8	154.4	87.6	134.1
Other Fossil Steam	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Combined Cycle	0.0	25.7	25.7	25.7	55.7	52.1	54.7	72.5	65.1	64.7
Combustion Turbine/Diesel	0.0	10.0	10.0	10.0	26.8	31.6	29.8	51.5	62.0	57.4
Nuclear Power	0.0	0.0	0.0	0.0	6.0	13.3	8.9	6.0	76.7	34.0
Pumped Storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewable Sources	0.0	10.4	10.4	10.4	16.0	14.9	15.9	21.8	18.6	20.1
Distributed Generation	0.0	0.2	0.2	0.2	1.4	1.3	1.4	5.5	7.1	6.7
Combined Heat and Power ¹	0.0	3.1	3.1	3.1	14.8	14.8	14.8	35.0	34.9	34.4
Total	0.0	61.3	61.4	61.5	162.9	162.3	164.4	346.8	352.1	351.5
Cumulative Retirements	0.0	7.1	7.1	7.1	59.8	61.9	61.5	64.7	67.1	67.2
Generation by Fuel (billion kilowatthours)										
Coal	1954	2195	2194	2199	2435	2385	2416	3205	2737	3065
Petroleum	115	93	92	93	92	93	93	101	94	99
Natural Gas	619	673	674	672	968	970	970	822	786	779
Nuclear Power	789	809	809	809	871	924	889	871	1412	1086
Pumped Storage	-8	-9	-9	-9	-9	-9	-9	-9	-9	-9
Renewable Sources	323	436	436	433	469	462	467	504	482	493
Distributed Generation	0	0	0	0	1	1	1	2	3	3
Combined Heat and Power ¹	161	192	192	192	280	280	279	429	429	425
Total	3955	4388	4389	4388	5108	5106	5107	5926	5935	5942
Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)²										
Petroleum	97.4	74.5	74.3	74.5	74.5	75.4	75.1	81.8	76.1	79.9
Natural Gas	295.9	297.4	298.0	297.1	402.8	405.2	403.8	344.3	335.0	331.3
Coal	1893.9	2147.8	2145.8	2150.9	2343.5	2311.5	2331.4	2876.6	2566.2	2782.5
Other	11.4	13.0	13.0	13.0	14.3	14.3	14.3	15.3	15.1	15.2
Total	2298.6	2532.7	2531.0	2535.5	2835.2	2806.4	2824.7	3318.0	2992.4	3209.0
Prices to the Electric Power Sector² (2004 dollars per million Btu)										
Petroleum	5.43	6.50	6.50	6.50	6.91	6.85	6.87	7.61	7.75	7.65
Natural Gas	5.92	5.46	5.47	5.46	5.40	5.43	5.41	6.26	6.21	6.17
Coal	1.36	1.48	1.48	1.48	1.39	1.38	1.39	1.51	1.43	1.48

¹Includes combined heat and power plants and electricity-only plants in commercial and industrial sectors. Includes small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid. Excludes off-grid photovoltaics and other generators not connected to the distribution or transmission systems.

²Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2006 National Energy Modeling System runs AEO2006.D111905A, ADVNUC5A.D120105A, and ADVNUC20.D120105A.

Results from Side Cases

Table D6. Key Results for Electric Power Sector Fossil Technology Cases
(Gigawatts, Unless Otherwise Noted)

Net Summer Capacity, Generation Consumption, and Emissions	2004	2010			2020			2030		
		Low Fossil	Reference	High Fossil	Low Fossil	Reference	High Fossil	Low Fossil	Reference	High Fossil
Capacity										
Pulverized Coal	309.5	317.9	317.9	317.9	349.7	334.7	330.2	449.0	372.6	340.0
Coal Gasification Combined-Cycle	0.3	0.3	0.7	0.3	0.3	10.6	9.9	0.3	84.8	90.6
Conventional Natural Gas Combined-Cycle	158.7	183.8	183.8	183.8	186.0	184.9	183.8	194.0	185.8	184.0
Advanced Natural Gas Combined-Cycle	0.0	0.0	0.0	0.0	8.7	28.8	54.7	18.4	44.9	102.9
Conventional Combustion Turbine	130.1	138.1	138.1	137.9	135.8	134.4	131.8	144.0	134.6	131.8
Advanced Combustion Turbine	0.0	0.9	0.9	1.1	17.9	14.6	9.6	36.1	39.1	32.0
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear	99.6	100.9	100.9	100.9	108.8	108.8	108.8	112.4	108.8	108.8
Oil and Gas Steam	124.3	122.4	122.4	122.4	85.9	80.3	70.6	75.9	75.3	59.4
Renewable Sources/Pumped Storage	113.0	123.4	123.4	123.4	129.8	129.0	127.5	137.1	134.8	130.0
Distributed Generation	0.0	0.2	0.2	0.2	2.9	1.4	1.1	13.1	5.5	3.8
Combined Heat and Power ¹	29.3	32.5	32.4	32.5	45.8	44.2	44.1	66.2	64.3	65.1
Total	964.9	1020.5	1020.8	1020.5	1071.6	1071.6	1072.0	1246.6	1250.5	1248.3
Cumulative Additions										
Pulverized Coal	0.0	11.3	11.3	11.3	46.7	31.9	27.4	146.0	69.9	37.2
Coal Gasification Combined-Cycle	0.0	0.0	0.4	0.0	0.0	10.3	9.6	0.0	84.5	90.3
Conventional Natural Gas Combined-Cycle	0.0	25.7	25.7	25.7	27.9	26.8	25.7	35.9	27.7	25.9
Advanced Natural Gas Combined-Cycle	0.0	0.0	0.0	0.0	8.7	28.8	54.7	18.4	44.9	102.9
Conventional Combustion Turbine	0.0	9.1	9.1	9.0	13.8	12.2	10.4	22.0	12.4	10.4
Advanced Combustion Turbine	0.0	0.9	0.9	1.1	17.9	14.6	9.6	36.1	39.1	32.0
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear	0.0	0.0	0.0	0.0	6.0	6.0	6.0	9.6	6.0	6.0
Oil and Gas Steam	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Renewable Sources	0.0	10.4	10.4	10.4	16.8	16.0	14.5	24.1	21.8	17.0
Distributed Generation	0.0	0.2	0.2	0.2	2.9	1.4	1.1	13.1	5.5	3.8
Combined Heat and Power ¹	0.0	3.1	3.1	3.1	16.4	14.8	14.7	36.9	35.0	35.7
Total	0.0	61.0	61.3	61.0	157.3	162.9	173.7	342.3	346.8	361.2
Cumulative Retirements	0.0	7.1	7.1	7.1	54.2	59.8	70.1	64.1	64.7	81.4
Generation by Fuel (billion kilowatthours)										
Coal	1954.0	2197.9	2194.8	2192.4	2460.5	2435.2	2399.1	3152.4	3205.4	3049.9
Petroleum	115.2	92.8	92.6	92.4	90.7	92.4	93.1	101.1	101.3	98.9
Natural Gas	618.6	672.5	672.6	676.0	922.4	967.8	1016.5	791.0	821.8	996.4
Nuclear Power	788.6	808.7	808.7	808.7	870.7	870.7	870.7	897.2	870.6	870.6
Renewable Sources/Pumped Storage	314.8	423.9	427.2	426.5	466.5	460.5	452.3	513.2	495.0	469.2
Distributed Generation	0.0	0.1	0.1	0.1	1.3	0.6	0.5	5.7	2.4	1.6
Combined Heat and Power ¹	161.3	192.1	191.8	192.2	292.0	280.3	279.7	442.8	429.0	434.1
Total	3954.9	4388.1	4387.7	4388.2	5104.0	5107.5	5111.9	5903.4	5925.6	5920.7
Fuel Consumption by the Electric Power Sector (quadrillion Btu)²										
Coal	20.26	22.96	22.92	22.89	25.32	25.02	24.67	31.22	30.74	28.96
Petroleum	1.12	0.97	0.97	0.97	0.95	0.97	0.98	1.05	1.07	1.05
Natural Gas	5.45	5.65	5.65	5.67	7.52	7.65	7.60	6.56	6.54	7.17
Nuclear Power	8.23	8.44	8.44	8.44	9.09	9.09	9.09	9.37	9.09	9.09
Renewable Sources	3.57	4.73	4.76	4.75	5.54	5.47	5.39	6.37	6.22	5.83
Total	38.63	42.76	42.74	42.73	48.41	48.19	47.73	54.57	53.66	52.10
Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)²										
Coal	1893.9	2152.0	2147.8	2145.5	2372.1	2343.5	2311.5	2922.8	2876.6	2711.1
Petroleum	97.4	74.7	74.5	74.3	72.8	74.5	75.4	80.1	81.8	80.7
Natural Gas	295.9	297.4	297.4	298.6	396.0	402.8	400.3	345.6	344.3	377.4
Other	11.4	13.0	13.0	13.0	14.3	14.3	14.1	14.9	15.3	14.4
Total	2298.6	2537.0	2532.7	2531.4	2855.2	2835.2	2801.1	3363.4	3318.0	3183.7

¹Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors. Includes small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid. Excludes off-grid photovoltaics and other generators not connected to the distribution or transmission systems.

²Includes electricity-only and combined heat and power plants whose primary business to sell electricity, or electricity and heat, to the public.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2006 National Energy Modeling System runs LFOSS06.D120105A, AEO2006.D111905A, and HFOSS06.D120105B.

Results from Side Cases

Table D7. Key Results for Renewable Technology Cases

Capacity, Generation, and Emissions	2004	2010			2020			2030		
		Low Technology	Reference	High Technology	Low Technology	Reference	High Technology	Low Technology	Reference	High Technology
Net Summer Capacity (gigawatts)										
Electric Power Sector¹										
Conventional Hydropower	77.64	77.67	77.67	77.67	77.80	77.87	77.75	77.80	77.87	78.10
Geothermal ²	2.11	2.56	2.56	2.80	3.83	4.61	6.19	5.11	6.64	9.14
Municipal Solid Waste ³	3.22	3.52	3.52	3.52	3.71	3.76	3.76	3.87	3.87	3.87
Wood and Other Biomass ⁴	2.00	2.15	2.15	2.20	2.41	2.46	3.96	3.84	4.63	10.55
Solar Thermal	0.39	0.47	0.47	0.47	0.50	0.50	0.50	0.55	0.55	0.55
Solar Photovoltaic	0.03	0.07	0.07	0.07	0.22	0.22	0.22	0.39	0.39	0.39
Wind	6.87	16.27	16.27	16.27	17.13	18.81	18.87	17.18	20.10	22.63
Total	92.26	102.69	102.69	103.00	105.59	108.23	111.24	108.74	114.06	125.24
End-Use Sector										
Conventional Hydropower	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Solid Waste	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Wood and Other Biomass	4.33	4.98	5.01	5.27	5.88	6.02	6.89	7.03	7.29	9.00
Solar Photovoltaic	0.12	0.58	0.63	0.63	0.68	0.75	0.75	0.80	1.68	1.93
Total	5.38	6.48	6.57	6.82	7.49	7.70	8.57	8.75	9.89	11.85
Generation (billion kilowatthours)										
Electric Power Sector¹										
Coal	1954	2200	2195	2191	2441	2435	2424	3222	3205	3162
Petroleum	115	92	93	93	94	92	92	103	101	101
Natural Gas	619	673	673	673	972	968	955	828	822	804
Total Fossil	2688	2966	2960	2957	3507	3495	3471	4153	4129	4067
Conventional Hydropower	264.50	296.98	296.98	296.98	298.07	298.46	297.73	298.46	298.85	300.04
Geothermal	14.36	17.51	17.51	19.16	27.65	34.01	47.91	39.74	52.70	73.01
Municipal Solid Waste ³	19.86	24.89	24.89	24.89	26.47	26.83	26.84	27.78	27.79	27.80
Wood and Other Biomass ⁴	9.49	40.64	44.67	45.45	48.73	48.59	59.94	54.86	57.83	95.96
Dedicated Plants	8.00	10.92	10.39	10.79	12.52	13.03	25.28	25.27	31.67	78.99
Cofiring	1.49	29.72	34.29	34.66	36.21	35.55	34.66	29.59	26.16	16.96
Solar Thermal	0.58	0.84	0.84	0.84	0.96	0.96	0.96	1.11	1.11	1.11
Solar Photovoltaic	0.00	0.18	0.18	0.18	0.54	0.54	0.54	0.98	0.98	0.98
Wind	14.15	50.87	50.87	50.87	53.91	59.82	59.97	54.08	64.51	73.90
Total Renewable	322.93	431.91	435.94	438.38	456.32	469.21	493.88	477.00	503.77	572.79
End-Use Sector⁵										
Total Fossil	111	136	136	136	219	218	217	357	357	353
Conventional Hydropower ⁶	4.45	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Solid Waste	2.12	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
Wood and Other Biomass	27.81	31.58	31.81	33.28	36.87	37.69	42.78	43.56	45.09	55.06
Solar Photovoltaic	0.26	1.23	1.34	1.34	1.45	1.60	1.60	1.70	3.62	4.16
Total Renewables	34.63	39.47	39.80	41.27	44.98	45.94	51.03	51.92	55.37	65.88
Sources of Ethanol										
From Corn	0.28	0.61	0.61	0.61	0.87	0.87	0.87	0.92	0.92	0.91
From Cellulose	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.05
Imports	0.00	0.04	0.04	0.04	0.06	0.06	0.06	0.07	0.07	0.07
Total	0.28	0.66	0.66	0.67	0.96	0.96	0.96	1.01	1.01	1.03
Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)¹										
Coal	1893.9	2152.0	2147.8	2145.5	2350.5	2343.5	2336.8	2896.4	2876.6	2842.7
Petroleum	97.4	74.3	74.5	74.6	76.0	74.5	74.1	82.7	81.8	81.8
Natural Gas	295.9	297.6	297.4	297.5	404.0	402.8	398.2	346.5	344.3	337.5
Other	11.4	13.0	13.0	13.0	14.0	14.3	14.7	14.9	15.3	15.8
Total	2298.6	2536.9	2532.7	2530.6	2844.6	2835.2	2823.9	3340.6	3318.0	3277.7

¹Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

²Includes hydrothermal resources only (hot water and steam).

³Includes landfill gas.

⁴Includes projections for energy crops after 2010.

⁵Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid. Excludes off-grid photovoltaics and other generators not connected to the distribution or transmission systems.

⁶Represents own-use industrial hydroelectric power.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2006 National Energy Modeling System runs LOREN06.D120505A, AEO2006.D111905A, and HIREN06.D120605A.

Results from Side Cases

Table D8. Total Energy Supply and Disposition, Oil and Gas Technological Progress Cases
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2004	2010			2020			2030		
		Slow Technology	Reference	Rapid Technology	Slow Technology	Reference	Rapid Technology	Slow Technology	Reference	Rapid Technology
Production										
Crude Oil and Lease Condensate	11.47	12.21	12.45	12.65	11.05	11.75	12.32	8.91	9.68	10.38
Natural Gas Plant Liquids	2.46	2.37	2.39	2.40	2.55	2.67	2.79	2.38	2.57	2.85
Dry Natural Gas	19.02	18.91	19.13	19.27	20.87	22.09	23.55	19.34	21.45	25.18
Coal	22.86	25.97	25.78	25.75	28.04	27.30	26.84	34.99	34.10	32.53
Nuclear Power	8.23	8.44	8.44	8.44	9.09	9.09	9.09	9.09	9.09	9.09
Renewable Energy ¹	5.74	7.07	7.08	7.04	8.02	8.00	7.78	9.12	9.02	8.85
Other ²	0.64	2.16	2.16	2.16	3.17	3.16	3.15	3.42	3.44	3.45
Total	70.42	77.12	77.42	77.71	82.79	84.05	85.52	87.26	89.36	92.32
Imports										
Crude Oil ³	22.02	22.18	22.01	21.93	25.33	24.63	24.14	30.47	29.54	28.75
Petroleum Products ⁴	5.93	6.44	6.36	6.24	8.09	8.01	7.83	9.39	9.27	8.96
Natural Gas	4.36	4.94	5.01	5.06	5.99	5.83	5.16	7.42	6.72	5.69
Other Imports ⁵	0.83	0.44	0.45	0.45	1.56	1.36	1.36	2.51	2.42	2.24
Total	33.14	34.00	33.83	33.67	40.96	39.83	38.50	49.79	47.95	45.63
Exports										
Petroleum ⁶	2.07	2.15	2.15	2.15	2.26	2.24	2.23	2.31	2.31	2.31
Natural Gas	0.86	0.55	0.55	0.56	0.65	0.68	0.72	0.90	1.01	1.12
Coal	1.25	1.03	1.03	1.03	0.46	0.46	0.46	0.40	0.40	0.39
Total	4.18	3.73	3.74	3.75	3.37	3.39	3.41	3.61	3.72	3.82
Consumption										
Petroleum Products ⁷	40.08	43.13	43.14	43.16	48.17	48.14	48.15	53.60	53.58	53.51
Natural Gas	23.07	23.76	24.04	24.22	26.68	27.70	28.46	26.36	27.66	30.21
Coal	22.53	25.28	25.09	25.05	28.50	27.65	27.24	35.46	34.49	32.78
Nuclear Power	8.23	8.44	8.44	8.44	9.09	9.09	9.09	9.09	9.09	9.09
Renewable Energy ¹	5.74	7.07	7.08	7.04	8.02	8.00	7.78	9.12	9.02	8.86
Other ⁸	0.04	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05
Total	99.68	107.75	107.87	107.99	120.51	120.63	120.77	133.69	133.88	134.50
Net Imports - Petroleum	25.88	26.47	26.22	26.01	31.16	30.39	29.74	37.54	36.49	35.40
Prices (2004 dollars per unit)										
Imported Low Sulfur Light Crude Oil Price (dollars per barrel) ⁹	40.49	47.29	47.29	47.29	50.70	50.70	50.70	56.97	56.97	56.97
Imported Crude Oil Price (dollars per barrel) ⁹	35.99	43.99	43.99	43.99	44.99	44.99	44.99	49.99	49.99	49.99
Natural Gas Wellhead Price (dollars per thousand cubic feet) ¹⁰	5.49	5.19	5.03	4.88	5.17	4.90	4.76	6.36	5.92	5.20
Coal Minemouth Price (dollars per ton)	20.07	22.21	22.23	22.30	20.35	20.20	19.95	21.76	21.73	20.99
Average Electricity Price (cents per kilowatthour)	7.6	7.3	7.3	7.2	7.3	7.2	7.2	7.5	7.5	7.4
Carbon Dioxide Emissions (million metric tons)	5899.9	6368.5	6364.9	6372.2	7148.2	7119.0	7121.4	8140.7	8114.5	8082.3

¹Includes grid-connected electricity from conventional hydroelectric; wood and wood waste; landfill gas; municipal solid waste; other biomass; wind; photovoltaic and solar thermal sources; non-electric energy from renewable sources, such as active and passive solar systems, and wood; and both the ethanol and gasoline components of E85, but not the ethanol components of blends less than 85 percent. Excludes electricity imports using renewable sources and nonmarketed renewable energy.

²Includes liquid hydrogen, methanol, supplemental natural gas, and some domestic inputs to refineries.

³Includes imports of crude oil for the Strategic Petroleum Reserve.

⁴Includes imports of finished petroleum products, unfinished oils, alcohols, ethers, and blending components.

⁵Includes coal, coal coke (net), and electricity (net).

⁶Includes crude oil and petroleum products.

⁷Includes natural gas plant liquids, crude oil consumed as a fuel, and nonpetroleum-based liquids for blending, such as ethanol.

⁸Includes net electricity imports, methanol, and liquid hydrogen.

⁹Weighted average price delivered to U.S. refiners.

¹⁰Represents lower 48 onshore and offshore supplies.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 natural gas supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2004 petroleum supply values: EIA, *Petroleum Supply Annual 2004*, DOE/EIA-0340(2004)/1 (Washington, DC, June 2005). 2004 carbon dioxide emission values: EIA, *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005). 2004 imported low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2004 values: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005) and EIA, *Quarterly Coal Report, October-December 2004*, DOE/EIA-0121(2004/4Q) (Washington, DC, March 2005). Projections: EIA, AEO2006 National Energy Modeling System runs OGLTEC06.D121605A, AEO2006.D111905A, and OGHTEC06.D121605A.

Results from Side Cases

Table D9. Natural Gas Supply and Disposition, Oil and Gas Technological Progress Cases
(Trillion Cubic Feet per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2004	2010			2020			2030		
		Slow Technology	Reference	Rapid Technology	Slow Technology	Reference	Rapid Technology	Slow Technology	Reference	Rapid Technology
Lower 48 Average Wellhead Price (2004 dollars per thousand cubic feet)	5.49	5.19	5.03	4.88	5.17	4.90	4.76	6.36	5.92	5.20
Dry Gas Production¹	18.46	18.36	18.58	18.71	20.26	21.44	22.87	18.78	20.83	24.44
Lower 48 Onshore	13.76	13.89	14.03	14.12	13.74	14.52	15.71	12.92	14.72	18.08
Associated-Dissolved	1.51	1.33	1.34	1.35	1.17	1.20	1.22	1.07	1.10	1.12
Non-Associated	12.26	12.57	12.69	12.77	12.57	13.33	14.49	11.85	13.62	16.96
Conventional	4.79	5.02	5.01	5.00	4.59	4.66	4.76	4.05	4.17	4.16
Unconventional	7.47	7.55	7.68	7.77	7.98	8.66	9.73	7.80	9.45	12.80
Lower 48 Offshore	4.26	4.22	4.31	4.35	4.32	4.71	4.94	3.72	3.97	4.22
Associated-Dissolved	0.85	1.07	1.08	1.10	1.25	1.34	1.40	1.06	1.15	1.26
Non-Associated	3.41	3.16	3.23	3.25	3.06	3.37	3.54	2.65	2.82	2.96
Alaska	0.44	0.24	0.24	0.24	2.21	2.21	2.21	2.14	2.14	2.14
Supplemental Natural Gas ²	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Net Imports	3.40	4.29	4.35	4.39	5.21	5.02	4.34	6.36	5.57	4.45
Pipeline	2.81	2.10	2.28	2.42	1.23	1.32	1.53	1.02	1.22	1.29
Liquefied Natural Gas ³	0.59	2.19	2.07	1.97	3.97	3.70	2.80	5.34	4.36	3.16
Total Supply	21.92	22.72	23.00	23.17	25.54	26.54	27.28	25.22	26.48	28.97
Consumption by Sector										
Residential	4.88	5.15	5.17	5.19	5.48	5.51	5.53	5.60	5.64	5.73
Commercial	3.00	3.07	3.08	3.10	3.55	3.57	3.60	3.94	3.99	4.08
Industrial ⁴	7.41	7.77	7.82	7.87	8.13	8.26	8.37	8.59	8.81	9.15
Electric Power ⁵	5.32	5.33	5.51	5.60	6.73	7.46	7.95	5.57	6.38	8.12
Transportation ⁶	0.02	0.05	0.05	0.05	0.09	0.09	0.09	0.12	0.12	0.12
Pipeline Fuel	0.67	0.62	0.63	0.63	0.75	0.78	0.80	0.72	0.75	0.83
Lease and Plant Fuel ⁷	1.11	1.07	1.09	1.09	1.19	1.25	1.31	1.08	1.17	1.33
Total	22.41	23.08	23.35	23.53	25.92	26.92	27.66	25.60	26.86	29.36
Gas to Liquids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discrepancy⁸	-0.49	-0.36	-0.36	-0.36	-0.38	-0.38	-0.38	-0.39	-0.39	-0.39
Lower 48 End of Year Reserves	183.64	209.30	214.35	219.01	210.18	229.52	254.49	187.07	222.72	295.89

¹Marketed production (wet) minus extraction losses.

²Synthetic natural gas, propane air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

³Includes any natural gas regasified in the Bahamas and transported via pipeline to Florida.

⁴Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

⁵Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

⁶Compressed natural gas used as vehicle fuel.

⁷Represents natural gas used in field gathering and processing plant machinery.

⁸Balancing item. Natural gas lost as a result of converting flow data measured at varying temperatures and pressures to a standard temperature and pressure and the merger of different data reporting systems which vary in scope, format, definition, and respondent type. In addition, 2004 values include net storage injections.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2004 consumption based on: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). Projections: EIA, AEO2006 National Energy Modeling System runs OGLTEC06.D121605A, AEO2006.D111905A, and OGHTEC06.D121605A.

Results from Side Cases

Table D10. Petroleum Supply and Disposition, Oil and Gas Technological Progress Cases
(Million Barrels per Day, Unless Otherwise Noted)

Supply, Disposition, and Prices	2004	2010			2020			2030		
		Slow Technology	Reference	Rapid Technology	Slow Technology	Reference	Rapid Technology	Slow Technology	Reference	Rapid Technology
Prices (2004 dollars per barrel)										
Imported Low Sulfur Light Crude Oil ¹	40.49	47.29	47.29	47.29	50.70	50.70	50.70	56.97	56.97	56.97
Imported Crude Oil ¹	35.99	43.99	43.99	43.99	44.99	44.99	44.99	49.99	49.99	49.99
Crude Oil Supply										
Domestic Crude Oil Production ²	5.40	5.77	5.88	5.98	5.22	5.55	5.82	4.21	4.57	4.90
Lower 48 Onshore	2.90	2.57	2.62	2.68	2.27	2.42	2.57	2.12	2.27	2.40
Lower 48 Offshore	1.59	2.37	2.42	2.46	2.19	2.36	2.49	1.82	2.03	2.23
Alaska	0.91	0.83	0.83	0.84	0.75	0.76	0.77	0.27	0.27	0.28
Net Crude Oil Imports	10.06	10.13	10.05	10.02	11.58	11.26	11.03	13.94	13.51	13.15
Other Crude Oil Supply	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Crude Oil Supply	15.48	15.90	15.93	15.99	16.80	16.81	16.85	18.15	18.08	18.05
Other Petroleum Supply										
Natural Gas Plant Liquids	1.81	1.74	1.75	1.76	1.86	1.94	2.03	1.73	1.87	2.07
Net Petroleum Product Imports ³	2.05	2.32	2.28	2.22	3.20	3.16	3.08	3.78	3.73	3.58
Refinery Processing Gain ⁴	1.05	1.31	1.31	1.30	1.46	1.44	1.43	1.85	1.82	1.79
Other Supply ⁵	0.35	0.94	0.94	0.94	1.56	1.52	1.49	2.16	2.16	2.14
Total Primary Supply⁶	20.74	22.20	22.21	22.22	24.87	24.87	24.87	27.66	27.65	27.63
Refined Petroleum Products Supplied										
Residential and Commercial	1.29	1.25	1.25	1.25	1.25	1.25	1.25	1.22	1.22	1.22
Industrial ⁷	5.02	5.23	5.23	5.23	5.56	5.55	5.56	6.06	6.06	6.05
Transportation	13.69	15.26	15.27	15.28	17.56	17.57	17.59	19.79	19.81	19.85
Electric Power ⁸	0.49	0.44	0.43	0.43	0.46	0.43	0.42	0.49	0.47	0.42
Total	20.76	22.17	22.17	22.18	24.82	24.81	24.82	27.57	27.57	27.55
Discrepancy⁹	-0.02	0.03	0.03	0.03	0.05	0.05	0.06	0.09	0.09	0.08
Lower 48 End of Year Reserves (billion barrels)²										
	18.21	19.28	19.83	20.32	18.33	19.61	20.70	16.50	17.91	19.26

¹Weighted average price delivered to U.S. refiners.

²Includes lease condensate.

³Includes net imports of finished petroleum products, unfinished oils, other hydrocarbons, alcohols, ethers, and blending components.

⁴Represents volumetric gain in refinery distillation and cracking processes.

⁵Includes alcohols, ethers, petroleum product stock withdrawals, domestic sources of blending components, other hydrocarbons, natural gas converted to liquid fuel, and coal converted to liquid fuel.

⁶Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.

⁷Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.

⁸Includes consumption of energy by electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.

⁹Includes small power producers and exempt wholesale generators.

⁹Balancing item. Includes unaccounted for supply, losses and gains.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 product supplied data based on: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2004 imported low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2004 data: EIA, *Petroleum Supply Annual 2004*, DOE/EIA-0340(2004)/1 (Washington, DC, June 2005). **Projections:** EIA, AEO2006 National Energy Modeling System runs OGLTEC06.D121605A, AEO2006.D111905A, and OGHTEC06.D121605A.

Results from Side Cases

Table D11. Natural Gas Supply and Disposition, Liquefied Natural Gas Supply Cases
(Trillion Cubic Feet per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2004	2010			2020			2030		
		Low LNG	Reference	High LNG	Low LNG	Reference	High LNG	Low LNG	Reference	High LNG
Production										
Dry Gas Production ¹	18.46	18.95	18.58	18.19	22.55	21.44	19.30	21.99	20.83	19.10
Lower 48 Onshore	13.76	14.33	14.03	13.70	15.51	14.52	13.09	15.67	14.72	13.08
Associated-Dissolved	1.51	1.34	1.34	1.34	1.20	1.20	1.20	1.10	1.10	1.10
Non-Associated	12.26	12.99	12.69	12.37	14.31	13.33	11.89	14.57	13.62	11.99
Conventional	4.79	5.13	5.01	4.88	4.88	4.66	4.31	4.36	4.17	3.95
Unconventional	7.47	7.86	7.68	7.48	9.42	8.66	7.58	10.21	9.45	8.04
Lower 48 Offshore	4.26	4.37	4.31	4.24	4.83	4.71	4.36	4.18	3.97	3.88
Associated-Dissolved	0.85	1.08	1.08	1.08	1.35	1.34	1.30	1.18	1.15	1.15
Non-Associated	3.41	3.29	3.23	3.16	3.48	3.37	3.06	3.01	2.82	2.73
Alaska	0.44	0.24	0.24	0.24	2.21	2.21	1.86	2.14	2.14	2.14
Supplemental Natural Gas ²	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Net Imports	3.40	3.73	4.35	4.94	2.59	5.02	8.61	2.80	5.57	10.53
Pipeline	2.81	2.41	2.28	2.13	1.49	1.32	1.08	1.50	1.22	0.95
Liquefied Natural Gas ³	0.59	1.33	2.07	2.80	1.10	3.70	7.52	1.30	4.36	9.58
Total Supply	21.92	22.75	23.00	23.20	25.21	26.54	27.98	24.87	26.48	29.70
Consumption by Sector										
Residential	4.88	5.15	5.17	5.19	5.46	5.51	5.59	5.59	5.64	5.73
Commercial	3.00	3.06	3.08	3.10	3.53	3.57	3.65	3.94	3.99	4.06
Industrial ⁴	7.41	7.79	7.82	7.87	8.15	8.26	8.42	8.60	8.81	9.12
Electric Power ⁵	5.32	5.32	5.51	5.65	6.29	7.46	8.70	5.03	6.38	9.17
Transportation ⁶	0.02	0.05	0.05	0.05	0.09	0.09	0.09	0.12	0.12	0.12
Pipeline Fuel	0.67	0.63	0.63	0.63	0.77	0.78	0.76	0.75	0.75	0.80
Lease and Plant Fuel ⁷	1.11	1.10	1.09	1.07	1.30	1.25	1.14	1.22	1.17	1.09
Total	22.41	23.11	23.35	23.55	25.59	26.92	28.36	25.25	26.86	30.09
Natural Gas to Liquids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discrepancy⁸	-0.49	-0.36	-0.36	-0.36	-0.38	-0.38	-0.38	-0.39	-0.39	-0.39
Lower 48 End of Year Reserves	183.64	216.33	214.35	212.33	239.57	229.52	214.88	234.12	222.72	202.44
Natural Gas Prices (2004 dollars per thousand cubic feet)										
Average Lower 48 Wellhead Price⁹	5.49	5.24	5.03	4.81	5.30	4.90	4.22	6.36	5.92	5.35
Delivered Prices										
Residential	10.72	10.86	10.65	10.43	10.90	10.48	9.72	12.11	11.67	11.05
Commercial	9.38	9.24	9.03	8.81	9.03	8.63	7.89	10.01	9.58	8.99
Industrial ⁴	6.29	6.09	5.86	5.63	6.07	5.66	4.94	7.10	6.65	6.08
Electric Power ⁵	6.07	5.77	5.60	5.40	5.84	5.53	4.92	6.76	6.41	6.05
Transportation ¹⁰	10.25	10.60	10.40	10.19	10.59	10.21	9.51	11.42	11.01	10.46
Average¹¹	7.74	7.63	7.41	7.17	7.60	7.14	6.37	8.75	8.22	7.53

¹Marketed production (wet) minus extraction losses.

²Synthetic natural gas, propane air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

³Includes any natural gas regasified in the Bahamas and transported via pipeline to Florida.

⁴Includes energy for combined heat and power plants, except those whose primary business is to sell electricity, or electricity and heat, to the public.

⁵Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

⁶Compressed natural gas used as vehicle fuel.

⁷Represents natural gas used in field gathering and processing plant machinery.

⁸Balancing item. Natural gas lost as a result of converting flow data measured at varying temperatures and pressures to a standard temperature and pressure and the merger of different data reporting systems which vary in scope, format, definition, and respondent type. In addition, 2004 values include net storage injections.

⁹Represents lower 48 onshore and offshore supplies.

¹⁰Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.

¹¹Weighted average prices. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2005/06) (Washington, DC, June 2005). 2004 consumption based on: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). Projections: EIA, AEO2006 National Energy Modeling System runs LOLNG06.D120405A, AEO2006.D111905A, and HILNG06.D120405A.

Results from Side Cases

Table D12. Petroleum Supply and Disposition, ANWR Drilling Case
(Million Barrels per Day, Unless Otherwise Noted)

Supply, Disposition, and Prices	2004	2010		2020		2030	
		Reference	ANWR	Reference	ANWR	Reference	ANWR
Crude Oil							
Domestic Crude Production ¹	5.42	5.88	5.88	5.55	6.15	4.57	5.22
Alaska	0.91	0.83	0.83	0.76	1.37	0.27	0.93
Lower 48 States	4.51	5.05	5.05	4.79	4.78	4.30	4.30
Net Imports	10.06	10.05	10.05	11.26	10.68	13.51	12.90
Other Crude Supply ²	-0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Crude Supply	15.48	15.93	15.93	16.81	16.84	18.08	18.13
Other Petroleum Supply							
Natural Gas Plant Liquids	1.81	1.75	1.75	1.94	1.95	1.87	1.90
Net Product Imports ³	2.05	2.28	2.28	3.16	3.21	3.73	3.74
Refinery Processing Gain ⁴	1.05	1.31	1.31	1.44	1.45	1.82	1.81
Other Inputs	0.35	0.94	0.94	1.52	1.48	2.16	2.14
Liquids from Coal	0.00	0.00	0.00	0.23	0.20	0.76	0.75
Other ⁵	0.35	0.94	0.94	1.28	1.28	1.39	1.39
Total Primary Supply⁶	20.74	22.21	22.21	24.87	24.92	27.65	27.71
Refined Petroleum Products Supplied by Fuel							
Motor Gasoline ⁷	9.10	9.94	9.94	11.28	11.31	12.49	12.52
Jet Fuel ⁸	1.63	1.88	1.88	2.19	2.19	2.31	2.31
Distillate Fuel ⁹	4.06	4.61	4.61	5.21	5.22	6.09	6.11
Residual Fuel	0.87	0.73	0.73	0.74	0.74	0.78	0.78
Other ¹⁰	5.10	5.01	5.01	5.40	5.41	5.89	5.90
by Sector							
Residential and Commercial	1.29	1.25	1.25	1.25	1.26	1.22	1.22
Industrial ¹¹	5.02	5.23	5.23	5.55	5.57	6.06	6.07
Transportation	13.69	15.27	15.27	17.57	17.61	19.81	19.85
Electric Power ¹²	0.49	0.43	0.43	0.43	0.44	0.47	0.48
Total	20.76	22.17	22.18	24.81	24.87	27.57	27.62
Discrepancy¹³	-0.02	0.03	0.03	0.05	0.05	0.09	0.09
Imported Low Sulfur Light Crude Oil Price (2004 dollars per barrel) ¹⁴	40.49	47.29	47.29	50.70	50.35	56.97	56.29
Imported Crude Oil Price (2004 dollars per barrel) ¹⁴	35.99	43.99	43.99	44.99	44.35	49.99	49.31
Import Share of Product Supplied	0.58	0.56	0.56	0.58	0.56	0.62	0.60
Net Expenditures for Imported Crude Oil and Petroleum Products (billion 2004 dollars)	152.36	189.84	189.86	231.71	219.94	310.15	295.23

¹Includes lease condensate.

²Strategic petroleum reserve stock additions plus unaccounted for crude oil and crude stock withdrawals minus crude product supplied.

³Includes other hydrocarbons and alcohols.

⁴Represents volumetric gain in refinery distillation and cracking processes.

⁵Includes petroleum product stock withdrawals; domestic sources of blending components, other hydrocarbons, alcohols, and ethers.

⁶Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.

⁷Includes ethanol and ethers blended into gasoline.

⁸Includes only kerosene type.

⁹Includes distillate and kerosene.

¹⁰Includes aviation gasoline, liquefied petroleum gas, petrochemical feedstocks, lubricants, waxes, asphalt, road oil, still gas, special naphthas, petroleum coke, crude oil product supplied, and miscellaneous petroleum products.

¹¹Includes consumption for combined heat and power (CHP), which produces electricity and other useful thermal energy.

¹²Includes consumption of energy by electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.

¹³Balancing item. Includes unaccounted for supply, losses, and gains.

¹⁴Weighted average price delivered to U.S. refiners.

¹⁵End-of-year operable capacity.

¹⁶Rate is calculated by dividing the gross annual input to atmospheric crude oil distillation units by their operable refining capacity in barrels per calendar day.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 imported crude oil price and petroleum product supplied based on: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). 2004 imported low sulfur light crude oil price: EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report." Other 2004 data: EIA, *Petroleum Supply Annual 2004*, DOE/EIA-0340(2004)/1 (Washington, DC, June 2005). Projections: EIA, AEO2006 National Energy Modeling System runs AEO2006.D111905A and ANWR2006.D120605A.

Results from Side Cases

Table D13. Key Results for Coal Cost Cases
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2004	2015			2030			Growth Rate, 2004-2030		
		Low Cost	Reference	High Cost	Low Cost	Reference	High Cost	Low Cost	Reference	High Cost
Production¹	1124.6	1300.5	1272.2	1248.2	1876.1	1702.7	1420.0	2.0%	1.6%	0.9%
Appalachia	403.2	398.6	389.2	378.7	461.7	412.0	367.5	0.5%	0.1%	-0.4%
Interior	146.3	209.5	208.9	214.5	299.2	280.8	289.1	2.8%	2.5%	2.7%
West	575.2	692.4	674.1	655.0	1115.2	1009.9	763.4	2.6%	2.2%	1.1%
Net Imports	-20.7	4.6	4.8	5.5	69.5	82.7	81.5	N/A	N/A	N/A
Total Supply²	1103.9	1305.1	1277.0	1253.8	1945.6	1785.4	1501.5	2.2%	1.9%	1.2%
Consumption by Sector										
Residential and Commercial	4.2	4.3	4.3	4.3	4.3	4.3	4.3	0.0%	0.0%	0.0%
Coke Plants	23.7	22.2	22.1	22.0	21.2	21.1	20.7	-0.4%	-0.4%	-0.5%
Other Industrial ³	61.2	66.1	66.2	66.1	67.5	67.2	66.6	0.4%	0.4%	0.3%
Coal-to-Liquids Heat and Power	0.0	13.6	10.9	10.1	155.1	96.4	25.4	N/A	N/A	N/A
Coal-to-Liquids Liquids Production	0.0	13.2	10.6	9.8	150.6	93.6	24.6	N/A	N/A	N/A
Electric Power ⁴	1015.1	1184.1	1161.3	1139.8	1545.6	1501.6	1358.9	1.6%	1.5%	1.1%
Total Coal Use	1104.2	1303.5	1275.5	1252.1	1944.3	1784.2	1500.4	2.2%	1.9%	1.2%
Average Minemouth Price										
(2004 dollars per short ton)	20.07	16.84	20.39	24.98	13.10	21.73	37.65	-1.6%	0.3%	2.4%
(2004 dollars per million Btu)	0.98	0.83	1.01	1.24	0.65	1.09	1.88	-1.5%	0.4%	2.5%
Delivered Prices										
(2004 dollars per short ton)⁵										
Coke Plants	61.50	52.35	60.06	69.90	44.38	62.67	94.11	-1.2%	0.1%	1.6%
Other Industrial ³	39.53	34.34	38.48	43.72	30.68	41.05	56.50	-1.0%	0.1%	1.4%
Coal to Liquids	N/A	10.25	12.74	16.02	14.36	21.06	26.11	N/A	N/A	N/A
Electric Power										
(2004 dollars per short ton)	27.43	24.57	28.12	32.57	22.16	30.58	44.83	-0.8%	0.4%	1.9%
(2004 dollars per million Btu)	1.36	1.22	1.40	1.64	1.07	1.51	2.24	-0.9%	0.4%	1.9%
Average	28.81	25.22	28.93	33.52	21.42	30.30	45.39	-1.1%	0.2%	1.8%
Exports ⁶	54.11	40.73	46.68	54.16	32.88	46.91	68.22	-1.9%	-0.5%	0.9%
Cumulative Electricity Generating Capacity Additions (gigawatts)⁷										
Coal	0.0	22.1	18.4	17.1	199.7	173.9	111.1	N/A	N/A	N/A
Conventional: Pulverized Coal	0.0	16.5	13.3	12.2	120.7	69.9	43.4	N/A	N/A	N/A
Advanced: IGCC	0.0	5.5	5.1	4.9	79.0	104.0	67.7	N/A	N/A	N/A
Petroleum	0.0	0.3	0.3	0.3	0.3	0.3	0.3	N/A	N/A	N/A
Natural Gas	0.0	52.0	52.6	53.3	132.5	140.5	168.1	N/A	N/A	N/A
Nuclear	0.0	2.2	2.2	2.2	6.0	6.0	19.1	N/A	N/A	N/A
Renewables ⁸	0.0	13.8	14.5	14.8	22.9	26.3	34.5	N/A	N/A	N/A
Other	0.0	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	N/A	N/A	N/A
Total	0.0	90.1	87.7	87.4	361.3	346.8	333.0	N/A	N/A	N/A
Liquids from Coal (million barrels per day)	0.00	0.10	0.08	0.07	1.17	0.76	0.18	N/A	N/A	N/A
Labor Productivity										
Coal Mining										
(short tons per miner per hour)	6.80	8.84	6.90	5.34	14.20	7.56	3.67	2.9%	0.4%	-2.3%
Rail: Eastern Railroads (billion freight ton-miles per employee per year)	7.43	11.43	8.91	6.90	19.79	10.61	5.59	3.8%	1.4%	-1.1%
Rail: Western Railroads (billion freight ton-miles per employee per year)	11.94	18.58	14.49	11.23	32.50	17.43	9.20	3.9%	1.5%	-1.0%

Results from Side Cases

Table D13. Key Results for Coal Cost Cases (Continued)
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2004	2015			2030			Growth Rate, 2004-2030		
		Low Cost	Reference	High Cost	Low Cost	Reference	High Cost	Low Cost	Reference	High Cost
Cost Indices (constant dollar index, 2004=1.000)										
Transportation Rate Multipliers										
Eastern Railroads	1.000	1.023	1.050	1.078	0.952	1.033	1.121	-0.2%	0.1%	0.4%
Western Railroads	1.000	1.015	1.035	1.057	0.958	1.022	1.089	-0.2%	0.1%	0.3%
Equipment Costs										
Mining	1.000	0.904	1.000	1.104	0.778	1.000	1.282	-1.0%	0.0%	1.0%
Railroads	1.000	0.875	0.968	1.070	0.705	0.908	1.166	-1.3%	-0.4%	0.6%
Average Coal Miner Wage (2004 dollars per hour)										
	21.57	19.71	21.57	23.83	16.95	21.57	27.65	-0.9%	-0.0%	1.0%

¹Includes anthracite, bituminous coal, lignite, and waste coal delivered to independent power producers. Waste coal deliveries totaled 12.5 million tons in 2004.

²Production plus net imports plus net storage withdrawals.

³Includes consumption for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public. Excludes all coal use in the coal to liquids process.

⁴Includes all electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.

⁵Prices weighted by consumption tonnage less imports; weighted average excludes residential and commercial prices, import prices, and export free-alongside-ship (f.a.s.) prices.

⁶F.a.s. price at U.S. port of exit.

⁷Cumulative additions after December 31, 2004. Includes all additions of electricity only and combined heat and power plants projected for the electric power, industrial, and commercial sectors.

⁸Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power. Facilities co-firing biomass and coal are classified as coal.

N/A = Not applicable.

Btu = British thermal unit.

IGCC = Integrated gas combined cycle.

Note: Totals may not equal sum of components due to independent rounding. Data for 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2004 data based on: Energy Information Administration (EIA), *Annual Coal Report 2004*, DOE/EIA-0584(2004) (Washington, DC, November 2005); EIA, *Quarterly Coal Report, October-December 2004*, DOE/EIA-0121(2004/4Q) (Washington, DC, March 2005); Securities and Exchange Commission Form 10K filings (BNSF, Norfolk Southern, and Union Pacific), web site www.sec.com; CSX Corporation, web site www.csx.com; U.S. Department of Labor, Bureau of Labor Statistics, Average Hourly Earnings of Productive Workers: Coal Mining, Series ID : ceu1021210006; and EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A. **Projections:** EIA, AEO2006 National Energy Modeling System runs HCCST06.D113005A, AEO2006.D111905A, and LCCST06.D113005A.

NEMS Overview and Brief Description of Cases

The National Energy Modeling System

The projections in the *Annual Energy Outlook 2006* (*AEO2006*) are generated from the National Energy Modeling System (NEMS) [1], developed and maintained by the Office of Integrated Analysis and Forecasting (OIAF) of the Energy Information Administration (EIA). In addition to its use in the development of the *AEO* projections, NEMS is also used in analytical studies for the U.S. Congress, the White House, and other offices within the Department of Energy. The *AEO* projections are also used by analysts and planners in other government agencies and outside organizations.

The projections in NEMS are developed with the use of a market-based approach to energy analysis. For each fuel and consuming sector, NEMS balances energy supply and demand, accounting for economic competition among the various energy fuels and sources. The time horizon of NEMS is the long-term period through 2030, approximately 25 years into the future. In order to represent regional differences in energy markets, the component modules of NEMS function at the regional level: the nine Census divisions for the end-use demand modules; production regions specific to oil, gas, and coal supply and distribution; the North American Electric Reliability Council (NERC) regions and subregions for electricity; and the Petroleum Administration for Defense Districts (PADDs) for refineries.

NEMS is organized and implemented as a modular system. The modules represent each of the fuel supply markets, conversion sectors, and end-use consumption sectors of the energy system. NEMS also includes macroeconomic and international modules. The primary flows of information between each of these modules are the delivered prices of energy to the end user and the quantities consumed by product, region, and sector. The delivered fuel prices encompass all the activities necessary to produce, import, and transport fuels to the end user. The information flows also include other data on such areas as economic activity, domestic production, and international petroleum supply.

The integrating module controls the execution of each of the component modules. To facilitate modularity, the components do not pass information to each other directly but communicate through a

central data file. This modular design provides the capability to execute modules individually, thus allowing decentralized development of the system and independent analysis and testing of individual modules, and permits the use of the methodology and level of detail most appropriate for each energy sector. NEMS calls each supply, conversion, and end-use demand module in sequence until the delivered prices of energy and the quantities demanded have converged within tolerance, thus achieving an economic equilibrium of supply and demand in the consuming sectors. Solution is reached annually through the long-term horizon. Other variables are also evaluated for convergence, such as petroleum product imports, crude oil imports, and several macroeconomic indicators.

Each NEMS component represents the impacts and costs of legislation and environmental regulations that affect that sector and reports key emissions. NEMS represents current legislation and environmental regulations as of October 31, 2005, such as the Energy Policy Acts of 2005 [2] and 1992 [3], the Clean Air Act Amendments (CAAA), and the costs of compliance with regulations, such as the Clean Air Interstate Rule (CAIR) and Clean Air Mercury Rule (CAMR), both of which were finalized and published on the U.S. Environmental Protection Agency web page in March 2005 and in the *Federal Register* in May 2005.

In general, the historical data used for the *AEO2006* projections were based on EIA's *Annual Energy Review 2004*, published in August 2005 [4]; however, data were taken from multiple sources. In some cases, only partial or preliminary data were available for 2004. Carbon dioxide emissions were calculated by using carbon dioxide coefficients from the EIA report, *Emissions of Greenhouse Gases in the United States 2004*, published in December 2005 [5].

Historical numbers are presented for comparison only and may be estimates. Source documents should be consulted for the official data values. Some definitional adjustments were made to EIA data for the projections. For example, the transportation demand sector in *AEO2006* includes electricity used by railroads, which is included in the commercial sector in EIA's consumption data publications. Footnotes in the appendix tables of this report indicate the definitions and sources of historical data.

NEMS Overview and Brief Description of Cases

The *AEO2006* projections for 2005 and 2006 incorporate short-term projections from EIA's September 2005 *Short-Term Energy Outlook (STEO)*. For short-term energy projections, readers are referred to monthly updates of the *STEO* [6].

Component Modules

The component modules of NEMS represent the individual supply, demand, and conversion sectors of domestic energy markets and also include international and macroeconomic modules. In general, the modules interact through values representing the prices or expenditures of energy delivered to the consuming sectors and the quantities of end-use energy consumption.

Macroeconomic Activity Module

The Macroeconomic Activity Module provides a set of essential macroeconomic drivers to the energy modules and a macroeconomic feedback mechanism within NEMS. Key macroeconomic variables include gross domestic product (GDP), industrial output, interest rates, disposable income, prices, new housing starts, new light-duty vehicle sales, and employment. The module uses the following models from Global Insight, Inc. (GI): Macroeconomic Model of the U.S. Economy, national Industry Model, and national Employment Model. In addition, EIA has constructed a Regional Economic and Industry Model to project regional economic drivers and a Commercial Floorspace Model to project 13 floorspace types in 9 Census divisions. The accounting framework for industrial output uses the North American Industry Classification System (NAICS).

International Module

The International Module represents world oil markets, calculating the average world oil price and computing supply curves for 5 categories of imported crude oil for the Petroleum Market Module (PMM) of NEMS. The module allows changes in U.S. import requirements. In addition, 17 international petroleum product supply curves, including supply curves for oxygenates and unfinished oils, are also calculated and provided to the PMM. A world oil supply/demand balance is created, including estimates for 16 oil consumption regions and 19 oil production regions. The oil production estimates include both conventional and nonconventional supply recovery technologies.

Residential and Commercial Demand Modules

The Residential Demand Module projects energy consumption in the residential sector by housing type and end use, based on delivered energy prices, the menu of equipment available, the availability of renewable sources of energy, and housing starts. The Commercial Demand Module projects energy consumption in the commercial sector by building type and nonbuilding uses of energy and by category of end use, based on delivered prices of energy, availability of renewable sources of energy, and macroeconomic variables representing interest rates and floorspace construction.

Both modules estimate the equipment stock for the major end-use services, incorporating assessments of advanced technologies, including representations of renewable energy technologies and effects of both building shell and appliance standards. The Commercial Demand Module incorporates combined heat and power (CHP) technology. The modules also include projections of distributed generation. Both modules incorporate changes to "normal" heating and cooling degree-days by Census division, based on State-level population projections. The Residential Demand Module projects that the average square footage of both new construction and existing structures is increasing based on trends in the size of new construction and the remodeling of existing homes.

Industrial Demand Module

The Industrial Demand Module projects the consumption of energy for heat and power and for feedstocks and raw materials in each of 16 industry groups, subject to the delivered prices of energy and macroeconomic variables representing employment and the value of shipments for each industry. As noted in the description of the Macroeconomic Module, the value of shipments is based on NAICS. The industries are classified into three groups—energy-intensive manufacturing, non-energy-intensive manufacturing, and nonmanufacturing. Of the 8 energy-intensive industries, 7 are modeled in the Industrial Demand Module, with components for boiler/steam/cogeneration, buildings, and process/assembly use of energy. Bulk chemicals are further disaggregated to organic, inorganic, resins, and agricultural chemicals. A representation of cogeneration and a recycling component are also included. The use of energy for petroleum refining is modeled in the Petroleum Market

NEMS Overview and Brief Description of Cases

Module, and the projected consumption is included in the industrial totals.

Transportation Demand Module

The Transportation Demand Module projects consumption of fuels in the transportation sector, including petroleum products, electricity, methanol, ethanol, compressed natural gas, and hydrogen, by transportation mode, vehicle vintage, and size class, subject to delivered prices of energy fuels and macroeconomic variables representing disposable personal income, GDP, population, interest rates, and the value of output for industries in the freight sector. Fleet vehicles are represented separately to allow analysis of CAAA and other legislative proposals.

The module also includes a component to assess the penetration of alternative-fuel vehicles explicitly. The air transportation module explicitly represents the industry practice of parking aircraft to reduce operating costs and the movement of aircraft from passenger to cargo markets as aircraft age [7]. For air freight shipments, the model employs narrow-body and wide-body aircraft only. The model also uses an infrastructure constraint that limits growth in air travel to levels commensurate with industry-projected infrastructure expansion and capacity growth.

Electricity Market Module

The Electricity Market Module (EMM) represents generation, transmission, and pricing of electricity, subject to delivered prices for coal, petroleum products, natural gas, and biofuels; costs of generation by all generation plants, including capital costs; macroeconomic variables for costs of capital and domestic investment; enforced environmental emissions laws and regulations; and electricity load shapes and demand. There are three primary submodules—capacity planning, fuel dispatching, and finance and pricing. Nonutility generation, distributed generation, and transmission and trade are modeled in the planning and dispatching submodules. The levelized cost of uranium fuel for nuclear generation is incorporated directly in the EMM.

All specifically identified CAAA compliance options that have been promulgated by the EPA are explicitly represented in the capacity expansion and dispatch decisions; those that have not been promulgated are not incorporated (e.g., fine particulate proposal). All specifically identified EPACT2005 financial incentives for power generation expansion and dispatch

have been implemented. Several States, primarily in the Northeast, have recently enacted air emission regulations that affect the electricity generation sector. Where firm State compliance plans have been announced, regulations are represented in *AEO2006*.

Renewable Fuels Module

The Renewable Fuels Module (RFM) includes submodules representing renewable resource supply and technology input information for central-station, grid-connected electricity generation technologies, including conventional hydroelectricity, biomass (wood, energy crops, and biomass co-firing), geothermal, landfill gas, solar thermal electricity, solar photovoltaics, and wind energy. The RFM contains renewable resource supply estimates representing the regional opportunities for renewable energy development. Investment tax credits for renewable fuels are incorporated, as currently legislated in the EPACT1992 and EPACT2005. EPACT1992 provides a 10-percent tax credit for business investment in solar energy (thermal non-power uses as well as power uses) and geothermal power. EPACT2005 increases the tax credit to 30 percent for solar energy systems installed before January 1, 2008. The credits have no expiration dates.

Production tax credits for wind, geothermal, landfill gas, and some types of hydroelectric and biomass-fueled plants are also represented. They provide a tax credit of up to 1.9 cents per kilowatt-hour for electricity produced in the first 10 years of plant operation. New plants that come on line before January 1, 2008, are eligible to receive the credit. Significant changes made for *AEO2006* in the accounting of new renewable energy capacity resulting from State renewable portfolio standards, mandates, and goals are described in *Assumptions to the Annual Energy Outlook 2006* [8].

Oil and Gas Supply Module

The Oil and Gas Supply Module represents domestic crude oil and natural gas supply within an integrated framework that captures the interrelationships among the various sources of supply: onshore, offshore, and Alaska by both conventional and nonconventional techniques, including natural gas recovery from coalbeds and low-permeability formations of sandstone and shale. This framework analyzes cash flow and profitability to compute investment and drilling for each of the supply sources, based on the prices for crude oil and natural

NEMS Overview and Brief Description of Cases

gas, the domestic recoverable resource base, and the state of technology. Oil and gas production functions are computed at a level of 12 supply regions, including 3 offshore and 3 Alaskan regions. This module also represents foreign sources of natural gas, including pipeline imports and exports to Canada and Mexico, and liquefied natural gas (LNG) imports and exports.

Crude oil production quantities are input to the Petroleum Market Module in NEMS for conversion and blending into refined petroleum products. Supply curves for natural gas are input to the Natural Gas Transmission and Distribution Module for use in determining natural gas prices and quantities. International LNG supply sources and options for regional expansions of domestic regasification capacity are represented, based on the projected regional costs associated with international gas supply, liquefaction, transportation, and regasification and world natural gas market conditions.

Natural Gas Transmission and Distribution Module

The Natural Gas Transmission and Distribution Module represents the transmission, distribution, and pricing of natural gas, subject to end-use demand for natural gas and the availability of domestic natural gas and natural gas traded on the international market. The module tracks the flows of natural gas in an aggregate domestic pipeline network, connecting the domestic and foreign supply regions with 12 demand regions. This capability allows the analysis of impacts of regional capacity constraints in the interstate natural gas pipeline network and the identification of pipeline capacity expansion requirements. The flow of natural gas is determined for both a peak and off-peak period in the year. Key components of pipeline and distributor tariffs are included in separate pricing algorithms.

Petroleum Market Module

The Petroleum Market Module (PMM) projects prices of petroleum products, crude oil and product import activity, and domestic refinery operations (including fuel consumption), subject to the demand for petroleum products, the availability and price of imported petroleum, and the domestic production of crude oil, natural gas liquids, and alcohol and biodiesel fuels. The module represents refining activities in the five Petroleum Administration for Defense Districts (PADDs), using the same crude oil types represented in the International Energy Module. It explicitly models the requirements of CAAA and the costs of

automotive fuels, such as conventional and reformulated gasoline, and includes biofuels production for blending in gasoline and diesel.

AEO2006 reflects State legislation that bans or limits the use of the gasoline blending component methyl tertiary butyl ether (MTBE) in Arizona, California, Colorado, Connecticut, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Michigan, Minnesota, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Rhode Island, South Dakota, Vermont, Washington, and Wisconsin. Furthermore, MTBE is assumed to be phased out by the end of 2008 as a result of EPACT2005, which allows refiners to discontinue use of oxygenates in reformulated gasoline, and because of concern about MTBE contamination of surface water and groundwater resources.

The nationwide phase-in of gasoline with an annual average sulfur content of 30 ppm between 2005 and 2007, regulations that limit the sulfur content of highway diesel fuel to 15 ppm starting in mid-2006 and of all nonroad and locomotive/marine diesel to 15 ppm by mid-2012, and the renewable fuels standard of 7.5 billion gallons by 2012 are represented in *AEO2006*. Growth in demand and the costs of the regulations lead to capacity expansion for refinery-processing units, assuming a financing ratio of 60 percent equity and 40 percent debt, with a hurdle rate and an after-tax return on investment of about 9 percent [9]. End-use prices are based on the marginal costs of production, plus markups representing product and distribution costs and State and Federal taxes [10]. Expansion of refinery capacity at existing sites is permitted in all of the five refining regions modeled.

Fuel ethanol and biodiesel are included in the PMM, because they are commonly blended into petroleum products. The module allows ethanol blending into gasoline at 10 percent by volume or less, as well as limited quantities of E85, a blend of up to 85 percent ethanol by volume. Ethanol is produced primarily in the Midwest from corn or other starchy crops, and it is expected to be produced from cellulosic material in other regions in the future. Biodiesel is produced from soybean oil or yellow grease (primarily, recycled cooking oil). Both soybean oil biodiesel and yellow grease biodiesel are assumed to be blended into highway diesel.

Alternative fuels such as coal-to-liquids (CTL) and gas-to-liquids (GTL) are modeled in the PMM, based

NEMS Overview and Brief Description of Cases

on their economics relative to competing feedstocks and products. CTL facilities are likely to be built at locations close to coal supply sources, where liquid products and electricity could also be distributed to nearby demand regions. GTL facilities may be built on the North Slope of Alaska but would compete with the Alaska Natural Gas Transportation System (ANGTS) for available natural gas resources. Both CTL and GTL are discussed in more detail in “Issues in Focus.”

Coal Market Module

The Coal Market Module (CMM) simulates mining, transportation, and pricing of coal, subject to the end-use demand for coal differentiated by heat and sulfur content. U.S. coal production is represented in the CMM using 40 separate supply curves—differentiated by region, mine type, coal rank, and sulfur content. The coal supply curves include a response to capacity utilization of mines, mining capacity, labor productivity, and factor input costs (mining equipment, mining labor, and fuel requirements). Projections of U.S. coal distribution are determined in the CMM through the use of a linear programming algorithm that determines the least-cost supplies of coal for a given set of coal demands by demand region and sector, accounting for minemouth prices, transportation costs, existing coal supply contracts, and sulfur and mercury allowance costs. Over the projection horizon, coal transportation costs in the CMM are projected to vary in response to changes in railroad productivity and the user cost of rail transportation equipment.

The CMM produces projections of U.S. steam and metallurgical coal exports and imports, in the context of world coal trade. The CMM’s linear programming algorithm determines the pattern of world coal trade flows that minimizes the production and transportation costs of meeting a pre-specified set of regional world coal import demands, subject to constraints on export capacities and trade flows. The international coal market component of the module computes trade in 3 types of coal for 16 export and 20 import regions. U.S. coal production and distribution are computed for 14 supply and 14 demand regions.

Annual Energy Outlook 2006 Cases

Table E1 provides a summary of the cases used to derive the *AEO2006* projections. For each case, the table gives the name used in this report, a brief

description of the major assumptions underlying the projections, a designation of the mode in which the case was run in NEMS (either fully integrated, partially integrated, or standalone), and a reference to the pages in the body of the report and in this appendix where the case is discussed. The following sections describe the cases listed in Table E1. The reference case assumptions for each sector are described at web site www.eia.doe.gov/oiaf/aeo/assumption/. Regional results and other details of the projections are available at web site www.eia.doe.gov/oiaf/aeo/supplement/.

Macroeconomic Growth Cases

In addition to the *AEO2006* reference case, the *low economic growth* and *high economic growth cases* were developed to reflect the uncertainty in projections of economic growth. The alternative cases are intended to show the effects of alternative growth assumptions on energy market projections. The cases are described as follows:

- The low economic growth case assumes lower growth rates for population (0.5 percent per year), nonfarm employment (0.7 percent per year), and productivity (1.8 percent per year), resulting in higher prices and interest rates and lower growth in industrial output. In the low economic growth case, economic output increases by 2.4 percent per year from 2004 through 2030, and growth in GDP per capita averages 1.9 percent per year.
- The high economic growth case assumes higher growth rates for population (1.1 percent per year), nonfarm employment (1.4 percent per year), and productivity (2.7 percent per year). With higher productivity gains and employment growth, inflation and interest rates are lower than in the reference case, and consequently economic output grows at a higher rate (3.5 percent per year) than in the reference case (3.0 percent). GDP per capita grows by 2.4 percent per year, compared with 2.2 percent in the reference case.

Price Cases

The world oil price in *AEO2006* is represented by the average U.S. refiners acquisition costs of imported low-sulfur light crude oil, in order to be more consistent with prices typically reported in the media. The low-sulfur light crude oil price is similar to the West Texas Intermediate (WTI) crude oil price. *AEO2006* also includes a projection of the annual average U.S.

NEMS Overview and Brief Description of Cases

Table E1. Summary of the AEO2006 cases

Case name	Description	Integration mode	Reference in text	Reference in Appendix E
Reference	Baseline economic growth (3.0 percent per year), world oil price, and technology assumptions. Complete projection tables in Appendix A.	Fully integrated	—	—
Low Economic Growth	Gross domestic product grows at an average annual rate of 2.4 percent from 2004 through 2030. Subset of projection tables in Appendix B.	Fully integrated	p. 62	p. 203
High Economic Growth	Gross domestic product grows at an average annual rate of 3.5 percent from 2004 through 2030. Subset of projection tables in Appendix B.	Fully integrated	p. 62	p. 203
Low Price	More optimistic assumptions for worldwide crude oil and natural gas resources than in the reference case. World oil prices are \$28 per barrel in 2030, compared with \$50 per barrel in the reference case, and lower 48 wellhead natural gas prices \$4.96 per thousand cubic feet in 2030, compared with \$5.92 in the reference case. Subset of projection tables in Appendix C.	Fully integrated	p. 64	p. 206
High Price	More pessimistic assumptions for worldwide crude oil and natural gas resources than in the reference case. World oil prices are about \$90 per barrel in 2030 and lower 48 wellhead natural gas prices \$7.72 per thousand cubic feet in 2030. Subset of projection tables in Appendix C.	Fully integrated	p. 64	p. 206
Residential: 2005 Technology	Future equipment purchases based on equipment available in 2005. Existing building shell efficiencies fixed at 2005 levels. Partial projection tables in Appendix D.	With commercial	p. 68	p. 206
Residential: High Technology	Earlier availability, lower costs, and higher efficiencies assumed for more advanced equipment. Building shell efficiencies increase by 22 percent from 2003 values by 2030. Partial projection tables in Appendix D.	With commercial	p. 68	p. 207
Residential: Best Available Technology	Future equipment purchases and new building shells based on most efficient technologies available. Building shell efficiencies increase by 26 percent from 2003 values by 2030. Partial projection tables in Appendix D.	With commercial	p. 68	p. 207
Commercial: 2005 Technology	Future equipment purchases based on equipment available in 2005. Building shell efficiencies fixed at 2005 levels. Partial projection tables in Appendix D.	With residential	p. 70	p. 207
Commercial: High Technology	Earlier availability, lower costs, and higher efficiencies assumed for more advanced equipment. Building shell efficiencies for new and existing buildings increase by 10.4 and 7.4 percent, respectively, from 1999 values by 2030. Partial projection tables in Appendix D.	With residential	p. 70	p. 207
Commercial: Best Available Technology	Future equipment purchases based on most efficient technologies available. Building shell efficiencies for new and existing buildings increase by 12.4 and 8.9 percent, respectively, from 1999 values by 2030. Partial projection tables in Appendix D.	With residential	p. 70	p. 207
Industrial: 2005 Technology	Efficiency of plant and equipment fixed at 2005 levels. Partial projection tables in Appendix D.	Standalone	p. 73	p. 207
Industrial: High Technology	Earlier availability, lower costs, and higher efficiencies assumed for more advanced equipment. Partial projection tables in Appendix D.	Standalone	p. 73	p. 207
Transportation: 2005 Technology	Efficiencies for new equipment in all modes of travel fixed at 2005 levels. Partial projection tables in Appendix D.	Standalone	p. 76	p. 208

NEMS Overview and Brief Description of Cases

Table E1. Summary of the AEO2006 cases (continued)

Case name	Description	Integration mode	Reference in text	Reference in Appendix E
Transportation: High Technology	Reduced costs and improved efficiencies assumed for advanced technologies. Partial projection tables in Appendix D.	Standalone	p. 76	p. 208
Transportation: Alternative CAFE	Assumes that manufacturers adhere to the proposed fleetwide increases in light truck CAFE standards to 24 miles per gallon for model year 2011.	Standalone	p. 24	p. 208
Integrated 2005 Technology	Combination of the residential, commercial, industrial, and transportation 2005 technology cases, electricity low fossil technology case, and assumption of renewable technologies fixed at 2005 levels. Partial projection tables in Appendix D.	Fully integrated	p. 60	—
Integrated High Technology	Combination of the residential, commercial, industrial, and transportation high technology cases, electricity high fossil technology case, high renewables case, and advanced nuclear cost case. Partial projection tables in Appendix D.	Fully integrated	p. 60	—
Electricity: Advanced Nuclear Cost	New nuclear capacity assumed to have 20 percent lower capital and operating costs in 2030 than in the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 84	p. 208
Electricity: Nuclear Vendor Estimate	New nuclear capacity assumed to have lower capital costs based on vendor goals. Partial projection tables in Appendix D.	Fully integrated	p. 84	p. 208
Electricity: Low Fossil Technology	New advanced fossil generating technologies assumed not to improve over time from 2006. Partial projection tables in Appendix D.	Fully integrated	p. 83	p. 209
Electricity: High Fossil Technology	Costs and efficiencies for advanced fossil-fired generating technologies improve by 10 percent in 2030 from reference case values. Partial projection tables in Appendix D.	Fully integrated	p. 83	p. 208
Electricity: Mercury Control Technologies	Cost and performance for halogenated activated carbon injection technology used to determine its impact on mercury removal requirements from coal-fired power plants.	Fully integrated	p. 59	p. 209
Renewables: Low Renewables	New renewable generating technologies assumed not to improve over time from 2006. Partial projection tables in Appendix D.	Fully integrated	p. 84	p. 209
Renewables: High Renewables	Levelized cost of energy for nonhydropower renewable generating technologies declines by 10 percent in 2030 from reference case values. Lower capital cost for cellulose ethanol plants. Partial projection tables in Appendix D.	Fully integrated	p. 84	p. 209
Oil and Gas: Slow Technology	Cost, finding rate, and success rate parameters adjusted for 50-percent slower improvement than in the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 88	p. 210
Oil and Gas: Rapid Technology	Cost, finding rate, and success rate parameters adjusted for 50-percent more rapid improvement than in the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 88	p. 209
Oil and Gas: Low LNG	LNG imports exogenously set to 30 percent less than the results from the high price case, with remaining assumptions from the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 90	p. 210

NEMS Overview and Brief Description of Cases

Table E1. Summary of the AEO2006 cases (continued)

Case name	Description	Integration mode	Reference in text	Reference in Appendix E
Oil and Gas: High LNG	LNG imports exogenously set to 30 percent more than the results from the low price case, with remaining assumptions from the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 90	p. 210
Oil and Gas: ANWR	Federal oil and gas leasing permitted in the Arctic National Wildlife Refuge starting in 2005. Partial projection tables in Appendix D.	Fully integrated	p. 94	p. 210
Coal: Low Cost	Productivity for coal mining and coal transportation assumed to increase more rapidly than in the reference case. Coal mining wages, mine equipment and coal transportation equipment costs assumed to be lower than in the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 102	p. 210
Coal: High Cost	Productivity for coal mining and coal transportation assumed to increase more slowly than in the reference case. Coal mining wages, mine equipment and coal transportation equipment costs assumed to be higher than in the reference case. Partial projection tables in Appendix D.	Fully integrated	p. 102	p. 210

refiners acquisition cost of imported crude oil (IRAC), which is more representative of the average cost of all crude oil used by refiners.

The historical record shows substantial variability in world oil prices, and there is arguably even more uncertainty about future prices in the long term. *AEO2006* considers three price cases (*reference case*, *low price case*, and *high price case*) to allow an assessment of alternative views on the course of future oil and natural gas prices. In the reference case, world oil prices moderate from current levels through 2015 before beginning to rise to \$57 per barrel in 2030 (2004 dollars). The low and high price cases define a wide range of potential price paths (from \$34 to \$96 per barrel in 2030). The two cases reflect different assumptions about the availability of world oil and natural gas resources and production costs; they do not assume changes in OPEC behavior. Because the low and high price cases are not directly integrated with a world economic model, the impact of world oil prices on international economies is not directly accounted for in this analysis.

- The reference case represents EIA's current judgment regarding the expected behavior of OPEC producers in the long term, adjusting production to keep world oil prices in a range of \$40 to \$50 per barrel, in keeping with OPEC's stated goal of keeping potential competitors from eroding its market share. Because OPEC (and particularly

the Persian Gulf nations) is expected to be the dominant supplier of oil in the international market over the long term, its production choices will significantly affect world oil prices.

- The low price case assumes greater world crude oil and natural gas resources which are less expensive to produce and a future market where all oil and natural gas production becomes more competitive and plentiful than the reference case.
- The high price case assumes that world crude oil and natural gas resources, including OPEC's, are lower and require greater cost to produce than assumed in the reference case.

Buildings Sector Cases

In addition to the *AEO2006* reference case, three standalone technology-focused cases using the Residential and Commercial Demand Modules of NEMS were developed to examine the effects of changes to equipment and building shell efficiencies.

For the residential sector, the three technology-focused cases are as follows:

- The *2005 technology case* assumes that all future equipment purchases are based only on the range of equipment available in 2005. Existing building shell efficiencies are assumed to be fixed at 2005 levels.

NEMS Overview and Brief Description of Cases

- The *high technology case* assumes earlier availability, lower costs, and higher efficiencies for more advanced equipment [11]. Building shell efficiency in 2030 is assumed to be 22 percent higher than the 2003 level.
- The *best available technology case* assumes that all future equipment purchases are made from a menu of technologies that includes only the most efficient models available in a particular year, regardless of cost. Building shell efficiency in 2030 is assumed to be 26 percent higher than the 2003 level.

For the commercial sector, the three technology-focused cases are as follows:

- The *2005 technology case* assumes that all future equipment purchases are based only on the range of equipment available in 2005. Building shell efficiencies are assumed to be fixed at 2005 levels.
- The *high technology case* assumes earlier availability, lower costs, and/or higher efficiencies for more advanced equipment than in the reference case [12]. Building shell efficiencies for new and existing buildings in 2030 are assumed to be 10.4 percent and 7.4 percent higher, respectively, than their 1999 levels—a 25-percent improvement relative to the reference case.
- The *best available technology case* assumes that all future equipment purchases are made from a menu of technologies that includes only the most efficient models available in a particular year, regardless of cost. Building shell efficiencies for new and existing buildings in 2030 are assumed to be 12.4 percent and 8.9 percent higher, respectively, than their 1999 values—a 50-percent improvement relative to the reference case.

Two additional integrated cases were developed, in combination with assumptions for electricity generation from renewable fuels, to analyze the sensitivity of the projections to changes in generating technologies that use renewable fuels and in the availability of renewable energy sources. For the Residential and Commercial Demand Modules:

- The *high renewables case* assumes greater improvements in residential and commercial photovoltaic systems than in the reference case. The high renewables assumptions result in capital cost estimates for 2030 that are approximately 10 percent lower than reference case costs for distributed photovoltaic technologies.

- The *low renewables case* assumes that costs and performance levels for residential and commercial photovoltaic systems remain constant at 2005 levels through 2030.

Industrial Sector Cases

In addition to the *AEO2006* reference case, two standalone cases using the Industrial Demand Module of NEMS were developed to examine the effects of less rapid and more rapid technology change and adoption. The Industrial Demand Module was also used as part of an integrated high renewables case. For the industrial sector:

- The *2005 technology case* holds the energy efficiency of plant and equipment constant at the 2005 level over the projection period. In this case, delivered energy intensity falls by 0.9 percent annually. Because the level and composition of industrial output are the same in the reference, 2005 technology, and high technology cases, any change in primary energy intensity in the two technology cases is attributable to efficiency changes. The 2005 technology case was run with only the Industrial Demand Module, rather than in fully integrated NEMS runs. Consequently, no potential feedback effects from energy market interactions were captured.
- The *high technology case* assumes earlier availability, lower costs, and higher efficiency for more advanced equipment [13] and a more rapid rate of improvement in the recovery of biomass byproducts from industrial processes (0.7 percent per year, as compared with 0.4 percent per year in the reference case). The same assumption is also incorporated in the integrated high renewables case, which focuses on electricity generation. While the choice of 0.7 percent recovery is an assumption of the high technology case, it is based on the expectation that there would be higher recovery rates and substantially increased use of CHP in that case. Changes in aggregate energy intensity result both from changing equipment and production efficiency and from changing composition of industrial output. Because the composition of industrial output remains the same as in the reference case, delivered energy intensity falls by 1.4 percent annually in the high technology case. In the reference case, delivered energy intensity falls by 1.2 percent annually between 2004 and 2030.

NEMS Overview and Brief Description of Cases

Transportation Sector Cases

In addition to the *AEO2006* reference case, two standalone cases using the Transportation Demand Module of NEMS were developed to examine the effects of less rapid technology change and adoption and more rapid technology change and adoption. For the transportation sector:

- The *2005 technology case* assumes that new vehicle fuel efficiencies remain constant at 2005 levels through the projection horizon, unless emissions and/or efficiency regulations require the implementation of technology that affects vehicle efficiency. For example, the new light truck corporate average fuel economy (CAFE) standards require an increase in fuel economy through 2007, and increases in heavy truck emissions standards are required through 2010. As a result, the technology available for light truck efficiency improvement is frozen at 2007 levels, and the technology available to heavy trucks is frozen at 2010 levels.
- In the *high technology case*, the characteristics of light-duty conventional and alternative-fuel vehicles reflect more optimistic assumptions about incremental improvements in fuel economy and costs [14]. In the air travel sector, the high technology case reflects lower costs for improved thermodynamics, advanced aerodynamics, and weight-reducing materials, providing a 25-percent improvement in new aircraft efficiency relative to the reference case in 2025. In the freight truck sector, the high technology case assumes more incremental improvement in fuel efficiency for engine and emissions control technologies [15]. More optimistic assumptions for fuel efficiency improvements are also made for the rail and shipping sectors.

Both cases were run with only the Transportation Demand Module rather than as fully integrated NEMS runs. Consequently, no potential macroeconomic feedback on travel demand was captured, nor were changes in fuel prices incorporated.

In addition to these standalone cases, EIA also developed an *alternative CAFE case* designed to examine the potential energy impacts of proposed reforms to the structure of CAFE standards for light trucks and increases in light truck CAFE standards for model years 2008 through 2011 [16]. The alternative CAFE case assumes that manufacturers will adhere to the proposed fleet-wide increases in light truck CAFE standards, to 24 miles per gallon for model year 2011.

Electricity Sector Cases

In addition to the reference case, four integrated cases with alternative electric power assumptions were developed to analyze uncertainties about the future costs and performance of new generating technologies. Two of the cases examine alternative assumptions for nuclear power technologies, and two examine alternative assumptions for fossil fuel technologies. Reference case values for technology characteristics are determined in consultation with industry and government specialists; however, there is always uncertainty surrounding newer, untested designs. The electricity cases analyze what could happen if costs of advanced designs are either higher or lower than assumed in the reference case. The cases are fully integrated to allow feedback between the potential shifts in fuel consumption and fuel prices.

Nuclear Technology Cases

- The cost assumptions for the *advanced nuclear cost case* reflect a 20-percent reduction in the capital and operating costs for advanced nuclear technology in 2030, relative to the reference case. The reference case, which assumes that some learning occurs regardless of new orders and construction, projects a 14-percent reduction in the capital costs of nuclear power plants between 2006 and 2030. The advanced nuclear cost case assumes a 31-percent reduction between 2006 and 2030.
- The *nuclear vendor estimate case* uses assumptions that are consistent with estimates from British Nuclear Fuels Limited (Westinghouse) for the manufacture of its AP1000 advanced pressurized-water reactor. In this case, the overnight capital cost of a new advanced nuclear unit is assumed to be 18 percent lower initially than assumed in the reference case and 44 percent lower in 2030. In both of the alternative nuclear cases, cost and performance characteristics for all other technologies are as assumed in the reference case.

Fossil Technology Cases

- In the *high fossil technology case*, capital costs, heat rates, and operating costs for advanced coal and natural gas generating technologies are assumed to be 10 percent lower than reference case levels in 2030. Because learning is assumed to occur in the reference case, costs and performance in the high case are reduced from initial levels by more than 10 percent. Heat rates in the

NEMS Overview and Brief Description of Cases

high fossil technology case fall to between 16 and 22 percent below initial levels, and capital costs are reduced by 22 to 26 percent between 2006 and 2030, depending on the technology.

- In the *low fossil technology case*, capital costs and heat rates for coal gasification combined-cycle units and advanced combustion turbine and combined-cycle units do not decline during the projection period but remain fixed at the 2006 values assumed in the reference case.

Details about annual capital costs, operating and maintenance costs, plant efficiencies, and other factors used in the high and low fossil technology cases are described in the detailed assumptions, which are available at web site www.eia.doe.gov/oiaf/aeo/assumption/.

An additional integrated case was also run to analyze the potential impacts of improved mercury control technologies to comply with CAMR. A detailed description of the rule is included in “Legislation and Regulations.”

- In the *mercury control technology case*, the cost and performance for halogenated activated carbon injection technology are used to determine its impact on mercury removal requirements from coal-fired power plants. Conventional activated carbon injection has not been effective in achieving high mercury removal rates from subbituminous and lignite coals, but preliminary tests show that high levels of mercury removal can be achieved with relatively low rates of brominated activated carbon injection. If brominated activated carbon becomes commercially available by 2018, it could have significant impacts on the cost of achieving mercury removal targets.

Renewable Fuels Cases

In addition to the *AEO2006* reference case, two integrated cases with alternative assumptions about renewable fuels were developed to examine the effects of less aggressive and more aggressive improvement in renewable technologies. The cases are as follows:

- In the *low renewables case*, capital costs, operations and maintenance costs, and performance levels for wind, solar, biomass, and geothermal resources are assumed to remain constant at 2006 levels through 2030.
- In the *high renewables case*, the levelized costs of energy for nonhydroelectric generating technologies using renewable resources are assumed to

decline to 10 percent below the reference case costs for the same resources in 2030. For most renewable resources, lower costs are accomplished by reducing the capital costs of new plant construction. To reflect recent trends in wind energy cost reductions, however, it is assumed that wind plants ultimately achieve the 10-percent cost reduction through a combination of performance improvement (increased capacity factor) and capital cost reductions. Biomass supplies are also assumed to be 10 percent greater for each supply step. Annual limits are placed on the development of geothermal sites, because they require incremental development to assure that the resource is viable. In the high renewables case, the annual limits on capacity additions at geothermal sites are raised from 25 megawatts per year through 2015 to 50 megawatts per year for all projection years. All other cases are assumed to retain the 25-megawatt limit through 2015. Other generating technologies and projection assumptions remain unchanged from those in the reference case. In the high renewables case, the rate of improvement in recovery of biomass byproducts from industrial processes is also increased. More rapid improvement in cellulosic ethanol production technology is also assumed, resulting in lower cost for cellulose ethanol at any level of output than in the reference case.

Oil and Gas Supply Cases

Two alternative technology cases were created to assess the sensitivity of the projections to changes in the assumed rates of progress in oil and natural gas supply technologies. In addition, high and low LNG supply cases were developed to examine the impacts of variations in LNG supply on the domestic natural gas market.

- In the *rapid technology case*, the parameters representing the effects of technological progress on finding rates, drilling, lease equipment and operating costs, and success rates for conventional oil and natural gas drilling in the reference case were increased by 50 percent. A number of key exploration and production technologies for unconventional natural gas were also increased by 50 percent in the rapid technology case. Key Canadian supply parameters were also modified to simulate the assumed impacts of more rapid oil and natural gas technology penetration on the Canadian supply potential. All other parameters

NEMS Overview and Brief Description of Cases

in the model were kept at the reference case values, including technology parameters for other modules, parameters affecting foreign oil supply, and assumptions about imports and exports of LNG and natural gas trade between the United States and Mexico. Specific detail by region and fuel category is presented in *Assumptions to the Annual Energy Outlook 2006*, available at web site www.eia.doe.gov/oiaf/aeo/assumption/.

- In the *slow technology case*, the parameters representing the effects of technological progress on finding rates, drilling, lease equipment and operating costs, and success rates for conventional oil and natural gas drilling in the *AEO2006* reference case were reduced by 50 percent. A number of key exploration and production technologies for unconventional natural gas were also reduced by 50 percent in the slow technology case. Key Canadian supply parameters were also modified to simulate the assumed impacts of slow oil and natural gas technology penetration on Canadian supply potential. All other parameters in the model were kept at the reference case values.
- The *high LNG case* exogenously specifies LNG imports at levels 30 percent higher than projected in the low price case. The intent is to project the potential impact on domestic markets if LNG imports turn out to be higher than projected in the reference case.
- The *low LNG case* exogenously specifies LNG imports at levels 30 percent lower than projected in the high price case. The intent is to project the potential impact on domestic markets if LNG imports turn out to be lower than projected in the reference case.
- The *ANWR case* assumes that the U.S. Congress will approve leasing in the 1002 Area Federal lands in the Arctic National Wildlife Refuge for oil and natural gas exploration and production.

Petroleum Market Cases

In addition to the *AEO2006* reference case, a case that is part of the integrated high renewable case evaluates the impact of more optimistic assumptions about biomass supplies on the production and use of cellulosic ethanol.

- The *high renewables case* uses more optimistic assumptions about the availability of renewable energy sources. The supply curve for cellulosic

ethanol is shifted in each projection year relative to the reference case, making larger quantities available at any given price earlier than in the reference case. More rapid improvement in cellulosic ethanol production technology is also assumed, resulting in lower cost for cellulose ethanol at any level of output than in the reference case.

Coal Market Cases

Two alternative coal cost cases examine the impacts on U.S. coal supply, demand, distribution, and prices that result from alternative assumptions about mining productivity, labor costs, and mine equipment costs on the production side, and railroad productivity and rail equipment costs on the transportation side. For the coal cost cases, adjustments to the reference case assumptions for coal mining and railroad productivity were based on variations in growth rates observed in the data for these industries since 1980. The low and high coal cost cases represent fully integrated NEMS runs, with feedback from the macroeconomic activity, international, supply, conversion, and end-use demand modules.

- In the *low coal cost case*, average annual productivity growth rates for coal mining and railroad productivity are 2.5 percent and 2.6 percent higher, respectively, than in the *AEO2006* reference case. On the mining side, adjustments to reference case productivity are applied at the supply curve level, while adjustments to railroad productivity are made at the regional level. Coal mining wages and mine equipment costs, which remain constant in real dollars in the reference case, are assumed to decline by 1.0 percent per year in real terms in the low coal cost case. Railroad equipment costs, which are projected to increase by 2.1 percent per year in constant dollars in the reference case, are assumed to increase at a slower rate of 1.1 percent per year.
- In the *high coal cost case*, average annual productivity growth rates for coal mining and railroad productivity are 2.5 percent and 2.6 percent lower, respectively, than in the *AEO2006* reference case. Coal mining wages and mine equipment costs are assumed to increase by 1.0 percent per year in real terms. Railroad equipment costs are assumed to increase by 3.1 percent per year.

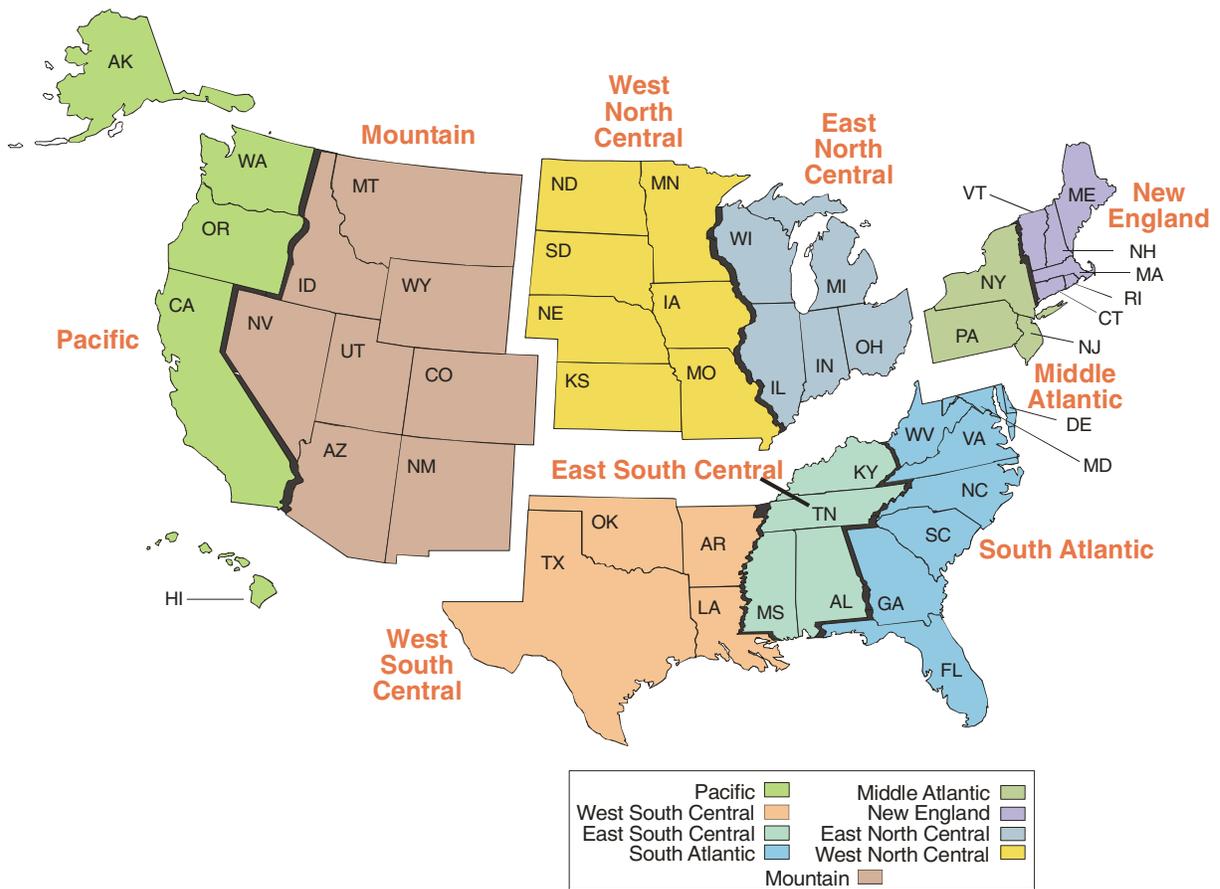
Additional details about the productivity, wage, and equipment cost assumptions for the reference and alternative coal cost cases are provided in Appendix D.

NEMS Overview and Brief Description of Cases

Notes

- [1]Energy Information Administration, *The National Energy Modeling System: An Overview 2003*, DOE/EIA-0581(2003) (Washington, DC, March 2003).
- [2]Energy Policy Act of 2005, P.L. 109-58.
- [3]Energy Policy Act of 1992, P.L. 102-486, Title III, Section 303, and Title V, Sections 501 and 507.
- [4]Energy Information Administration, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005).
- [5]Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2004*, DOE/EIA-0573(2004) (Washington, DC, December 2005).
- [6]Energy Information Administration, *Short-Term Energy Outlook*, web site www.eia.doe.gov/emeu/steo/pub/contents.html. Portions of the preliminary information were also used to initialize the NEMS Petroleum Market Module projection.
- [7]Jet Information Services, Inc., *World Jet Inventory Year-End 2003* (Woodinville, WA, March 2004), and personal communication from Bill Francois (Jet Information Services) and Thomas C. Hoang (Boeing).
- [8]Energy Information Administration, *Assumptions to the Annual Energy Outlook 2006*, DOE/EIA-0554 (2006) (Washington, DC, to be published).
- [9]The hurdle rate for a coal-to-liquids (CTL) plant is assumed to be 12.3 percent because of the higher economic risk involved in this technology.
- [10]For gasoline blended with ethanol, the tax credit of 51 cents (nominal) per gallon of ethanol is assumed to be extended through 2030, based on the fact that the ethanol tax credit has been continuously in force for the past 25 years and was recently extended from 2007 to 2010 by the American Jobs Creation Act of 2004.
- [11]High technology assumptions are based on Energy Information Administration, *EIA—Technology Forecast Updates—Residential and Commercial Building Technologies—Advanced Adoption Case* (Navigant Consulting, Inc., September 2004).
- [12]High technology assumptions are based on Energy Information Administration, *EIA—Technology Forecast Updates—Residential and Commercial Building Technologies—Advanced Adoption Case* (Navigant Consulting, Inc., September 2004).
- [13]These assumptions are based in part on Energy Information Administration, *Industrial Technology and Data Analysis Supporting the NEMS Industrial Model* (FOCIS Associates, October 2005).
- [14]Energy Information Administration, *Documentation of Technologies Included in the NEMS Fuel Economy Model for Passenger Cars and Light Trucks* (Energy and Environmental Analysis, September 2003).
- [15]A. Vyas, C. Saricks, and F. Stodolsky, *Projected Effect of Future Energy Efficiency and Emissions Improving Technologies on Fuel Consumption of Heavy Trucks* (Argonne, IL: Argonne National Laboratory, 2001).
- [16]National Highway Traffic Safety Administration, *Average Fuel Economy Standards for Light Trucks Model Years 2008-2011*, 49 CFR Parts 523, 533, and 537, Docket No. 2005-22223, RIN 2127-AJ61 (Washington, DC, August 2005).

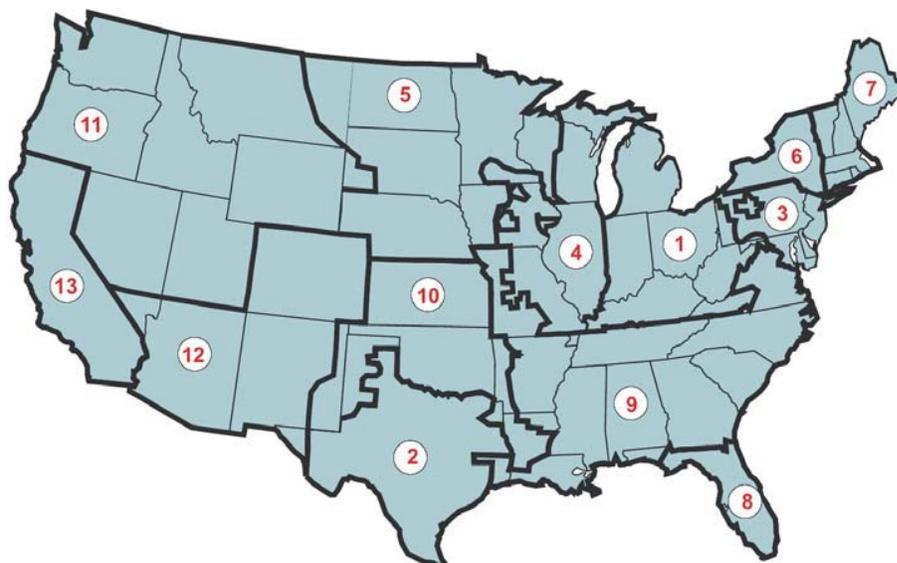
F1. United States Census Divisions



Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

Regional Maps

F2. Electricity Market Module Regions



- | | |
|---|--|
| 1 East Central Area Reliability Coordination Agreement (ECAR) | 8 Florida Reliability Coordinating Council (FL) |
| 2 Electric Reliability Council of Texas (ERCOT) | 9 Southeastern Electric Reliability Council (SERC) |
| 3 Mid-Atlantic Area Council (MAAC) | 10 Southwest Power Pool (SPP) |
| 4 Mid-America Interconnected Network (MAIN) | 11 Northwest Power Pool (NWP) |
| 5 Mid-Continent Area Power Pool (MAPP) | 12 Rocky Mountain Power Area, Arizona, New Mexico, |
| 6 New York (NY) Southern Nevada (RA) | 13 California (CA) |
| 7 New England (NE) | |

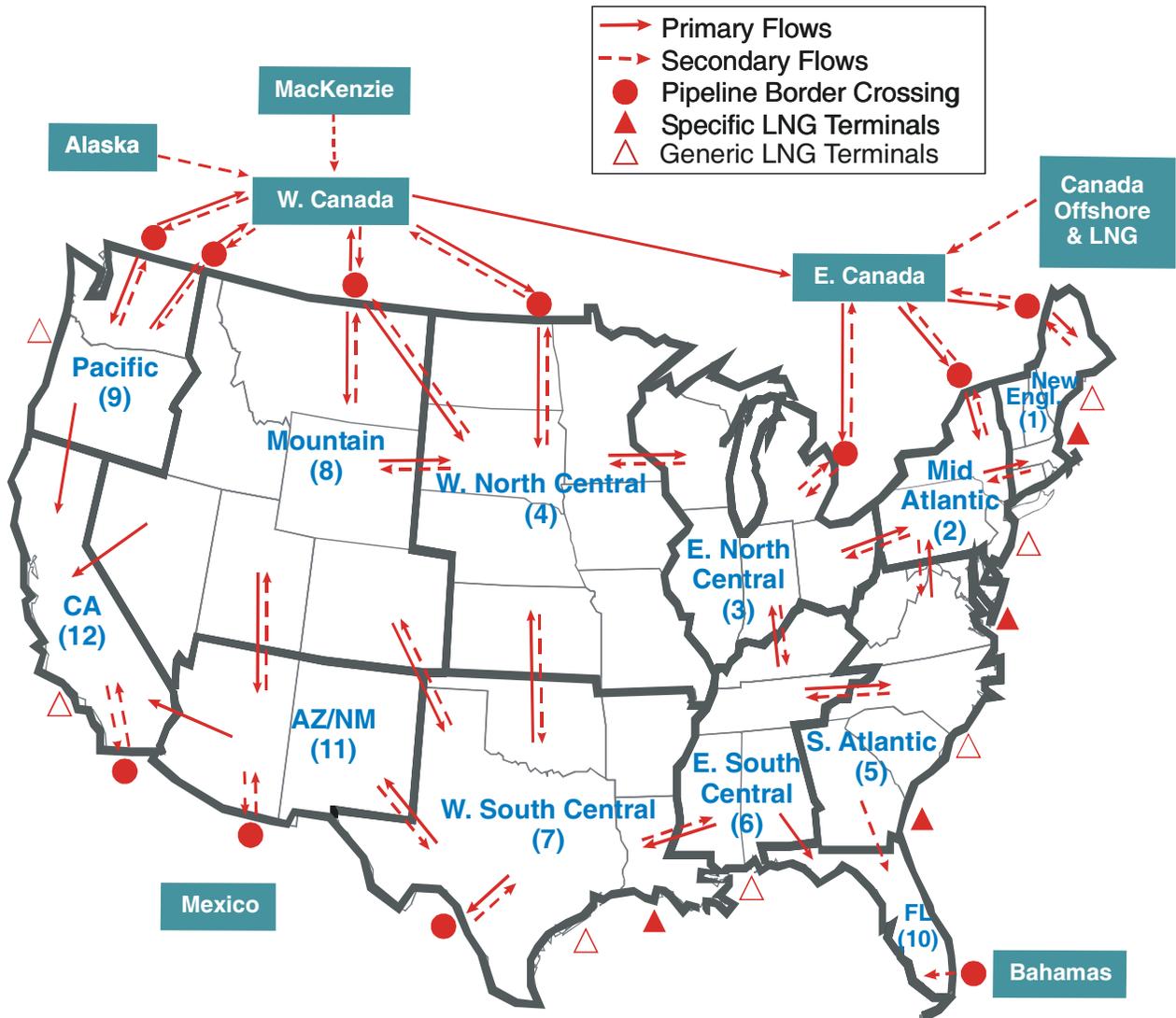
Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

F3. Oil and Gas Supply Model Regions



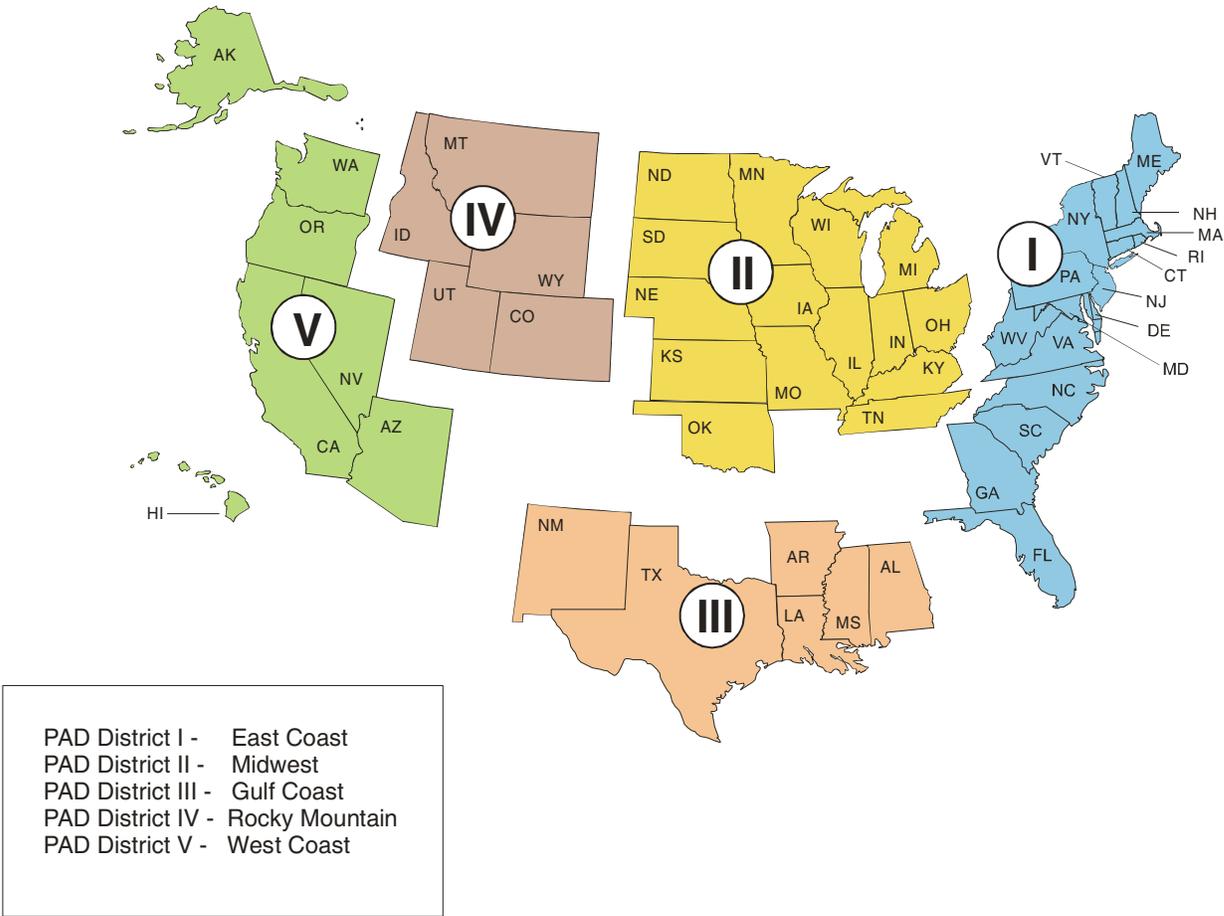
Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

F4. Natural Gas Transmission and Distribution Model Regions



Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

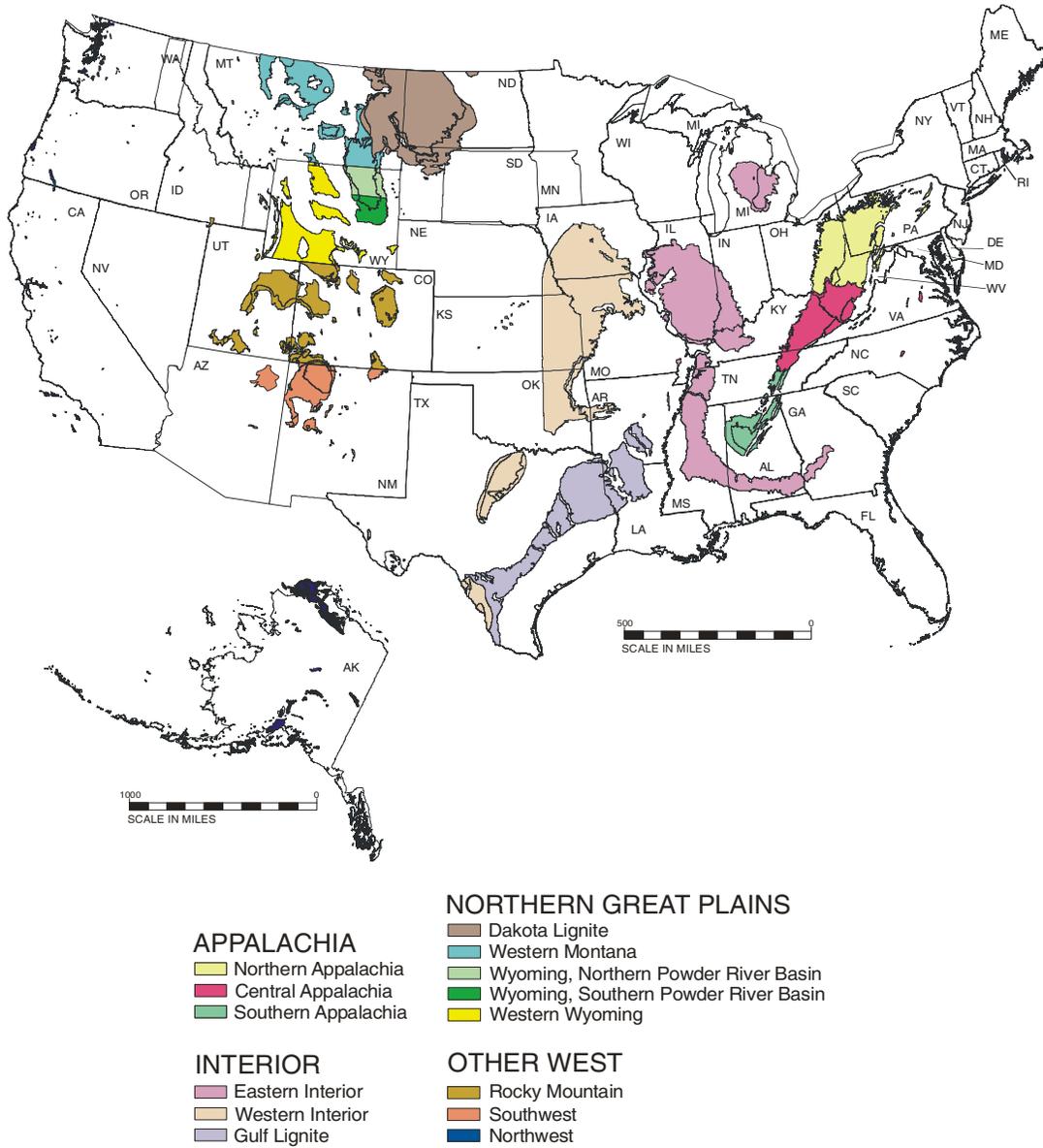
F5. Petroleum Administration for Defense Districts



Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

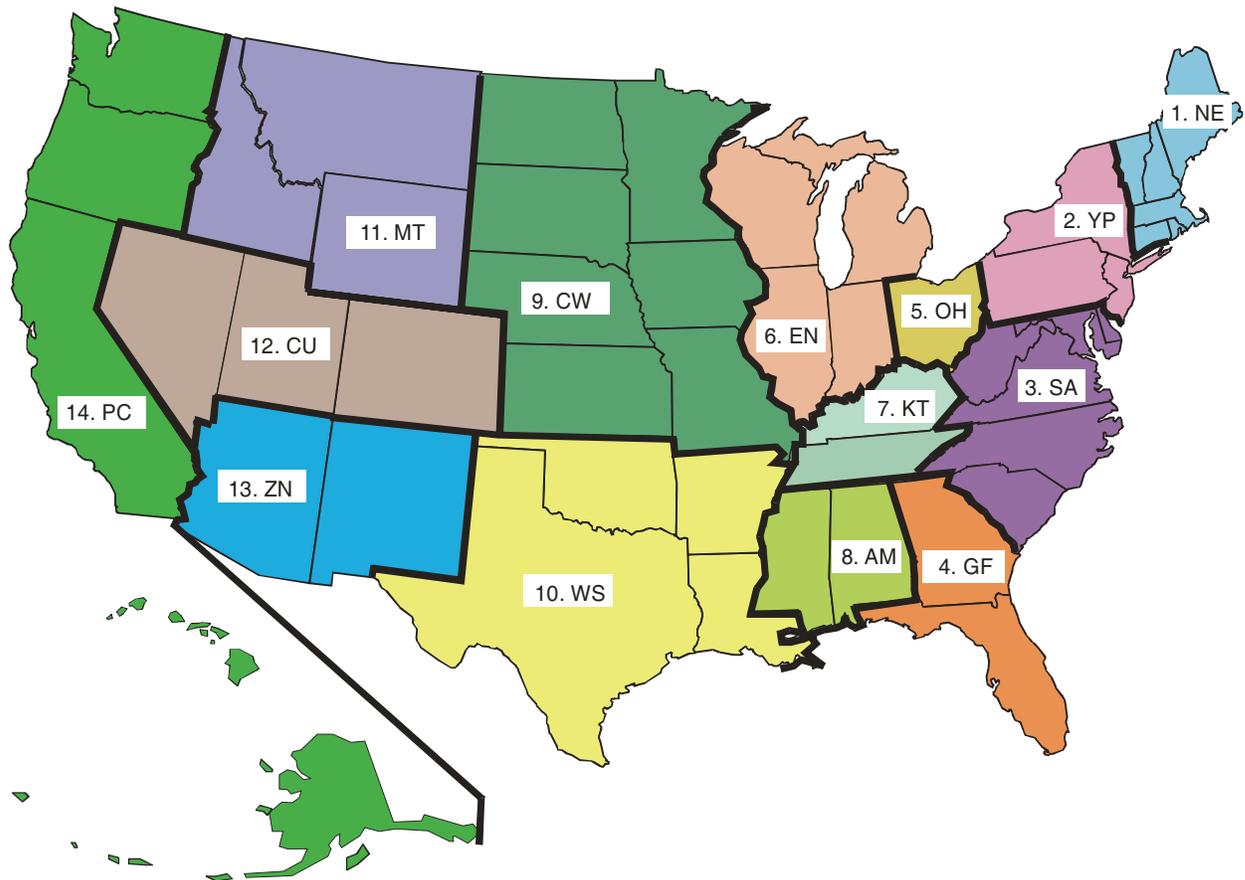
Regional Maps

F6. Coal Supply Regions



Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

F7. Coal Demand Regions



Region Code	Region Content
1. NE	CT,MA,ME,NH,RI,VT
2. YP	NY,PA,NJ
3. SA	WV,MD,DC,DE,VA,NC,SC
4. GF	GA,FL
5. OH	OH
6. EN	IN,IL,MI,WI
7. KT	KY,TN

Region Code	Region Content
8. AM	AL,MS
9. CW	MN,IA,ND,SD,NE,MO,KS
10. WS	TX,LA,OK,AR
11. MT	MT,WY,ID
12. CU	CO,UT,NV
13. ZN	AZ,NM
14. PC	AK,HI,WA,OR,CA

Source: Energy Information Administration. Office of Integrated Analysis and Forecasting.

Appendix G

Conversion Factors

Table G1. Heat Rates

Fuel	Units	Approximate Heat Content
Coal¹		
Production	million Btu per short ton	20.411
Consumption	million Btu per short ton	20.276
Coke Plants	million Btu per short ton	27.426
Industrial	million Btu per short ton	22.473
Residential and Commercial	million Btu per short ton	22.948
Electric Power Sector	million Btu per short ton	19.966
Imports	million Btu per short ton	25.000
Exports	million Btu per short ton	26.108
Coal Coke	million Btu per short ton	24.800
Crude Oil		
Production	million Btu per barrel	5.800
Imports ¹	million Btu per barrel	5.980
Petroleum Products		
Consumption ¹	million Btu per barrel	5.357
Motor Gasoline ¹	million Btu per barrel	5.215
Jet Fuel	million Btu per barrel	5.670
Distillate Fuel Oil ¹	million Btu per barrel	5.799
Residual Fuel Oil	million Btu per barrel	6.287
Liquefied Petroleum Gas ¹	million Btu per barrel	3.618
Kerosene	million Btu per barrel	5.670
Petrochemical Feedstocks ¹	million Btu per barrel	5.527
Unfinished Oils	million Btu per barrel	5.825
Imports ¹	million Btu per barrel	5.473
Exports ¹	million Btu per barrel	5.753
Natural Gas Plant Liquids		
Production ¹	million Btu per barrel	3.724
Natural Gas¹		
Production, Dry	Btu per cubic foot	1,027
Consumption	Btu per cubic foot	1,030
End-Use Sectors	Btu per cubic foot	1,031
Electric Power Sector	Btu per cubic foot	1,025
Imports	Btu per cubic foot	1,023
Exports	Btu per cubic foot	1,009
Electricity Consumption	Btu per kilowatthour	3,412

Btu = British thermal unit.

¹Conversion factors vary from year to year. Values correspond to those published by EIA for 2004 and may differ slightly from model results.

Sources: Energy Information Administration (EIA), *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005), and EIA, AEO2006 National Energy Modeling System run AEO2006.D111905A.